Animism in Thought and Language

by

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Abstract

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This dissertation has two principal lines of development. The first challenges the conventional assumption that the animistic outlook of children and the biological outlook of adults represent developmentally distinct psychologies and world views. In particular, it is argued that animism in children does not represent a naive theory of biology, and that mature biological theories do not function as radical replacements for animism, despite their universal effect of inhibiting animistic expression as they claim first semantic rights to the word *alive*.

Phenomenologically, both young and old are oriented to their own lives in terms of their own embodiment, purposiveness, and activity (EPA). These modes of relating to one's own life give rise to animistic predispositions, since EPA sensitivities not only disclose one's own being, and the being of others, but also draw inanimate entities to the forefront of one's attention when they are also in some sense embodied and involved in purposive activities and hence, in some sense, of like kind. Evidence for the perseverance of animistic sentiment and norms into adulthood is presented from psychological, neurological, literary, and anthropological sources.

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In its second line of development, the dissertation argues that perseverant animistic sentiment and norms universally give rise to two classes of linguistic effects. First, figurative senses of life- and death-related expressions are dominated by animistic sentiment. Second, the norms of a crosscultural animism hierarchy are reflected in the norms of a crosslinguistic ANIMACY hierarchy: e.g., the likelihood that nouns will be classified as ANIMATE corresponds to the likelihood that animists will label their referents as alive.

Four empirical studies support these psycholinguistic theses. In Study 1, college students' figurative judgments of the relative aliveness of 32 entities are related to judgments of relative EPA status, and also related to the crosscultural animism hierarchy and the crosslinguistic ANIMACY hierarchy. Study 2 provides a replication. Study 3 relates these findings to a comparable study with animistic preschoolers. Study 4 correlates the aliveness ranks of the entities in Study 1 with their ANIMACY ranks in the Navajo ANIMACY system, an elaborate system according completely with the crosslinguistic ANIMACY hierarchy.

Eve E. Sweetser — 17 Nov. 1992

Chair — Date

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Chapter One
Introduction

1.1 The Scope of the Project

In the late 1920's and early 1930's, some of Jean Piaget's most compelling writing on the child's conception of the world concerned a phenomenon which he called 'childhood animism'. Childhood animism was the tendency in children to attribute life and consciousness to inanimate entities such as sewing machines, rivers and lightning, while at the same time denying life to biologically alive but quiescent entities such as trees or barnacles. It is clear from Piaget's early work, and from the work of his successors, that children in their extreme youth possess an intuitive holistic conception of life which is only imperfectly informed by biological understanding. The child first comprehends life on the model of his or her own life: to be alive is to have a body, and to deploy this body toward purposive ends. For the child, the body is a design for action, and the purposes and activities which are articulated through the body are as much a property of a living thing as are the biological features of the body. The child may say that a table is alive because it has legs, or that the sun is alive because it gives us heat and lights our way, or that a river is alive because it goes and goes. Having a body, having a purpose, being active: these are the things that count when the child decides what is and is not 'alive.' Piaget claimed that this interpretation of the nature of life was transmogrified in late childhood as children matured cognitively and acquired knowledge of biology and of the true mechanisms of physical causation.[1]

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[1]Though Piaget spoke of animism as the tendency to attribute life and consciousness to nonliving things, he also recognized that attributions of consciousness were to some degree independent of attributions of aliveness. Both phenomena are of interest here; however, it is the conceptualization of life and the use of the word *alive* which are of paramount concern. Therefore, in presenting original positions, the word *animism* will be used with the following sense:

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Piaget's essential findings have been replicated in many cultures: the universality of childhood animism is very secure. However, certain findings since the 1950's have imperiled Piaget's claim that the animistic thought tendencies of children are extinguished with cognitive maturity and the acquisition of scientific understanding. Several experimental studies comparable to the ones conducted with children demonstrate a tendency in adults to express animistic views, even when biological rigor is actively encouraged. Additional evidence arises from neuropsychological studies of adult aphasics who have naming difficulties sensitive to the alive-inanimate distinction. Arguably, the finer aspects of these patients' impairments indicate how they internally structure the category of {living things}. There is some evidence that this structure is not what would be predicted by strict biological criteria, though it accords with the animistic category structure of children. Further evidence for the perseverance of animistic category norms in adulthood arises from literary research which has found that the frequency with which human beings are fictionally transformed into another type of entity (e.g., mammal, insect, tree) corresponds to the likelihood that that type of entity will be judged alive by animists. It appears that adults' judgments of human-nonhuman similarity, and hence tranformability, reflect the gradient norms of animistic appraisal. Anthropological studies demonstrate that the inanimates most likely to be judged alive by animists are also the inanimates most likely to be deified in a mythology or a magicoreligious system. Finally, the enduring animistic sensibilities of adults are attested in a general way by anthropological studies of the animistic-

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Animism: a mental orientation which permits assertions that nonliving entities are alive, as well as assertions that living entities are not alive.

A few other word usage clarifications may be useful:

Animacy: the common biological status of animals and plants.
Animates: any living entities, including humans, other animals, and plants.
Inanimates: any nonliving entities or objects of contemplation, including liquids, solids, gases, and abstract concepts.

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ally colored way that judicial institutions dispose of objects involved in crimes; e.g., by ritualized destruction or banishment.

These psychological, neuropsychological, literary and anthropological findings have yet to be fully integrated into our understanding of the animistic attitude. It is one mission of this dissertation to promote this integration and to argue, on the basis of these studies and from original research, that the animistic sensibilities of the child do persevere into adulthood where they co-exist — sometimes not too comfortably — alongside more scientific views. This dissertation will thus oppose the Piagetian position that the animism which flourishes in childhood expresses a cognitive orientation to the world which is relativistically distinct from the analyticity of adults. In arguing for the perseverance of animistic thought activities in adults, the dissertation will be dismantling a traditional argument for conceptual relativity between adults and children.

The true relationship, and the contiguities, between the animistic (or holistic) conception of life and the biological (or criterial) conception of life will be examined in some detail. Just as the animism of children and the biology of adults have been long regarded as relativistically distinct, there has been a tendency among some contemporary psychologists and linguists to regard holistically defined concepts and criterially defined concepts as fundamentally incompatible. This dissertation will explicate the interactivity of animistic and biological conceptions. Certainly there is a dissonance between classical categories characterized by necessary and sufficient criteria, and nonclassical categories characterized by less determinate phenomenologies of mentation. However, close inspection reveals that the biological conception of life does not really fit the mold of a rigidly defined classical category, as is typically presumed. In addition, the animistic conception of life provides part of the ground out of which the biological conception of life developmentally (and historically) emerges. It is likely that many other categories which are presumed to have classical specifi-

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cations actually have origins involving holistic thought processes and fail to attain classical ideals. In demonstrating contiguities between the biological and animistic conceptions of life, this work will align itself with others which are chary of the view that category formation is a bipartite process, rigid and Spartan in some cases while expansive and Athenian in others. We note that the earliest relationship between Sparta and Athens was one of alliance; only after much development had taken place did enmity arise.

This dissertation will argue, as its master thesis, that perseverant animism in adults gives rise to two broad classes of linguistic effects in languages around the world. First of all, it can be crosslinguistically observed that adults use the words *alive* and *dead* figuratively in much the same way that young children use these words animistically; viz., to focus in on the embodiment, purposiveness, and activity of entities which stand out for them in the world. In English, for example, 'to bring an idea to life' means to physically realize the idea; i.e., to 'embody' the idea as a physical fact. Purposiveness is focussed when it is said that a cause has 'taken on a life of its own'. Activity is focussed when it is said that someone is a 'live wire,' or that an engine has 'died' or 'come to life,' or that a party is 'dead' or 'live,' or that a debate has 'livened up' or 'died down.'

Secondly, it can be crosslinguistically observed that formal (and not so formal) ANIMACY distinctions in languages tend to distribute the entities of the world into just the same groups and hierarchies that young children form when they animistically assess the life status of the things around them.[2] The puzzler about ANIMACY as a semantic dimension of nouns has always been that it does not align well with our technical notion of animacy as a biological status. It

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[2]ANIMACY: a semantic dimension of nouns according to which nouns are classified into two or more groups (e.g., ANIMATE v. INANIMATE) and treated differently in the language as a consequence of this categorization. The relationship between linguistic ANIMACY and biological animacy is at least as tenuous as the relationship between linguistic GENDER and biological gender.

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sometimes occurs that inanimates are categorized as ANIMATE, and that animates are categorized as INANIMATE. In Chinantec, which applies ANIMATE or INANIMATE affixes to all nouns, the sun and the moon and the stars and lightning are classified as ANIMATE, while plants are classified along with stones as INANIMATE. Further, a language may recognize graduated levels of ANIMACY, while biological animacy is essentially a binary distinction. In Navajo, eight different levels of ANIMACY are distinguished — and here again lightning is assigned to a higher ANIMACY class than plants. This dissertation will argue, on the basis of such observations and from original empirical research, that perseverant animism in adults is universally the causal ground for the development of linguistic ANIMACY systems, and of life- and death-related tropes in language. It will be argued that these two broad classes of linguistic conventions are simply additional forms of perseverant animism in adults, forms which are codified in our languages as external expressions of our interior mental life.

In its course, this dissertation will explore the phenomenology of animistic sensibilities, which is another way of saying that it will explore the semantics of the animistic concept of life. The position being taken here is that there is no difference between an explication of the phenomenology of animistic judgments and an explication of the semantics of the word used to advance those judgments. It is not necessary to develop separate phenomenologies to speak of how the mind is exercised animistically and how the word *alive* is exercised animistically. For those who feel that a discussion of semantics is something other than a discussion of mind, the approach practiced here will be unforgiveable. For others, the work here is intended as a demonstration of the kind of eclecticism and sensitivity which is required for a semantics to properly acknowledge the phenomenological unity of our linguistic and nonlinguistic ways of life.

It has already been hinted that a phenomenological appraisal of the animistic concept of life will require that the phenomenology of embodiment, purposiveness, and activity (henceforth EPA) be ad-

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dressed. It is the entities in the world which are more embodied and more purposive and more active which show up animistically as more alive. This is to say that EPA considerations form the causal ground out of which the aliveness of entities is animistically judged; EPA considerations are the main, recurrent themes of animistic appraisal. It can be said, then, that embodiment and purposiveness and activity are the principal semantic dimensions of the animistic concept of life. One of the tasks of the dissertation is to develop a fuller characterization of what it means for an entity to be more 'embodied' or 'purposive' or 'active,' since it is obvious from the outset that these are not simply traditional semantic features, but phenomenological complexes requiring individual clarification.

In tandem with its implications for cognitive semantic theory, the dissertation will have implications for linguistic methodology in its promotion of interdisciplinary inquiry, its promotion of rigorous analyses of figurative word use, and its promotion of experimental — rather than merely introspective — investigation of semantic categories. The dissertation will advocate an expansive practice of linguistics rather than a linguistics narrowly or formalistically conceived.

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1.2 An Outline

Chapter Two explicates and reassesses the phenomenon of animism as it appears in both children and adults. The first section of the chapter describes the historical development of the concept of animism in the field of anthropology, and details how this concept came to be applied in developmental psychology by Piaget. The section emphasizes that, historically, those scholars who have denied animistic tendencies in adults have not done so on the basis of empirical findings so much as on the basis of a broad, soft prejudice that the mental life of 'civilized, rationalistic' adults was relativistically distinct from the mental life of children and primitive peoples. In fact, this hypothesis of pervasive cognitive relativity between adults and children is empirically disconfirmed, especially insofar as it is instantiated as a Piagetian scheme of global, stage-wise, developmental transformation.

The second section of Chapter Two presents the findings of empirical investigations of animism in a way that supplements and revises the classical view of animism along four main lines. One of these themes of supplementation regards the necessity to reject the classical system of animistic stages proposed by Piaget. It is argued that the stages are not defined in coherent ways, that they are not properly isolable, and that they cannot be associated with any particular age ranges.

A second theme of supplementation regards the semantic problems of investigating and interpreting animistic behavior. The central problem confronting investigators is always what the animist *means* when he says that such and such an entity is 'alive,' since the only thing that is at first reasonably certain about such statements is that they are not intended to entail all of the biological commitments which normally attach to literal, considered attributions of life.

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The question of what the animist means dovetails with a third theme of supplementation: the variability and evanescence of animistic behavior. The inconsistency of animistic attributions and rationales forms an important part of an argument that animism is less a system of causal/biological beliefs than a pattern of situated subjective reactions to the changing dramatic foci of the presentational world.

Questions relating to animists' beliefs and communicatory intentions are part and parcel of the fourth, most farreaching theme of supplementation: the developmental complexity of relationship between animism on the one hand, and biological, causal, and metaphoric understanding on the other. It is argued that animistic sensibilities and animistic expression are always sensitive to causal and biological knowledge, and become increasingly mediated by maturing causal and biological theories, but that the causal and biology theories of the older child (and adult) do not function as replacements for animistic perspectives. It is argued that, since animism never really serves as an early theory or system of causal or biological beliefs, one should not assume that it is replaced by more veridical theories or systems of belief. In fact, convergent empirical evidence from diverse sources suggests that animistic sensibilities do persevere into adulthood in much the same form that they are found in children. These sources include, most notably, direct psychological investigations of animism in adults.

The second section of Chapter Two closes with the observation that tensions between animistic and causal-biological perspectives are principally resolved in the adult by saying of animistic expressions that they are not intended literally. Rather, it is the biological perspective which is accorded first semantic rights to the predicate *alive*. This phenomenon is taken to be a universal demonstration that criterially structured categories are cognitively preferred and accorded greater prestige than categories of less determinate structure and greater subjective content.

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The third section of Chapter Two seeks to clarify the enduring appeal of animistic perspectives by clarifying the phenomenology of animistic appraisals. It has long been recognized that animistic attributions are projective in nature, and imbued with subjectivity in a way that biological attributions are not. They are responses to entities which are regarded as being like ourselves, in some fashion. This section develops the thesis that we primary understand ourselves as entities which are embodied, purposive and active — where these terms are taken to represent whole phenomenological complexes of key human attributes. Because we are always directed toward these aspects of our own being, we are constituted as detectors of other beings which are embodied, purposive and active, as well. In the process of detection, entities which are not bona fide beings may also be advanced to the forefront of our attention. It is these entities which become the objects of animistic attributions, whether or not these entities are actually regarded as other beings. In particular, content analyses of the rationales offered by animists for their attributions of life serve to establish the relationship between animistic projection and the EPA-attunedness central to human self-understanding.

Chapter Three argues that the perseverance of animistic sensibilities in adults gives rise to two classes of linguistic phenomena. The first major section of the chapter uses English data to argue that nonbiological senses of life- and death-related words are dominated by senses which animistically focus on the embodiment, purposiveness, and activity of entities in the world. The second major section of the chapter argues that ANIMACY governed phenomena are also under the principal control of animistic sensibilities. In particular, there are numerous ways in which the structure of a crosslinguistic ANIMACY hierarchy accords with the structure of a crosscultural animism hierarchy, while diverging from biological models of animacy. For example, the likelihood that a noun will be classified as ANIMATE in a language corresponds to the likelihood that the referent of that noun will be regarded as alive by animists. To take a second example, ANIMACY classifications may be hierarchically

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graded, just as animists may affirm that some entities are more alive than others. In sum, it is contended that perseverant animistic modes of appraisal in adults provide the causal ground for a good deal of the figurative use of life- and death-related words, and a good deal of the ANIMACY phenomena which are observed in languages worldwide.

Chapter Four presents four original studies designed to empirically test the claims regarding the perseverance of animistic sensibilities into adulthood, the relationship between animistic sensibilities and EPA considerations, and the continuities between animistic sensibilities and the sensibilities represented in figurative speech and ANIMACY phenomena. In Study 1, college students were presented with pairs of entities and asked to intuitively judge which entities were, *in a manner of speaking*, 'more alive,' 'more embodied,' 'more purposive,' and 'more active.' The results show a strong relationship between figurative intuitions of relative 'aliveness,' and intuitions of relative 'embodiment,' 'purposiveness,' and 'activity.' In addition, the overall pattern of judgments of relative 'aliveness' is in strikingly ways isomorphic with the crosscultural animism hierarchy (and the crosslinguistic ANIMACY hierarchy). These results demonstrate that animistic norms and the EPA sensitivities which underlie them can be readily evoked from an adult population, under conditions where it is specifically allowed to set biological doctrine aside.

Study 2 presents a partial replication of Study 1 in a sample of high school students. This is particularly interesting in that some evidence suggests that older high school students are among those least likely to express overtly animistic views.

Study 3 elicits judgments of relative aliveness from animistic preschoolers who were presented with a subsample of the entities presented in Studies 1 and 2. The aliveness hierarchy obtained from the preschoolers is compared with the hierarchies obtained from the college and high school samples. Again, the agreement between hier-

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archical intuitions is striking, as is the correspondence between these intuitions and the hierarchical distribution of entities in ANIMACY systems around the world.

In Study 4, it is demonstrated that the rank order of the entities in the college students' 'aliveness' hierarchy correlates very impressively with the rank order of these entities in the Navajo ANIMACY hierarchy, an elaborate system whose details accord completely with the crosslinguistic ANIMACY hierarchy.

It is argued that these four studies empirically demonstrate contiguities between animistic appraisal in overtly animistic children, figurative intuitions of relative 'aliveness' in English speaking high school and college students, and the crosslinguistic norms of ANIMACY ranking, as exemplified by the Navajo ANIMACY system. The general interpretation of these findings is that the animistic norms of childhood are preserved into adulthood, where they may be conventionalized in figurative expressions or codified as norms for ANIMACY ranking phenomena.

The first section of Chapter Five presents a summary and general discussion. The second section presents, retrospectively, a schematic diagram of the master argument structure of the dissertation. The individual arguments developed in the dissertation are listed retrospectively and portrayed as links in a tetrahedral structure.

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Chapter Two
Animism

2.1 Conceptual Aspects of Animism

This section will describe the historical development of the concept of childhood animism, and will review the basic structure of the concept as it came to be formulated by Piaget. However, the section is intended as more than a review. It will also begin to address the question of why most researchers in the last 100 years, and Piaget in particular, have acted to repress the notion that animistic tendencies persisted into adulthood — this, in opposition to earlier commentators and contrary to observed facts. In order to argue that perseverant animism in adults produces certain effects in language, it is first necessary that perseverant animism in adults be made credible. This will require a broad reassessment of the Piagetian precept, masquerading as 'common sense,' that animism ceases in late childhood. The reassessment begins here. It will be shown that the denial of animism in adults has always been accompanied by a prejudice that adults were rational thinkers while children (like primitives) were not, and that there existed a relativistic gulf between the intellectual and scientific objectivity of adults and the emotional and pretheoretical subjectivity of children (or primitives). This prior commitment to relativity between thought modes and to relativity between adults and children (or primitives) has predetermined that observable animism in adults would be regarded as anomalistic, and be minimized, made light of, or ignored.

2.11

Prior to Piaget, many observers of human nature had commented on animistic tendencies in adults and in children, and speculated about the relationship between mental processes of projection, animistic attributions of life, and the formation of religious ideas (see Dennis, 1938 and DelVal, 1975:21-42;64-68 for reviews). Zenophanes is believed to have written circa 540 B.C. that if horses

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and oxen thought in the human manner they would imagine gods in the forms of horses and oxen. David Hume elaborates this insight in a well known passage from *The Natural History of Religion.* He speaks about how the "ignorant multitude" has always reacted apprehensively, and projectively, to the "unknown causes" of the natural order.

> There is an universal tendency among mankind to conceive all beings like themselves, and to transfer to every object, those qualities, with which they are familiarly acquainted, and of which they are intimately conscious. We find human faces in the moon, armies in the clouds; and by a natural propensity, if not corrected by experience and reflection, ascribe malice or good-will to every thing, that hurts or pleases us. Hence the frequency and beauty of the *prosopopœia* in poetry; where trees, mountains and streams are personified, and the inanimate parts of nature acquire sentiment and passion. And though these poetical figures and expressions gain not on the belief [i.e., are not accepted as literally true], they may serve, at least, to prove a certain tendency in the imagination, without which they could neither be beautiful nor natural ... Nay, philosophers cannot exempt themselves from this natural frailty; but have oft ascribed to inanimate matter the horror of a *vacuum*, sympathies, antipathies, and other affections of human nature. (1757:29f)

We note with appreciation Hume's sensitivity to language in his remarks on how the text of poetry may supply us with a subtext of mind.

The earliest observations of animism in children are found in Tiedemann (1787), who, like Hume, held that the animistic tendency

> is certainly due to the fact that one always envisages an unknown thing through one that is known; ... now there is nothing nearer and more familiar to us than ourselves, wherefore images of our own reactions, our own way of doing things, are constantly mingled with our ideas of external objects; therefore; we conceive all things as being like us, alive as ourselves, and acting by the same powers and motives as we do. (1787:229)

In a subsequent essay, Maine de Biran echoed, not only this theme of projection, but also the conviction that children's animistic tendencies persisted throughout the lifetime, giving rise to magical beliefs.

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> As the child, misled by some rough resemblances in form, clothes, etc., applies to the stranger the tender name of father, so the man — still a child — extends his *ego* over the whole of nature, attributes his will, his own activity, to all that sustains with him the general relation of mobility, animates with his soul the stars, the clouds, the rivers, the plants, and peoples with genii, with active powers, the sky and the earth. (1803:227)

Auguste Comte, in his *Positive Philosophy,* proclaimed that the earliest form of religion was

> a complete and usually very durable state of pure Fetichism, which allowed free exercise to that tendency of our nature by which Man conceives of all external bodies as animated by a life analogous to his own, with [only] differences of mere intensity. (1830-42, II:155)

The aboriginality of fetishism was presumed to be proved by the observation of these tendencies in primitives, and also in children, whose course of individual mental development recapitulated the course of mental evolution.[3]

> But, though we are too distant from fetichism to form a just conception of it, each one of us may find in his own earliest experience a more or less faithful representation of it. (1830-42, II:157)

In a wonderful crescendo of radical thinking, Comte insisted that the fetishistic/animistic tendency was, broadly speaking, characteristic of higher animals as well. Comte envisioned a simple experiment which would demonstrate the matter, while allowing for relativistic differences between the parties tested.

> If, for instance, we exhibit a watch to a child or a savage, on the one hand, and a dog or a monkey, on the other, there will be no great difference in their way of regarding the new object, further than their form of expression: — each will suppose it a sort of animal, exercising its own tastes and inclinations: and in this they will hold a common fetichism, — out of which the one may rise, while the other cannot. (1830-42, II:156f)

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[3]In reporting on the works of earlier scholars, it should be noted that peoples regarded as 'primitive' in earlier times included peoples whose cultures would not be regarded as primitive today. We have come a long way in our appreciation of the complexity of less technologically advanced societies.

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Foreshadowing Piaget, Comte theorized that human ideas and conceptual styles developed through a series of stages (the Law of the Three States), but allowed that ascension to the higher stages did not completely obliterate the earlier patterns of thought.

> We may recognize some features of that [earlier fetishistic/animistic] state in our own condition of mind when we are betrayed into searching after the mode of production of phenomena, of whose natural laws we are ignorant. ... A man who smiles at the folly of the savage in taking the watch for an animal, may, if wholly ignorant of watch-making, find himself surprised into a state not so far superior, if any unforeseen and inexplicable effects should arise from some unperceived derangement of the mechanism. (1830-42, II:157)

2.12

The first to employ the word *animism* in connection with the thought tendencies of primitives and children was Edward Burnett Tylor, whose seminal *Primitive Culture* (1871) was wholly devoted to a discussion of animism and the "doctrine of souls." Tylor borrowed the word from Georg Ernst Stahl, who had coined it from the Latin *anima* 'breath, life, soul' in 1720. Stahl was a chemist, a physician to the king of Prussia, and the principal originator of the theory of phlogiston. Stahl believed that the biological processes of all living organisms were regulated by an immaterial soul and that, further, an *anima mundi* suffused the physical universe, organizing and regularizing the natural order. Tylor appropriated the word for his epic argument that a belief in the existence of souls was the origin of the world's religions.

Tylor proposed that the metaphysical curiosity of early peoples was piqued by two great riddles: the question of what animates the living body over the corpse, and the question of how one's own ego exits the body, and how other egos seem to visit, in dreams and visions. Tylor speculated that early thinkers deduced from these phenomena the existence of a "ghost-soul" which could inhere in or depart from corporeal forms. The ghost-soul was on the one hand a vitalizing principle which imparted life. On the other hand, it was a

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phantom which could silkily appear in dreams, visions, or other altered states. Since early peoples tended to believe in the universal animation of nature, and since all things made appearances in altered states of consciousness, all worldly entities were believed to possess ghost-souls. These early views were inferred by examining the views of primitive peoples, "who have departed least from primitive conditions" (1871, I:284).

> Thus, when in surveying the quaint fancies and wild legends of the lower tribes, we find the mythology of the world at once in its most distinct and rudimentary form, we may here again claim the savage as a representative of the childhood of the human race. (*Ibid.*)

The figurative use of "childhood" was here quite apt, since Tylor continuously emphasized the childlike quality of these ideas, and the projective use to which they were put; viz., to explain the mysteries of biology and causation which were beyond the ken of children and primitives (1871, II:184f).

> [T]he more we compare the mythic fancies of different nations, in order to discern the common thoughts which underlie their resemblances, the more ready we shall be to admit that in our childhood we dwelt at the very gates of the realm of myth. In mythology, the child is in a deeper sense than we are apt to use the phrase in, father of the man. (1871, I:284)

> Even in civilized countries, [this "doctrine of universal vitality"; this belief in animating souls] makes its appearance as the child's early theory of the outer world, nor can we fail to see how this comes to pass. The first beings that children learn to understand something of are human beings, and especially their own selves; and the first explanation, as though chairs and sticks and wooden horses were actuated by the same sort of personal will as nurses and children and kittens. (1871, I:285f)

> Conformably with that early childlike philosophy in which human life seems the direct key to the understanding of nature at large, the savage theory of the universe refers its phenomena in general to the wilful action of pervading personal spirits. It was no spontaneous fancy, but the reasonable inference that effects are due to causes, which led the rude men of old days to people with such ethereal phantoms their own homes and haunts, and the vast earth and sky beyond. Spirits are simply personified causes. (1871, II:108)

Between modern and savage philosophies there was a "vast intellectual tract." Notwithstanding, there were continuities of

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animism between primitive and civilized peoples. Outside of religion, these were revealed in animistic conventions of language and poetry, in spontaneous animistic outbursts and, occasionally, even in contemporary times, in deviant scientific theories (1871, I:286f, 291f, 300ff; II:181ff).[4] Animism proceeded where people proceeded, in essential sentiment unchanged.

> Animism characterizes tribes very low in the scale of humanity, and thence ascends, deeply modified in its transmission, but from first to last preserving an unbroken continuity, into the midst of high modern culture. (1871, I:426)

> [T]he conception of the human soul is, as to its most essential nature, continuous from the philosophy of the savage thinker to that of the professor of theology. ... The theory of the soul is one principal part of a system of religious philosophy, which unites, in an unbroken line of mental connexion, the savage fetish-worshipper and the civilized Christian. (1871, I:501f)

These views were to become enormously influential in the fields of anthropology and comparative religion. Two generations of students sat at Tylor's knee. Below, the positions of Hume, Tiedemann, Maine de Biran, Comte and Tylor are summarized in Table 1.

	Animism viewed as a phenomenon of :			
	Higher Animals	'Primitives'	Children	'Civilized' Adults
Hume		X	X	X
Tiedemann			X	X
Maine de Biran		X	X	X
Comte	X	X	X	X
Tylor		X	X	X

Table 1. Views on the Range of Animism

[4]One might take as an example Gustav Theodor Fechner, the German physicist and experimental psychologist who conceived of the cosmos as highly animistic in a theoretical vision strongly influenced by Spinoza. He regarded the earth as a self-moving organism, and regarded the animacy of plants and planets and stars as being of like kind.

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It can be assumed that the thinking of many others was in accord with the thinking of these luminaries; hence, that animism was once widely regarded as active in the psychology of civilized adults. But this view was not to last. It was to be banished by the ascendancy of intellectual systems which argued or were taken to imply that profound *relativistic* differences separated the mental life of civilized adults and the mental life of primitives and children. Following Tylor, it was going to be 70 years before anyone would again point out with pleasure the animistic continuities between children and adults.[5]

2.13

The first thought system arguing for the relativistic uniqueness of adult mentality was Darwinism, as it was misinterpreted and abused by social scientists. Following *On the Origin of Species* (1859) and the *Descent of Man* (1871), primitive peoples were broadly regarded by educated folk to be *less evolved* editions of human beings. Viewing primitives as less evolved was qualitatively different from viewing them as just inferior and brutish. Much of the European peasant class was inferior and brutish, by educated accounts. With the rise of evolutionism, the chasm between primitives and civilized peoples came to be regarded by many as a chasm of ages, rather than a rift of intelligence, of temperament, and of quality of culture. In part this was manifested as a heightened dis-

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[5]Piaget was potentially familiar with each of these works. The passage from Hume was later quoted by Tylor (1871) and by Freud (1913), and Piaget (1926b) demonstrated a good knowledge of these works. Though Tylor is only denounced in passing (1926b:239), it is nevertheless clear that Piaget had read Tylor closely, since some of his knowledge of the work of William James and Max Müller obviously had *Primitive Culture* as its source (*cp.* Piaget, 1926b:250 and Tylor, 1910,I:301,304; and also Piaget, 1926b:208 and Tylor, 1910,I:298f). Piaget's disdain for Tylor was the consequence, or obverse, of his reverence for Lévy-Bruhl in the 1920's. The fact that Lévy-Bruhl had written a book on Comte (1900) increases the already good chance that Piaget was familiar with Comte's *Positive Philosophy*. It is inconceivable that Piaget was not aware of Tiedemann's views. Finally, Piaget (1926b) demonstrates at least some knowledge of the work of Maine de Biran.

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inclination for social scientists to emphasize parallels between civilized and primitive adults.

At that time generally, it was felt that, if primitive mentality had a counterpart in the civilized world, it was only in the mentality of children. Some speciously adapted Ernst Haeckel's biological edict that ontogeny recapitulates philogeny (1867), and held that the mental development from childhood to adulthood was a reverberation within the individual of the evolutionary wave that had produced modern humans, and by which Western peoples had ascended above their primitive cousins.

Such views were epitomized by the remarks of Professor Draper (1860) in "On the Intellectual Development of Europe," as reviewed in the *Report* of the British Association for the Advancement of Science, one principal forum for Darwinian ideas. Draper first drew parallels between a) the successive stages of development in each modern individual; b) the profusion of contemporary life forms, which anyone might array from lower to higher; and c) the evolutionary succession of life forms through geologic time.

> In these three lines of life he maintained that the general principle is to differentiate intelligence from instinct. In man himself three distinct instrumental nervous mechanisms exist, and three distinct modes of life are perceptible, the automatic, the instinctive, the intelligent. They occur in epochal order, from infancy through childhood to the more perfect [adult] state.
>
> Such holding good for the individual, it was then affirmed that it is physiologically impossible to separate the individual from the race, and that what holds good for the one holds good for the other too, and hence that man is the Archetype of Society, and individual development the model of social progress, and that both are under the control of immutable law ...

The cognitive progression from the automatic to the instinctive to the intelligent was said to accord with the cultural progression from Greek to Roman to European civilization. Draper went on to draw finer analogies between five stages in individual development and five stages in the development of Greek mental life. Modern European civilization was said to be in the fourth stage of its cycle.

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And all of these developments, like spheres within spheres, or clocks within clocks, were driven by the same lawful mechanisms of evolution.

Draper's views were not atypical for his time, as witnessed by the emergence of Social Darwinism as a powerful social philosophy, regardless of the fact that it had no legitimate claim whatsoever to Darwinism, veridically conceived.[6] Though most psychologists of that era stopped short of supposing, like Draper, that the ontogeny of mind recapitulated the philogeny of mind, there was everywhere an implicit intellectual decorum which regarded the mental caste of the primitive as of like kind with that of children, neurotics, or the mentally compromised. What should be said in sum is that there was always a tendency to associate primitive thought with the thought of children, and to recognize a qualitative distinction between the thought activities of these parties and the thought activities of civilized adults, but that these tendencies were *greatly accentuated* by the incursion of evolutionary motifs into the discussion of psychosocial differences. It was one thing to admit to uncivilized or childlike elements in one's own mentality; it was quite another thing to acknowledge these elements when they were cast as unevolved or atavistic.

The second thought system arguing for incommensurable differences between the mentalities of civilized and primitive peoples was that system of conceptual relativity advanced by Lucien Lévy-Bruhl to oppose Tylor's claim of continuity between "the savage fetish-worshipper and the civilized Christian." With the coming of a new century, Tylor's account of the monogenesis and unilinear evolution of religion was assailed by critics of note. These included Andrew Lang (1898), R. R. Marett (1900; 1914), Émile Durkheim (1912) and, as mentioned, Lucien Lévy-Bruhl (1910). In the course of

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[6]Neither did any social 'applications' of evolutionary theory win the support of Darwin, who declined, for example, to have dedicated to him the first English edition of *Das Kapital.*

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this reevaluation, Tylor's account of animism lost its status as the universal principle of religious invention that it once had seemed to be.

For one thing, the diversity of magicoreligious systems in primitive cultures spoke against the idea that they had all arisen from a single metaphysical impulse, or proceeded along a single developmental track. Lang cited numerous examples of "high gods of low races" where what was worshipped was not a blithering of spirits, but a bureau of "magnified non-natural men," with nothing ethereal about them. Lang opined that the mystery of creation had encouraged such primitives to anthropomorphize their deities as the heroic designers of the natural order. This suggested that different cosmological preoccupations tended to foster different forms of religion; i.e., that a preoccupation with visions and dreams encouraged animism, while concerns over the mechanism and magnitude of creation encouraged mythology. Certainly, the new data contributed by Lang and other anthropologists gave flight to the claim that one form of religion necessarily preceded another.

Marett, as early as 1899, criticized the intellectualism which Tylor imputed to primitives. Marett doubted that the rational capacities of primitive peoples were sufficient for the thinking out of animistic philosophies. It was more likely the case that animistic stages of thought were preceded by a "preanimistic" stage in which primitives regarded some but not all inanimate entities as alive, and entertained vague superstitions and magical beliefs regarding their willful exercise of power. Only gradually would this "preanimism" issue into animism proper, with its postulation of souls. Animistic precepts might then rationalize customs which were already in existence, but this would be a case of thought tidying up after mystical sentiment. Marett held that religious practices originated in response to vague if deeply felt compulsions rather than rational considerations, and that such practices could be well on their way to institutionalization before their content was ever philosophically appraised.

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This criticism interlocked with those of Durkheim and his followers, who objected that the thought scenario which Tylor claimed had led to animism could only be scripted at the level of individuals, and not at the social level at which religious institutions were formed. Religion was a social fact: it was a matter of "collective representations" (Durkheim and Mauss, 1903; Durkheim, 1912), and the sociological laws which governed the formation and succession of collective representations were not reducible to the laws of psychology which might apply to an individual's thought progressions.

Lévy-Bruhl was at that time closely associated with Durkheim and Marcel Mauss, and well appreciated the specious intellectualism and sociological shortcomings of Tylor's work. Lévy-Bruhl ridiculed Tylor's postulation of "savage philosophers," and rigorously developed the antithetical idea that the mentalities of primitive and civilized peoples were radically distinct because the fundamental laws governing their collective representations were radically incompatible. Whereas the thinking of civilized peoples was rationalistic and dependent upon logic, the thinking of primitives was "prelogical" or "mystical" and not answerable to logical laws. Lévy-Bruhl's *Les Fonctions Mentales dans les Sociétés Inférieures* (1910) offered a deep elaboration of the hypothesis that groups appearing on the surface to be just culturally distinct might, in their psychology, be estranged by relativistic differences in world view. It is fair to say that Lévy-Bruhl was the first in history to clearly express the concept of conceptual relativity — here, inextricably linked with cultural relativity.

It should be pointed out that Lévy-Bruhlian relativity differed from the Darwinesque relativity already discussed in that it did not presuppose that cognitive deficiencies or atavisms were the cause of the relativistic differences at issue. Lévy-Bruhl did believe that primitive mentality evolved toward the mentality of civilized peoples. But he did not believe that primitive mentality was the result of mental deficiencies in primitives. For all peoples, men-

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tality was imposed by the collective representations — in a sense, the cognitive style — of the society. The evolutionary process whereby primitive mentality became civilized was not a redress of innate cognitive deficiencies, but the acquisition of higher, logic-based formats for the deployment of basic cognitive abilities. The ascent of humankind coincided with the ascent of logic. Permeating Lévy-Bruhl's account of anthropological relativity was this cognitive distinction between logical and "prelogical/mystical" modes of thought.

For Lévy-Bruhl, the relativistic enterprise was fairly underway just as soon as he came to terms with what it meant for there to be "collective representations" at all. In the lexicon of the Durkheimian school, the term referred to the normative social constructs according to which natural and social reality were understood by the individuals in a society. One might say that collective representations were the mental 'possessions' which individuals shared by virtue of their common acculturation. But for Lévy-Bruhl, it was not so much the case that the mind (or society) was in possession of collective representations, as that the mind (and society) was constituted by them. Just as culture was a mental fact, so was mind a cultural fact.

> A definite type of society, with its own institutions and customs, will therefore necessarily have its own mentality. Different mentalities will correspond with different social types, and all the more because institutions and customs themselves are at bottom only a certain aspect of collective representations, only these representations considered objectively, as it were. (1910:27f)[7]

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[7]Here it is plain enough that the relationship between social mentality and social institutions was one of close correspondence and coevolution. This meant that, as with all social institutions, languages were reflective of the mentality of their speakers (1910: Chp. IV). Among civilized peoples, language conveyed a heritage of well-defined ideas and imposed logical discipline, but among primitives language conveyed a heritage of logically compromised concepts. But contrary to what Margaret Mead (1931:684) and C. Scott Littleton (1985:xxix-xxxi) have supposed, there was nothing in Lévy-Bruhl to suggest an early version of the Sapir-Whorf hypothesis. There was no indication that linguistic conventions played a unique role as causes in the formation of world views. Language transmitted world views, but did not shape them. In particular, language

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Lévy-Bruhl was committed to the position that phenomenological experience was from the outset constructed, rather than interpreted, via the operation of collective representations. The differences in world view thus produced in different societies could be extreme. In order to begin his investigations on the surest possible footing, Lévy-Bruhl compared the mentality of primitives, taken broadly as a type, with the mentality of his own "rationalistic, scientific, Mediterranean" culture, taken as another type — in fact, the type most contrastive with the first.[8]

> [P]rimitives perceive nothing in the same way as we do. The social *milieu* which surrounds them differs from ours, and precisely because it is different, the external world they perceive differs from that which we apprehend. Undoubtedly they have the same senses as ours ... and their cerebral structure is like our own. But we have to bear in mind that which their collective representations instil into all their perceptions. Whatever the object presented to their minds, it implies mystic properties which are inextricably bound up with it, and the primitive, in perceiving it, never separates these from it.
>
> To him there is no phenomenon which is, strictly speaking, a physical one, in the sense in which we use the term. The rippling water, the whistling wind, the falling rain, any natural phenomenon whatever, a sound, a colour, — these things are never perceived by him as they are by us, that is, as more or less compound movements bearing a definite relation to preceding and to subsequent movements. His perceptive organs have indeed grasped the displacement of a mass of material as ours do; familiar objects are readily recognized according to previous experience; in short, all the physiological and psychological processes of perception have actually taken place in him as in ourselves. Its result, however, is immediately enveloped in a state of complex consciousness, dominated by collective representations. Primitives see with eyes like ours, but they do not perceive with the same minds. (1910:43f)

The philosophical problem was to determine the general nature of the schism between primitive and Mediterranean mentalities.

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provided a stock of concepts (by naming these concepts), but did not determine whether the concepts would be well-defined in the rationalistic style or ill-defined in the mystical style (1910:107f). Raul Pertierre concurs that Lévy-Bruhl's work did not fit the mold of Whorf's linguistic reductionism (1984:13-15). Piaget's views on the role of language were consonant with those of Lévy-Bruhl (1926b:248-250).

[8]Lévy-Bruhl left open the question as to how many relativistic schisms could be found between societal types (or between societies, or between groups within societies, *etc.*). Neither did he advance definite opinions on the singularity or multiplicity of evolutionary tracks through mental space. However, he did hint that "transitional types" existed between primitive and Mediterranean mentality (1910:29).

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Hence, the philosophical modus operandi was to determine, via the comparative method, the general character of the laws which regulated the formation of collective representations. If different laws prescribed different envelopes of mentality, then a comparative description of these laws was sufficient to provide a comparison of the mentalities per se. When Lévy-Bruhl addressed the general character of Mediterranean mentality, he found a dependence upon the laws of logic, and in particular, upon the law of the excluded middle. The collective representations of the Mediterranean type were said to shun internal contradiction. In contrast, the collective representations of the primitive type were said to blend the intellectual, the emotional and the motoric into a "prelogical" and "mystical" whole, in accord with what was termed the Law of Participation.

In reviewing a wide range of reports on primitive mentation, Lévy-Bruhl found that primitives did not conceive of object identity nor of causal chains in the same way as did civilized peoples. For the primitive, the notion of a discrete entity was compromised by a mystical sense that entities were, in their very identity, in a process of interactive communion with the other entities of the world. Further, these interactions, or "participations," were not constrained by the Mediterranean understanding that, grosso modo, restricted the relationship of causation to those interactions which were contiguous in space and time. The primitive mentality did not fully acquiesce to the logical Mediterranean distinctions between this thing and that thing, or between one time and another, or between one location and the next — and as a consequence, in their primitive representations, notions of identity and notions of causes ran amok.

The Law of Participation was said to create a profusion of mystical effects in concrete customs, rituals, myths and beliefs. So a Bororo maintained that he was an arara (a red parrot) and that he was also a human being (Von den Steinen). A Californian Indian maintained that, in the yearly ritual in which buzzards were killed in different villages, the different buzzards were one and the same

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bird (Bancroft). A Mandan chief refused to be photographed, lest the photograph be effaced, which would disturb his sleep after he was dead (Catlin). Wachaga mourners prayed that the deceased would have the pleasure of killing his dead enemies anew in the afterlife (Gutmann). In cultures too numerous to review, the name of a person was understood to be connected with him, and language (as well as thought) was guarded lest it have unfortunate physical effects. All manner of sympathetic magic was practiced; there was a belief in divination, in numerology, in telekinesis, in mana, in taboo.

This assessment of primitive mentality provided for a radical depreciation of Tylor's account of the emergence of the "doctrine of souls" in primitive societies. In arguing that primitives were neither particularly mindful of logical relations nor desirous of causal explanations in the Mediterranean style, Lévy-Bruhl utterly disparaged Tylor's supposition that "savage philosophers" had inferred the existence of souls in the process of formulating "a fairly consistent and rational primitive philosophy" (Tylor, 1871, II:428f). Primitives, asserted Lévy-Bruhl, had neither means nor motive to do any such thing.

> [W]e shall find ourselves in a blind alley, whenever we propound a question in such terms as: How would the primitive's mind explain this or that natural phenomenon? The very enunciation of the problem implies a false hypothesis. We are supposing that his mind apprehends these phenomena like our own. We imagine that he simply perceives such facts as sleep, dreaming, illness, death, the rise and the decline of heavenly bodies, rain, thunder, etc., and then, stimulated by the principle of causality, tries to account for them. But to the mentality of undeveloped peoples, there are no [isolable]natural phenomena such as we understand by the term. Their mentality has no need to seek an explanation for them; for the explanation is [already] implied in the mystic elements of the collective representations of them. (Lévy-Bruhl, 1910:45)

> [Tylor's] is a very seductive theory, and it seems as if, were we in the place of the "savage philosopher," we should reason as he does — that is, as we make him reason. But have such "savage philosophers" ever existed? Do the collective representations of the soul in the lower races constitute a sort of doctrine born of the necessity for resolving biological problems? Nothing seems more unlikely. Nothing seems more improbable even, if it be certain that the mentality of such races is oriented differently from our own, and that their collective representations are, above all, mystical by nature, primitives being much more concerned about the

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> mystic virtues inherent in things than about the logical coherence of their own thought. That is why, the more rational and consecutive this primitive "philosophy" of the soul becomes, the more reason will there be to fear that, in spite of the amount of evidence collected and the skill of those who interpret it, it will still be very far removed from that which it pretends to explain. (1910:81f)

In his explication of the conceptual relativity of primitive and civilized peoples, Lévy-Bruhl addressed also the problem of conceptual overlap between the two groups. Wasn't it true that primitives acted logically in some respects, and that the rationality of civilized peoples was somewhat partial? What did this imply about the perseveration of primitive mentality and about the depth of relativity between the groups? Lévy-Bruhl acknowledged that vestiges of prelogical mentality persisted in the collective representations of civilized folk.

> Even among people like ourselves, ideas and relations between ideas governed by the law of participation are far from having disappeared. They exist, more or less independently, more or less impaired, but yet ineradicable, side by side with those subject to the laws of reasoning. Understanding, properly so called, tends towards logical unity and proclaims its necessity; but as a matter of fact our mental activity is both rational and irrational. The prelogical and the mystic are co-existent with the logical. (1910:386)

> The mentality of primitive peoples ... long remains prelogical, and most of its ideas preserve a mystic imprint. Moreover, there is nothing to prevent abstract and general concepts, once formed, [from] retaining elements which are still recognizable as vestiges of an earlier stage. ... [The rational concept] is a sort of logical "precipitate" of the collective representations which have preceded it, and this precipitate nearly always brings with it more or less of a residuum of mystic elements. (1910: 379f)

In the prelogical mentality of primitives, intellectual and emotional and motoric appraisals of the world were undifferentiated. In the logical mentality of civilized peoples, the intellectual mode of thought was distinguished and held above the others, but emotional and motoric thinking still played a role, since the functions they served could not be completely provided for by intellectual means. Thus concepts retaining a prelogical cast were not to be found in science, where intellectual thought modes held sway, but in

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the concepts of the everyday and in the concepts of religion, where affective expression was invited.

> [I]n a large number of concepts, there are indelible traces [of mysticality] which remain. It is far from being *all* the concepts in current use, for instance, which express the objective features and relations of entities and of phenomena solely. Such a characteristic is true of a very small number only, and these are made use of in scientific theorizing. ... Others, that is our most familiar concepts, nearly always retain some vestiges of the corresponding collective representations in prelogical mentality. Suppose, for example, that we are analysing the concepts of soul, life, death, society, order, fatherhood, beauty or anything else you like. If the analysis be complete it will undoubtedly comprise some relations dependent upon the law of participation which have not yet entirely disappeared. (1910:382)

> [Religious concepts tend to exhibit perseverant mysticality] because they promise that which neither a purely positive science nor any theory of philosophy can hope to attain: a direct and intimate contact with the essence of being, by intuition, interpenetration, the mutual communion of subject and object, full participation and immanence, in short, that which Plotinus has described as ecstasy. (1910:384f)

On sum, however, the "residuum" or "imprint" or "vestiges" or "traces" of prelogical mentality were not consequential enough to compromise the rationalistic substrate of the Mediterranean world view, *even though* rigorous rationalism was only practiced in "a very small number" of concepts (*loc. cit.*). Here could be seen an undeterable drive to characterize civilized thinking in terms of what were regarded to be its finest thought products, allied with a prejudice that concepts which failed to meet standards of theoretical logic were not really concepts at all. It was only logical thinking which supported "understanding, properly so called" (*loc. cit.*), and it was only civilized peoples who were capable of such understanding.

The reason why prelogicality had a tough time persisting in the world view of civilized peoples was that logic acted as a purifying force in their conceptual system. It was in the nature of logical laws to resist violation. This intractibility of logical laws enabled them, from modest beginnings in the mentality of primitives, to finally overcome the law of participation. The increasingly civilized mind was increasingly intolerant of the contradictory character of

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mystical representations, and banished them — first from scientific concepts, where the force of logic was strongest, and later from more ordinary patterns of thought. Where some residuum of mystical mentality yet remained, the very recognition that this constituted a *contradiction* in mental temperament was itself a testimony to the hard won supremacy of rationality over mysticism.

Recall further the level of abstraction at which this discussion was taking place. Mysticality and logicality were not constructs which were intended to apply to the psychology of single individuals, but were constructs referring to the collective representations of — not even single societies — but aggregates of societies. At this level of generalization, Lévy-Bruhl had no difficulty in maintaining that these conceptual types were relativistically distinct, despite the slight mystical tendencies of rationalistic societies.

In short, Lévy-Bruhl felt that the observed instances of prelogical thinking in civilized people were not a threat to the view that their mentality was essentially rationalistic because the prelogical thinking a) was minimal, and restricted to lay situations where careful thought was not required; b) was moribund in scientific contexts where careful thought was required; c) was anomalous, as recognized by civilized peoples themselves; and d) was inconsequential at a philosophical level of discussion.

What then of instances of logical thinking in primitives? Did these belie conceptual relativity between primitives and civilized peoples? Lévy-Bruhl recognized that primitives made innumerable logical inferences as a matter of course in their everyday life, functioning for the most part in just the way that one would expect a European to function (1910:78f). But this evidence of logical functioning could not be considered a contamination of the primitive prelogical mentality, since prelogicality did not prohibit the exercise of practical logic alongside the exercise of mysticism. It was in the nature of the mystical mind to fail to distinguish between the

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two. Hence, the presence of rudimentary logical thinking in primitives was entirely compatible with the view that their mentality was essentially mystical. And after all, it wasn't as if primitives were manipulating formal systems: it was just that, in their own fashion, they behaved sensibly.

> In the mentality of primitive peoples, the logical and prelogical are not arranged in layers and separated from each other like oil and water in a glass. They permeate each other, and the result is a mixture which is a very difficult matter to differentiate. (1910:107)

> [T]he greater the advance made by logical thought, the more seriously does it wage war upon ideas which, formed under the dominance of the law of participation, contain implied contradictions ... But this intolerance is not reciprocal. If logical thought does not permit contradiction,and endeavors to suppress it as soon as it perceives it, prelogical, mystic mentality is on the contrary indifferent to the claims of reason. It does not seek that which is contradictory, nor yet does it avoid it. (1910:383; cf. 78)

Lévy-Bruhl's treatment of conceptual overlap should have signalled that the contrast which he sought to establish was, first and foremost, a contrast between modes of thought, and only secondarily a contrast between populations. It was the mystical mentality and the logical mentality, rather more than primitives and civilized peoples, that were actually being juxtaposed.

Lévy-Bruhl's brilliant and original work was not well treated by contemporary critics, though there is some indication that his thinking may be revived in the present day (e.g., via Pertierra, 1984; Littleton, 1985). Intellectualists such as Bronislaw Malinowski held that human mental processes were everywhere the same, and that primitives were not so much prelogical as unsuccessful with logic. Others such as Robert Lowie objected to the use of the comparative method for the postulation of a single primitive type of mentality. Many others argued for the co-existence of logical and mystical thought modes in both primitives and civilized peoples. But, ironically, the sternest criticism was advanced by Boasian cultural relativists who felt that Lévy-Bruhl had not gone far enough in his cultural relativity, since he had failed to advance his thinking

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beyond eurocentric evolutionary views. Boasians demanded that all cultures be assessed in their own terms, without reference to absolute standards of measure such as logical rigor.

Critical pressures in concert with Lévy-Bruhl's own rethinking culminated in significant modifications of the relativity hypothesis in his *Carnets* (= *Notebooks,* written between January, 1938 and February, 1939, and published in 1949). In some ways the hypothesis was weakened. Lévy-Bruhl was more appreciative of the logical capacities of primitives (though he still doubted that they were capable of formal operations), and he was more open about the ubiquity of mystical mentality in civilized populations.

> [Primitive] minds do not differ from ours from the logical point of view ... They reject, as we do, through a sort of mental reflex, what is *logically* impossible, absurd in the strict sense of the word. (1949:62)
>
> There is a mystical mentality which is more marked and more easily observable among 'primitive peoples' than in our societies, but it is present in every human mind. (1949:101)
>
> ... I do not assert (today less than ever) that there exists a mentality peculiar to 'primitive peoples'. There is in their mentality a large part which they have in common with us. Equally, there is in the mentality of our societies a part (larger or small according to the general conditions, beliefs, institutions, social classes, etc. ...) which is common to it and to that of 'primitive peoples'. (1949:125f)

But in other respects the hypothesis was strengthened, since Lévy-Bruhl was never more cogent in his explication of what did distinguish the dominant thought modes of the two groups at issue. The entire rationalistic enterprise of civilized cultures was held to depend on the formation of criterially defined concepts whose stability enabled them to endure the stern handling of logical manipulation in the construction of scientific views.

> [T]he difference between the role of concepts in the primitive mentality and their role in the structure of our world view (*Weltanschauung*) is striking. For us, these concepts express relations, combinations ruled by constant and necessary laws, and, if it is a matter of living things, animals or plants, forms no less regular and constant: concepts based on the comparison of things, the analysis and subordination of their characteristics, classifications equivalent to definitions. (1949:129f)

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> [I]n the world of living things, there is something which corresponds to what are the laws of the physical world, constituting like them an essential element of permanency and fixity; these are the forms of those things, which heredity transmits and preserves so faithfully, and which are so peculiar to the innumerable species of plants and animals (to say nothing of crystals and minerals) that they serve to define them and suffice to do so: where would botany and zoology be without the classification that makes the study of morphology possible? (1949:134)

In contrast, the mystical mentality which typified primitives was incapable of fostering concepts with clear definitions. The mystical mentality was wholly absorbed in the flux of experience and in the welter of emotions and in the imagined operation of magical forces, with the effect that the concepts formed were forever subject to mutation. Concepts were shaped by the exigencies, and fancies, of the moment. Lévy-Bruhl pointed out that even something so basic as the conception of humans as breathing animals was subject to mystical revision, as proved by the Bororos' claim that the Trumai spent the night at the bottom of the river. It was not that the Bororo had no conception of drowning, but rather that the Bororo had no definitive conception of being human. If sorcerers could fly through the air, why might not the Trumai be able to sleep in the water? Concepts in primitive mentality were typified by a lack of stability precisely because the participations and causal hypotheses entertained by primitives were everchanging. It was for this reason that their concepts were not legitimately conceptual at all, and could not serve as a basis for real knowledge.

> [T]he thought of primitive men is not conceptual like ours, that is important: neither the laws of nature nor the forms of living things play in their thought a role comparable with that which they do in our thought, at least as soon as it is a question of a mystical experience or a magical operation. Whereas for us concepts are rigid frameworks, where has to enter the reality perceived by us, which surrounds us and about which we must endeavor to know what is permanent in order that we may make ourselves as far as possible master of it, the concepts of the primitive mentality, like the forms which they express, offer no resistance to fluidity, as soon as it is a question of mystical experience. (1949:135)

In this way, the antinomy between primitive and civilized mentalities was recast as the juxtaposition of concepts (and concept formation processes) which were on the one hand indistinct and

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mutable and, on the other hand, well-defined and fixed. The overall effect of Lévy-Bruhl's later thinking was to transport his relativity hypothesis from the field of anthropology to the field of cognitive studies. Again, in retrospect, it might seem to have been this kind of a hypothesis all along; i.e., a hypothesis of how the "intellectual" thought modes employed in scientific theorizing differed relativistically from the "mystic/emotional/motoric" thought modes employed in unreflective daily living and mythic exuberance.

It cannot be said that Lévy-Bruhl's influence in learned circles was ever really great, though his ideas have always been admired for their depth and ingenuity. His peculiar and hybridized status as a philosopher of mind with an anthropological thesis put people off. He was, in his concern with conceptual relativity, too in advance of his times, and in his anthropological views too retrograde. But be that as it may, he had a tremendous indirect influence that continues today because of the deep impression which his early work made upon one man, Jean Piaget.

2.14

In Piaget, Lévy-Bruhl's anthropological thinking was faithfully converted into cognitive developmental terms, with full preservation of its dominant theme of conceptual relativity. Lévy-Bruhl's conception of primitive mentality became the child's conception of the world. Lévy-Bruhl's "law of participation" became Piaget's childhood "realism" and "idea of participation."[9] Lévy-Bruhl's "mystic indissociation" of intellectual, emotional and motoric modes of thought became Piaget's "indissociation" and "magical thinking." Lévy-Bruhl's qualitative evolution from primitive to civilized mentality became Piaget's "equilibration" from one qualitatively distinct stage of cognitive development to the next. For both, mental development was an ascension from a world view predomi-

[9]In connection with realism, Piaget also owed (and acknowledged) a large debt to James Sully.

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nantly constructed along emotional and motoric lines to a world view predominantly constructed in accordance with logical principles. In every key respect, the mentality of Lévy-Bruhl's mystical primitives aligned with the mentality of Piaget's animistic children. Similarly the mentality of Mediterranean peoples aligned with the mentality of rationalistic adults.[10]

Regarding the connection between the child's mind and the mind of primitives, Piaget professed neutrality.

> If this research is to be of value we must as before set aside all we have learned from the analysis of primitive mentality and in particular the important work of M. Lévy-Bruhl. We shall no doubt come across analogies between the child and the primitive at every step; this will be, however, in the course of studying the child himself without any preconceived ideas, rather than because we are deliberately seeking such analogies. (1926b:88)

> The term animism denotes a belief peculiar to primitive peoples. If we use it here in speaking of the child it is as if we were deciding out of hand the question as to whether these similar beliefs were identical for the primitive and the child. But such is not the case. We shall use the word "animism" simply as a generic term, leaving the question open whether the various types of animism have the same or distinct psychological origins. (1926b:170)

But when the psychological origins of animism were addressed, it was plain that the equation between the child's mind and the primitive's mind was, for Piaget, already in perfect balance. By Piaget's account, childhood animism first arose from the psychological "realism" of the child. The child failed to differentiate his psychic life and physical reality: his entire world was at first a living field which had his own barely recognized ego as its natural center. The child did not distinguish between living and inert bodies, nor between purposive and mechanical movements. And, by Piaget's ac-

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[10]Note also one striking programmatic parallel between the work of Piaget and Lévy-Bruhl. Lévy-Bruhl's *How Natives Think* (1910) corresponds with Piaget's *The Child's Conception of the World* (1926b); Lévy-Bruhl's sequel, *Primitive Mentality* (1922), which attempts to show how causation is conceived by primitives, corresponds with Piaget's sequel, *The Child's Conception of Physical Causality* (1930).

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count, this incubative state of animism was the same for primitives as it was for children.

> Since the child does not distinguish the psychical from the physical world, since in the early stages of his development he does not even recognize any definite limits between his self and the external world, it is to be expected that he will regard as living and conscious a large number of objects which are for us inert. (1926b:169)

> The primitive does not distinguish mind from matter. It is precisely because he has not made this distinction that all things appear to him endowed both with material properties and with will. (*Ibid.*)

As the child's sense of self consolidated, the otherness of entities in the world became better recognized. Owing to the child's egocentrism, the world appeared as a complex of entities functionally directed toward anthropocentric goals. The functional unity of the natural order was not accidental, but one of moral necessity: People were the commanders and Nature the commanded. The child's belief in the purposiveness of the natural order directly influenced his views on consciousness and life. Since he lacked an adequate understanding of physical causation, he could only explain the activities of worldly entities by supposing these activities to be intentional; that is, by supposing the entities to be alive. The world appeared as a biosphere of nonhuman beings which served, or resisted serving, human intentions. If an entity presented resistance, it was because that entity had its own purposes which it pursued egoistically. In the child's projections, consciousness of his own effort implied sentient force in a resisting object; consciousness of a stymied desire implied some contrapurpose in the obstacle to fulfillment.

> [I]t is not because the child believes things to be alive that he regards them as obedient, but it is because he believes them to be obedient that he regards them as alive. (1926b:48)

The child felt, in his relationship with nature, an illusory sense of interaction and communion. To the degree that his own desires held sway, he was impressed with his own magical capabilities; to the degree that natural objects succeeded in resisting

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his intentions, he was impressed by the force of their animism. In pointedly borrowing the term "participation" from Lévy-Bruhl, Piaget likened the child's sense of "participation" in physical events to the mystic attitude said to typify the mentality of primitives.

> It may be that the child's idea of "participation" differs from that of the primitive, but they resemble one another, and this is sufficient to authorise us in choosing our vocabulary from among the expressions which have been found most adequate in describing primitive thought. (1926b: 132)

Often, when the child began to address the origins of the natural world, his anthropocentric attitude brought him to the view that nonhuman entities were actually created for human purposes by human or divine agency. Piaget referred to this view as "mythological artificialism," and again likened the thinking of the child to the thinking of primitives.

> [When the child comes to formulate artificialist views,] there are at the roots — other things being equal — the same relations as those that M. Lévy-Bruhl has stressed as existing between the first stage of primitive mentality, where participations are simply felt and lived, and a second stage where participations begin to be formulated and thus give rise to myths about origins. (1926b:371f)

Social factors might influence thinking as well. Both the child's animism and the animism of primitives were reinforced by animistic conventions in language.

> This is so for two reasons. [First,] language always lags in its aptitude for expression. That is to say, when speaking in images we are always compelled to draw on forms of expression that we have really outgrown. For example, we say "the sun is trying to break through the mist," which is an animistic and dynamic way of speaking, and moreover takes no account of the distance which in reality separates the sun from the mist and suggests they are actually engaged in conflict. ... Adult language provides the very conditions necessary to foster the child's animism and this the more so, since generally speaking the child takes all metaphors literally ...
>
> [Speaking carefully, it is not so much that language causes child animism, but that there is] "convergence" between the regressive tendencies of language and the child's natural trend of mind. It is not the child which is moulded by language; it is the language which is already childish.
>
> [Secondly, language itself] "dramatises" the simplest judgements. The fact of separating the subject from the verb and the predicate leads the mind to substanstialise the subject and to endow it with an activity of its own and with distinct qualities, as if the subject was something more

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> than the sum of its actions and the sum of its qualities. ... By tolerating the expression "the wind blows" ... language perpetrates, in fact, the triple absurdity of suggesting that the wind can be independent of the action of blowing, that there can be a wind that does not blow, and that the wind exists apart from its outward manifestations. But it is so natural for us to talk in this way that we regard it almost as correct. When we say "cold fish calls for mayonnaise" we do not suppose that the fish itself actually calls at all, but when we say "the wind blows" we really believe that "it" blows. ... Such cases certainly favor Max Müller's doctrine that the animism of savages, together with all religion, is a "disease of language." Again, it is obvious that it is simply a matter of convergence between language and mentality, be it primitive or child. (1926b:249f)

In order for childhood animism to disappear, the child had to make a conceptual leap away from egocentric realism; i.e., there had to be a paradigmatic shift in the child's understanding of the relationship between the contents of his mind and the functioning of reality. At its outset, this shift was not the result of acquiring scientific knowledge, but of acquiring a new knowledge of self (1926b:238-245).

> No direct experiment can possibly lead the child to the discovery that a movement is not purposive or that an activity is not conscious. The power of dissociating does not arise from a wider knowledge nor from a developed ability to control circumstances nor from experimentation but from a radical change in the habits of mind. Only a qualitative development of the child's mind can lead it to abandon animism.
>
> What is the explanation of this change in the child's trend of mind? The dissociation of ideas can only result from his becoming progressively aware of his self and his own thought. (1926b:238)

> It is only by a series of experiences of a social or inter-individual type, causing him to realise that other people's behavior is not always necessarily intelligent or even intentional, ... that the [child] forms such improbable conceptions as movement without consciousness or existence without awareness. ... [T]he "depersonalisation" of reality is bound up with the growth of self-consciousness. ... [A]ccording as the child comes to realise his self he builds up a whole scale of differing types of action, from voluntary and reflective action to involuntary and unconscious action. ... [O]nly the growth of the knowledge of the self ... can enable these ideas to become dissociated. (1926b:240f)

The child's advance away from animism coincided with, and was allied with, other steplike cognitive advances. As the child quantally ascended from one stage of development to the next, cognizing strategies were reconstituted along more mature lines and, in

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some measure, world view was transformed. For Piaget, intelligence was "a particular instance of biological adaptation" (1952:3f), "the form of equilibrium towards which the successive adaptations and exchanges between the organism and his environment are directed" (1950:6). Key in Piaget's ecological or interactionist view of development was the notion of stepwise advance between stages of equilibrium.

Let us summarize Piaget's account of the origins of childhood animism. We find first that the child *intellectually* lacks adequate theories of biology and physical causation, and that the same can be said of primitives. We next find that the animistic child is *psychodynamically* characterized by an egocentric realism which fails to adequately distinguish inner and outer reality, and that the same is said of primitives. We find furthermore a tendency to project motives onto inanimate entities, and to personalize interactions with them, just as we observe with primitives. Finally, we find that the child's animism is *socially* abetted by linguistic forms which promote animistic interpretations, and that this is a condition, too, of the languages of primitives.

Since Piaget at every turn emphasizes parallels between childhood animism and the animism of primitives, it is just impossible to believe him when he professes neutrality on the issue of whether the two ought to be equated. It is obvious that the two forms of animism were strongly identified in his mind, in their overt qualities, in their covert origins, and in the conceptual chasm said to separate them from the biological rationalism of civilized adults.

These views brought with them powerful reasons to resist any notion that animistic tendencies were significantly preserved in adults. First, on the face of it, for adults to hold animistic ideas alongside biological ideas would be illogical, since animism and biology appeared logically disjunct. So there was a *logical* reason to disbelieve that animistic concepts could survive into adulthood. Se-

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condly, to allow for perseverant animism in adults would compromise the conceptual relativity between adults and children that was at the very heart of Piaget's stagewise view of development. So there was a *psychological* reason to be predisposed against the idea of perseverant animism. Third, given the equation between the animism of children and the animism of primitives, any acceptance of perseverant animism in adults would have had also the unacceptable effect of establishing a continuity between the mentality of primitives and the mentality of civilized peoples. Recall that it was Piaget's appreciation of Levy-Bruhl's views on conceptual/cultural relativity that led him in the first place to appropriate the term *animism* from the literature of anthropology. So there was a eurocentric *anthropological* bias against the notion of perseverant animism.

Given that Piaget did not systematically explore for animism in European adults, how can one help but conclude that Piaget's claim that animism was confined to the minds of children and primitives resulted more from pre-existing theoretical biases than from demonstrated facts? The position derived chiefly from Piaget's own broad view of stagewise development as an ascension of logical capacities, though it appears also to have been fortified by contemporary European attitudes on the incommensurability of primitive and civilized mentalities. The position had evolved from a long scholastic tradition which acknowledged psychological continuities between children and primitive peoples (and sometimes early humans, neurotics and the mentally handicapped, as well), but denied essential continuity between these parties and psychoculturally advanced adults. The disparities between these two broad groups was sometimes cast in pseudo-evolutionary terms, sometimes in psychocultural terms, and sometimes in more purely psychological or cognitive developmental terms. In every case, however, the gulf between the mentalities of these groups was upheld by some principle of conceptual relativity. And the principle of conceptual relativity was generally upheld by imposing an artificial homogeneity of style on the thought processes, or categorization processes, or world view formation processes of the disparate groups. It was ad-

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vanced adults whose concepts were logical; it was children and primitives whose concepts arose from mere emotional and motoric considerations. While the mentality of advanced adults was characterized by a sharply defined rationalistic objectivity; the mentality of children and primitives was characterized by a nebulous mystic realism.

For Piaget, it was not possible to operate with these theoretical biases and also acknowledge that the animistic tendencies of childhood maintained any significant influence on the psychology of adults. Hence, animistic features of language were viewed as conservatisms or dramaticisms which did not legitimately reflect the refined thought capacities of modern peoples (1926b:248-250). Animism and realism could occasionally be observed in the adult, but they were "of infinitely smaller extent than that of the child" (1926b:166). Animistic tendencies might appear under conditions of high emotionality or simple inattentiveness of mind, but they were so subsidiary to logical thought tendencies that they did not really compromise the rationalism of adults (1926b:162-166). In short, Piaget's position of denial on this matter faithfully echoed that of his conceptual predecessor, Lévy-Bruhl.

In actuality, Piaget did not look very hard to see how 'compromised' the rationality of adults might be. It was uncontroversial that adults used the word *alive* to refer to the criterially defined biological status of animals and plants. And it was uncontroversial that, in a myriad of other instances, adults demonstrated a capacity to perform formal operations with the category {alive} and with other classically defined categories. For Piaget, the acquisition of these formal capacities *entailed* that animistic thought tendencies had been outgrown or outgunned, since Piaget could not conceive of how they might be preserved against the logical demands of a mature rational mind. Piaget's prior commitment to the view that logic-based concept formation processes were incompatible with alternate concept formation processes led him to assume that the abundant evidence of formal operations on the part of adults was

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a priori evidence that animistic thinking had ceased. And Piaget's prior commitment to the view that only criterially defined concepts were true concepts led him to devaluate any evidence of animistic thinking in adults that he happened across.

Another way of putting this is to say that Piaget was blind to the possibility that the concept {alive} did not evolve in a unilinear fashion. In the Piagetian view, the animistic conception of life evolved directly into a biological one. It was not conceivable that the animistic conception of life underwent differentiation such that both an animistic and a biological conception of life were carried into adulthood. Yet there was nothing in the findings of Piaget that was inconsistent with this scenario, and there were even then some concrete facts to recommend it. Presumably it was never considered as even a possibility worth investigating just because it was so staunchly believed that animistic thinking and rationalistic thinking could not, in comparable proportions, compatibly co-exist.

2.15

When the evidence of the present day is reviewed, there is not much empirical support for any of the Piagetian presuppositions which had a role in the denial of perseverant animism in adults. True, it is still debated today whether or not there are relativistic differences between the mentality of adults and the mentality of children. Susan Carey (1985a, 1985b, 1988, 1991), Alison Gopnik (1988a), and Philip Kitcher (1988) are among those who view the conceptual changes from childhood to adulthood as localized relativistic changes similar to the changes said to occur when one scientific theory is superseded by another (Kuhn, 1962; 1982a). But no one currently supports a claim of conceptual relativity so all-encompassing as that once advanced by Piaget. It was Piaget's overarching view of conceptual relativity that was expressed in his theory of developmental stages, and in his juxtaposition of childhood realism and adult rationalism. And it was these theoretical constructs that denied the possibility of perseverant animism in

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adult mentality. The current proponents of conceptual relativity do not support a global stage theory of cognitive development; neither do they support the idea of homogeneous and disjunct cognitive styles for children and adults. In consequence, they are not, like Piaget, committed in principle to the denial of perseverant animistic thought tendencies in adulthood.[11]

The principal reason why Piaget's global theory of developmental stages is no longer generally acclaimed is that the evidence does not endorse it: multiple correlations do not obtain between the child's emergent abilities to classify, seriate, conserve, measure, give predictions and explanations, assume another's visual or social perspective, and so on (Gelman and Baillargeon, 1983). In short, there is no evidence that these abilities arise with the emergence of globally integrated cognitive structures or modes of thought. In addition, the Piagetian stage theory is underspecified and hedged to such a degree that it is regarded by many to be "hopelessly philosophical and incapable of direct empirical evaluation" (Brainerd, 1973b:349). Certainly, the empirical findings that do tend to support it do not support it uniquely, but are also supportive of alternate theories. Finally, there is a growing body of evidence that the modes of thinking of even very young children and completely mature adults are neither homogeneous nor disjunct. The polarity between the rationalism of the adult and the realism of the child appears to have been misconceived. It is this point which directly bears upon the inadvisability of continuing to suppose, as a corollary to stagewise development, that animistic thought tendencies do not persist into adulthood.

The homogeneity of rationalism in adults (a.k.a. the hegemony of classically structured categories and formal operations) has been utterly discredited by modern programs of research in concept for-

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[11] *No* position will be taken on whether or not there exist relativistic conceptual changes in the course of development; it is only affirmed here that global relativity is unfounded.

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mation (see Smith and Medin's review, 1981). In the work of Eleanor Rosch and her colleagues, in particular, it has been amply demonstrated that concept formation in adults is pervasively nonclassical and pervasively mindful of just those emotional and motoric aspects of interaction with the world which Lévy-Bruhl and Piaget portrayed as immature procedures of thought (for overviews, see Rosch, 1977; Rosch, 1978; Mervis and Rosch, 1981).

In contrast with the classical view that true categories were rationally structured in terms of necessary and sufficient conditions, Rosch proposed a more naturalistic account of the category formation process. Rosch observed that the perceived world was not an unstructured soup of equiprobably occurring attributes; rather, there was a natural basis for the classification of kinds in the world because there were real patterns of correlated attributes in the phenomenal order of the world. (E.g., trees have trunks and also roots and branches and leaves and vertical orientation and ...) Rosch proposed that the formation of natural categories was guided by a need for cognitive economy. This required that a balance be struck between a) the tendency to form a large number of fine-grained but similar categories, where membership predicted a large number of attributes, and b) the tendency to form a small number of more discriminable, broad-grained categories, where the diversity of the presentational world was more manageably smoothed. These tendencies were resolved at the "basic level" of category formation: the balance point at which within-category similarity and between-category discriminability were co-maximized; the most inclusive (abstract) level at which categories still richly mirrored the patterns of attribute correlation found in the phenomenal world. In categories formed in this way, individual members did not necessarily share a determinate set of features, though overlapping patterns of shared features might produce a 'family resemblance' across the category membership. (And the features themselves, as 'categories' in their own right, were also amenable to gradation.)

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In the immediate context, the relevance of Rosch's work is two-fold. First, as mentioned, Rosch's account of category formation was always sensitive to the relevance of such nonclassical features as the functionality of the object in cultural scripts, the motor programs required for interaction with the object, and the emotional reactions evoked by the object (as, for example, in the case of facial expressions, where a physiological basis for intersubject agreement on categories of expressions could be argued). Unlike Piaget, Rosch was disinclined to prejudge what kinds of attributes were considered by adults forming concepts. The result of nearly a generation of liberated research in adult concept formation has been a dramatic expansion of the traditional view that the only legitimate categories were those whose members were defined by 'essences'; i.e., by precisely specified, necessary and sufficient, objective, immutable, and logically primitive features.

Secondly, Roschian analysis has provided for some reassessment of the relationship between classical and nonclassical category formation processes. The same principles which promote the emergence of categories as graded clusters of correlated attributes promote also the emergence of prototype effects within categories. The category members taken to be prototypical of the category are just those members which best recapitulate the correlational structure of the category as a whole. To the degree that a category is contemplated in terms of its most typical members, the category may seem to be defined by a complex of invariable features (Rosch and Mervis, 1975; Rosch *et al.*, 1976). This is to say that the inclination to view categories in classical terms ironically might have its origin in nonclassical processes of concept formation. This insight undercuts the claim that adult concepts are homogeneously rationalistic by challenging, in a highly original way, the homogeneity of rationalistic structures per se. A simple inspection of one's own working categories reveals that most of the so-called criterially defined categories that we operate with in the everyday are, in fact, *hyperstabilizations* of categories which have nonclassical structure. This generalization holds true even in science, and

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particularly in the biological branches of science. When concepts such as {life} are investigated deeply, the feasibility of a criterial definition of the concept only diminishes, though most lay adults harbor a conviction that this biological status can be precisely characterized.[12]

Finally, Rosch has demonstrated convincingly that reasoning need not depend on the availability of classically defined categories, but may proceed with the aid of nonclassically defined reference points (Rosch, 1975; 1983). Hence, neither the categories constructed by adult thinkers nor the reasoning processes undertaken by them argue, as once thought, for a homogeneous rationalism in adults.

In parallel fashion, contemporary research discredits the notion of homogeneous realism in young children, with its affiliated claims of egocentrism, prelogicality, and precausality. Our view of the sophistication of the infant or young child's mental life only expands. The young thinker displays much of the mental competence observed in the adult though, in the case of the child, knowledge is often only implicit and processing abilities are often fragile and domain or task specific (Gelman and Baillargeon, 1983; Rogers and Sloboda, 1983:293-356).

The claim of egocentric realism is controverted by evidence that the child is socially minded, can take the point of view of others, and appropriately employ deictic terms in language. For a review of the development of such capacities from the 18th month, see Flavell (1977). In addition, the 3-year-old child has been shown

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[12]The same is true of categories of artifacts, where the illusion of criterial definition is high because we consciously deliberate over the construction and naming of artifacts. Despite our best rationalistic efforts, it turns out that concepts such as {computer} and {program} so successfully evade criterial definition that they may become objects of philosophical discussion. We are happy to call an IBM mainframe used by the U.S. Weather Service a computer, but less happy to accord computer status to a thermostat, or to a knee whose rheumatism indexes dampness and cold. But the criteria which we would like to have decide the issue are not ready to hand.

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to distinguish between mental and physical entities, between hypothetically fanciful and real world propositions, and between mere appearance and reality (Flavell, Flavell, and Green, 1986; Wellman and Estes, 1986; Estes, Wellman, and Woolley, 1989). Mature 3-year-olds will affirm that only physical objects can be seen and touched by both the child and other people, and that only objects of thought can be changed by thought alone. Gopnik (1988a; 1988b) argues that the acquisition by 3-year-olds of an understanding of object permanence requires the development of a nonegocentric theory of objects, and that this dovetails with the emergence of a representational theory of mind. In the last few years, the consensus has grown that, by four years of age (if not sooner), the child has developed a theory of mind which acknowledges the mind's representational activities (Wellman, 1990).

The claim of precausality is controverted by evidence that the preschool child has causal expectations which acknowledge the ordering of cause and effect (Bullock and Gelman, 1979) and, in causal chains, the operation of intermediary mechanisms (Baillargeon, Gelman, and Meck, 1981; Bullock, Gelman, and Baillargeon, 1982). Shultz (1982) has demonstrated that even 2-year-olds implicitly posit a transmission-like relationship between cause and effect. Golinkoff *et al.* (1984) and Ball (1979) have demonstrated causal expectations in infants. In a study which recalls the work of Michotte (1963), Ball used the tendency of infants to visually fixate on anomalous events to assess the infants' expectations of causal relation. For a number of trials, a red cube moved along a track and disappeared behind a screen, after which a white cube emerged at the other end of the screen. The adult inference would be that the red cube collided with the white cube behind the screen, and launched the white cube. On later trials the screen was raised, and the infants saw either contact or no contact between the two objects. Infants showed a significant increase in visual attention on the noncontact trial as opposed to the contact trial, suggesting that infants were surprised by an upset in their causal expectations. Golinkoff et al. (1984) report on three experiments with infants

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which suggest that, prior to 24 months of age, the causal powers of people are distinguished from those of inanimate objects.

The claim of prelogicality is also disconfirmed by a large convergent literature, only minimally sampled here. Carey (1985b:496-500) argues that the ability to form implicit hypotheses is required for the attainment of a representational theory of mind, and for virtually all concept formation and language acquisition. Rosch *et al.* (1976) have shown that 3-year-olds will overtly group objects into classes, especially at the basic level, and Ross (1980) has replicated this finding with 12-, 18-, and 24-month olds. Evidence for implicit knowledge of hierarchical or superordinate relations between categories has been developed in connection with kindergarteners by Kobasigawa and Orr (1973), in connection with preschoolers by Keil (1979:133-137), in connection with older 2-year-olds by Goldberg, Perlmutter, and Meyers (1974), and putatively in connection with 21-month-olds by Daehler, Lonardo, and Bukatko (1979). Smith (1979) has demonstrated that 4-year-olds can solve problems by implicitly evaluating class inclusion relations. In parallel, Greenfield, Nelson and Saltzman (1972) and Koslowski (1980) have demonstrated rudimentary seriation ability in 3-year-olds, and Trabasso (1975) has demonstated youthful ability to make transitive inferences. Hawkins *et al.* (1984) and Dias and Harris (1988) have shown that, under appropriate circumstances, 4-year-olds will deliver logically based (rather than empirically based) inferences when presented with syllogisms. Harris (1975) has demonstrated syllogistic ability in children 4:6-5:4. When told that a wug is a man, bird, flower, house, aeroplane, or drink, his young subjects were ready to advance an opinion on whether a wug has wings, eats food, and is alive.

When presented with such evidence, it is no longer comfortable to luxuriate in the simplicity of outlook which has held that the cognitive styles of adults and children are homogeneous and relativistically disjunct. It has been shown that the Piagetian juxtaposition of childhood realism and adult rationalism arose from

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an improperly grounded prejudice that the cognitive differences between adults and children (and primitives, etc.) were describable in global relativistic terms, and that this prejudice led naturally to an a priori denial of perseverant animism in adults. This position was empirically supported by the emergence, in late childhood, of a concept of life defined in biological terms — a concept which was believed to be in principle incompatible with animistic conceptions. However, the possibility that an animistic conception of life had survived the transition to adulthood, and maintained a cognitive presence alongside biological constructs, was never seriously entertained. This systematic oversight has persisted into the present day, despite the now faint dissent of pre-Piagetian commentators, despite the now transparently prejudiced hedging of Piaget himself, and despite the contemporary abandonment of the realism/rationalism dichotomy and its attendant theory of global cognitive stages.

The conceptual review of animism advanced in this section has been intended as a campaign of liberation. In deposing the false prejudice against the idea that animistic tendencies persist into adulthood, we are liberated to reconsider the facts of animistic behavior (and to consider facts heretofore ignored), and to reformulate our understanding of the animistic conception of life. The following section will offer another review — a review of the facts of animism unadorned by Piagetian preconceptions. The section will take pains to consider certain data which has received only scant attention in traditional treatments of animism, including the once shocking and inexplicable findings of the first empirical investigations of animism in adults in the 1950's. The section will deeply revise the classical account of animism, and radically reassess the complexity of relationship between animism and biological understanding.

At every turn, it will be emphasized that the central feature of animistic behavior is the animistic deployment of the word *alive.* When we inquire into the nature of animism, when we puzzle over what it means to be animistic, we are interested in the nature of a

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certain mentality. But in our final understanding of animism, there is no separating the animistic mentality from the semantics of the words used to express it.

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2.2 Empirical Aspects of Animism

2.21

As pointed out in the previous section, Piaget was not the first to observe animism in children, but only the first to propose a developmentally integrated account of what it meant for children to be animistic. Many of the child biographers of the late 19th century made some comment on the animistic tendencies of children, and some of these, perhaps under the influence of Tylor, pointed out the similarity between children's thought and the thought of primitive peoples. Hippolyte Taine commented on his daughter.

> Animal or tree, she immediately treats it as a person and wants to know its thoughts and words; that is what she cares about; by a spontaneous induction she imagines it like herself, like us; she humanizes it. This disposition is found among primitive peoples ... (1876:258)

F. Queyrat presented like remarks.

> The child does not stop here. Not content with believing in the existence, extended over all of nature, of living beings more or less analogous to himself, *he animates and personifies these same things.* Resembling in this way primitive man, he concedes sentiment and life to that which we look upon as inert and as absolutely unconscious, and he supposes, in the diverse objects, emotions, desires or purposes similar to our own. In this way, he not only gives body, but also soul to the wind which blows and howls in the night. (1905:43, my translation of DelVal's translation [1975:40])

Other works appearing about this time offered the same kind of anecdotal details of animism which made Piaget's *The Child's Conception of the World* such a fascinating volume. Preyer (1888: 346) recorded that many children regarded a locomotive as tired when it stood still, and as thirsty when its tank needed filling. Sully also recorded attributions of life to machines, as well as to smoke and wind and fire and other motile inanimates (1896:94-96). Froebel (1826:54) noted the tendency to suppose, not only that inanimate objects were alive and sentient, but also that they had the capacity to hear and even speak. Sully concurred that, next to apparently

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autonomous movement, apparently autonomous vocalization or soundmaking was the most common reason for attributing life to inanimate objects (1895:Chp.4). The relationship between linguistic, or intentionalistic, capacity and children's attributions of life was underscored by accounts of a 20-month-old child and a 4-year-old child who projected personalities onto mere letters of the alphabet (*Ibid:*43). Whiting (1892-93) reports her own youthful projections involving numerals. Here, in what amounts to a projective metonomy, the symbol used is taken to have the symbolic capacities of the symbol user. G. Stanley Hall (1883) detailed the projective fancies of children who believed that a doll could feel cold, that it pained flowers to tear or burn them, and that humanlike motives could be ascribed to such mysterious entities as the sky, the stars, clouds, lightning and thunder. Of 48 children questioned by Hall, 20 believed the sun, moon, or stars to be alive. William James (1892) relayed the autobiographical accounts of deaf mutes who, in their childhood, had projected an animistic presence into celestial bodies. Rasmussen noted in his daughter at the age of four the conviction that the moon intentionally follows us (1922). These works can be taken as representative of a considerable, if diffuse, anecdotal literature.

2.22

However, our fundamental understanding of childhood animism is owed to the work of three independent international research teams. Jean Piaget's seminal investigations with some 600 Swiss children are reported in *The Child's Conception of the World* (1926b). Wayne Dennis and R. W. Russell's large-scale studies of American children are reported in a series of articles (Russell and Dennis, 1939; Russell, 1940a; Russell, 1940b). Monique Laurendeau and Adrienne Pinard's fullscale studies of 500 Canadian children are reported in *Causal Thinking in the Child* (1962).

The Canadian study, a sympathetic reexamination of pre-causality in the child, is certainly the finest classically Piagetian study of childhood animism. Laurendeau and Pinard used Piagetian

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clinical interviews to assess the animistic tendencies of 500 French Canadian children ranging in age from 4:0 to 12:0.[13] The children were asked to judge whether 21 entities (14 nonliving, 5 animal, 2 plant) were alive, and to justify their answers.[14] The Canadian team found that almost all of the children employed multiple kinds of justifications for attributing life, regardless of their age. However, one justification — autonomous movement — never appeared before others had, and never appeared in the youngest age group. This led the team to propose three stages of conceptual development.[15]

> Stage 0. No identifiable concept; incomprehension. (Laurendeau and Pinard, 1962: 141-144).

At this stage, children may answer randomly or contradictorily, or spontaneously admit that they do not understand the question. Everything, or nothing, may be said to be alive.

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[13]The 500 subjects were evenly distributed between 10 age groups (4:0, 4:6, 5:0, 6:0, 7:0, 8:0, 9:0, 10:0, 11:0, 12:0). There were an equal number of males and females in each age group. All children were physically intact. Academic level was controlled for each age group. All children lived with their own family. The number of siblings in the Ss' families was balanced in the four youngest age groups. The occupational level of parents was quite mixed, and balanced between age groups. The study was conducted in Montreal.

[14]The entities were: a mountain, the sun, the table, an automobile, a cloud, a lamp, a watch, a bell, the wind, an airplane, the fire, the rain, a bicycle, a pencil, a cat, a bird, a fly, a snake, a fish, a flower, and a tree.

[15]Piaget's stage system included one more developmental stage, since it held that children who had formed a conception of life first attributed life on the basis of activity, activation, or usefulness (from acquisition of the word *alive* at about 4 years old up to 6 or 7 years old), then on the basis of movement (up to 8 or 9 years old), and later on the basis of automous movement (up to 11 or 12 years old), before restricting life to animals alone or to animals or plants. Piaget's system has been used by Russell and Dennis (1939, 1941); Dennis and Russell (1940); Russell (1940a, 1940b, 1942); Bruce (1941); Dennis (1943), Tomlinson-Keasey and Keasey (1972), and Papalia-Finlay (1978), who found that almost all subjects could be classsified within it. However, Piaget's Stages I and II of the life concept were collapsed by Laurendeau and Pinard, who found insubstantial empirical evidence to justify this division (1962: 133). In this text, Roman numerals will be used in reference to Piagetian stages, while Arabic numerals will refer to the stages set forth by Laurendeau and Pinard.

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Stage 1. Life attributed to entities on the basis of their activity, usefulness, anthropomorphism, or movement. (Laurendeau and Pinard, 1962:144-147; cf. Piaget, 1926b: 174-182,196-201).
Average age of accession: 5:3.

Any object may be conscious or alive at a given moment, if the object is whole and in some way activated. An animal always feels a pin prick, but a wall feels nothing unless it is knocked down. Then it feels itself being broken. Entities are judged to be alive if they are "doing something" of if they have force, especially in activities which directly involve or affect people. A candle is alive during the time when it is lit and giving light. A tree is alive when it has fruit. A mountain is not alive because "it doesn't do anything" or it is alive because, like a table and a person, "it stands up." Wind, clouds and cats are alive because "they have mouths" (for blowing, raining, and meowing), or because they move. A bicycle is alive because "it can go." The moon is alive because it follows us when we walk. Plants may be thought alive because they grow or, quite frequently, not alive on account of their immobility — an ambivalence which may persist into very late childhood.[16]

Of these criteria for life, it is certainly movement which is the most favored. Surely the child seizes upon movement as a preeminent characteristic of life on heavily egocentric grounds. Movement is always involved in the child's own purposive exertions, and in speaking and thinking — which both may be conceptually physicalized as an exercise of the vocal apparatus (Piaget, 1926b:37-55; Dennis, 1942: 309f, 312, 317). By projective analogy, the movement of entities is taken as a primary index of their will and purposiveness. But the child does not say that movement is

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[16]Note that Laurendeau and Pinard were more attentive to children's anthropomorphizing tendencies than was Piaget, so that anthropomorphism was included in their description of Stage 1 thinking. Piaget was not unmindful of the role of anthropomorphic projection in children's attributions of life; however, he regarded anthropomorphic rationales for attributing life as more ad hoc than other rationales (1926b:195).

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evidence of *purposiveness*. He has a more definite word for it. He says that a moving thing is *alive*.

> Stage 2. Life attributed to entities whose movement is autonomous.
> (Laurendeau and Pinard, 1962:147-150; cf. Piaget, 1926b: 182-185, 201-205).
> Average age of accession: 7:4.

The more advanced child recognizes that not all entities move of their own accord. The wind is alive and knows it is blowing, but clouds are not alive because they are moved by the wind. A bicycle is not alive because it is we who make it go. Fire may or may not be thought alive, since someone at least has to light it before it can commence its autonomous activity.

The Stage 2 child has discovered a criterion for life which sharpens the intentionalistic focus of his conception of life, and makes more accurate predictions than any criteria he has used before. Still, autonomous movement falsely predicts the life of some natural phenomena (the sun, wind, rain, lightning, etc.), and fails to predict the life of plants. The child in this stage typically continues to employ his earlier criteria alongside this newly discovered one, and to make animistic overattributions and underattributions.

> Stage 3. Life restricted to animals and plants, or to animals only.
> (Laurendeau and Pinard, 1962:150-153; cf. Piaget, 1926b: 185-187, 201-205).
> Average age of accession: 9:7.

Despite a persistent belief that the sun and moon are alive, the child eventually restricts life and consciousness to animals and plants, or to animals alone. Animism may persist in connection with the sun and moon because their movements are grand, apparently autonomous, and appear to accord with an intelligent routine. Further, their mechanisms are not accessible to direct investigation:

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when their aliveness or intentionality is supposed, it is not easily disconfirmed. For the most part, Stage 3 children continue to deny that plants are alive. The child's justifications may still invoke the inadequate criteria of prior stages, but there emerges eventually a valid, if rudimentary, biological understanding of the concept {alive}. Ultimately, all children will include plants among living things as they acquire adultlike knowledge of biological and causal processes.

The basic phenomena of childhood animism have been widely replicated in both European and noneuropean samples. The present work will cite approximately eighty studies employing diverse methodologies and examining diverse peoples. As always, crosscultural research has had to contend with special methodological complications, from the mundane (such as determining the ages of subjects) to the exotic (such as complexities of translation). Russell and Dennis (1939) attempted to develop a standardized test for animism, and employed it, with some modification, to investigate animism in Hopi (Dennis, 1943) and Zuni populations (Dennis and Russell, 1940). The entities presented for testing were certainly basic:

pencil	river	dog
knife	clouds	bird
mirror	lightning	bug
broken button	stone	tree
comb	moon	flower
chair	wind	grass
broken dish		
watch		

It is naive, however, to consider the list to be culturally impartial. For example, not all cultures have equal experience with watches and chairs, or even with rivers and trees.[17] Neither is it guaranteed that *tree*, *flower* and *grass* will represent in other cultures the ba-

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[17]E.g., Brown and Thouless (1954:36) reported that, in a neighborhood of aboriginal children tested at Coober Pedy in the Far North of South Australia, the few trees to be seen were dead trunks. It was very sensible therefore for the children to regard trees as nonliving.

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sic botanical categories that they represent in Western ones (Berlin, Breedlove, and Raven, 1973). Finally, the selection fails to control for the fact that some of these entities, particularly lightning and the moon, may be objects of religious sentiment. In fact, it is unlikely that any culture-neutral testing instrument can be developed. Nevertheless, while the crosscultural literature is lacking in uniformity, and while investigators have in their interpretations shown a wide range of enthusiasm and disenthusiasm for Piagetian universals, the sheer abundance of crosscultural findings of childhood animism leaves little doubt that animism flourishes in every sector of the globe.[18]

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[18]A strongly dissenting voice may be heard from Mead (1928; 1931:675; 1932), whose unique methods did not reveal animism in a group of Manus children of the Manu'a archipelago of the Samoan islands (Admiralty Islands, New Guinea). The idiosyncracy of Mead's concept of animism and of her methods for investigating it is well aired in Bruce (1941:87), Dennis (1943:34f), and Jahoda (1958a:201f,206f).

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Culture / Nationality	Study
Australian	Sedgwick, Linke and Lucas, 1978; Lucas, Linke and Sedgwick, 1979
Australian Aborigine	Brown and Thouless, 1965 (passing mention); Nurcombe, 1970
American	Berzonsky, 1970, 1973, 1974, 1988; Berzonsky et al., 1988; Berzonsky, Ondrako, and Williams, 1977; Bruce, 1941; Bullock, 1985; Carey 1985a; Cherry, this volume; Dennis, 1942; Gann, 1980; Gelman, Spelke and Meck, 1982; Granich, 1940; Hall, 1883; Holland and Rohrman, 1979; James and Miller, 1973; Keil, 1979; Klayman, 1979; Klingensmith, 1953; LeFurgy and Swigart, 1972; Lerner, 1937; Looft, 1973, 1974; Looft and Charles, 1969; Manaster, 1980; Nass, 1956; Oakes, 1947; Russell, 1940a, 1940b, 1942; Russell and Dennis, 1939, 1941; Safier, 1964; Schecter, 1980; Schwartz, 1980; Sharp et al., 1985; Sheehan and Papalia, 1974; Siegler and Richards, 1983; Smeets, 1973, 1974; Sugarman, 1982; Tomlinson-Keasey and Keasey, 1972; Tunmer, 1985; Whiteman, 1967
Canadian	Berzonsky, 1971, 1973; Boisclair and Dubreuil, 1975; Gorman, 1983; Laurendeau and Pinard, 1962; Laurendeau-Bendavid, 1977
Chinese	Huang and Lee, 1945 (cf. Strauss, 1951)
Egyptian	Khalil, 1987
English	Honkavaara, 1958; Khalil, 1987; King, 1961
Finnish	Honkavaara, 1958
German	Zeininger, 1929
Ghanan	Jahoda, 1958b
Hopi	Havighurst and Neugarten, 1955

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Culture / Nationality	Study
Japanese	Kawamura, 1987; Inagaki and Sugiyama, 1988; Inagaki, 1989; Inagaki and Hatano, 1987; Inagaki and Hatano, in prep.; Hatano et al., in prep.
Martiniquais	Boisclair and Dubreuil, 1975
Navajo	Havighurst and Neugarten, 1955
Papago	Havighurst and Neugarten, 1955
Puerto Rican	Keil, 1979
Swiss	Piaget, 1926b, 1933; DelVal, 1975
Rwandan	Laurendeau-Bendavid, 1977
Sioux	Havighurst and Neugarten, 1955
Spanish	DelVal, 1975
Swedish	Gorman, 1983; Klingberg, 1957
Trinidadian	Fraser-Abder, 1982
Zia	Havighurst and Neugarten, 1955
Zuni	Dennis and Russell, 1940; Havighurst and Neugarten, 1955

Table 2. Crosscultural Animism Research

2.23

Coupled with the seminal work of Piaget, Laurendeau and Pinard, and Dennis and Russell, the crosscultural studies cited above complete what might be called the classical account of childhood animism. This account affirms that, universally, animistic tendencies appear in the postinfantile period of development, only to finally subside with the cognitive integration of late childhood or adolescence and the acquisition of adultlike knowledge of biology and physical causation. Here, the universality of animism is fully accepted. However, numerous features of the classical account must be disavowed: the characterization of animism as a systematic set of beliefs; the characterization of animism as a belief system in fundamental conflict with biological theory; the characterization of

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animism as a thought syndrome confined by its very nature to childhood and; finally, the characterization of the developmental course of animism as a quantal ascension through a series of cognitive stages. With respect to these points, the classical account of animism must be supplemented, elaborated, revised and, in many ways, confounded, contradicted, and transformed, and this will be undertaken in the following pages.

2.231

Four interconnecting themes of supplementation will be developed. The first of these concerns the multiplicity of difficulties — particularly, the semantic difficulties — which arise when trying to interpret animism research. Generally, research reports offer a very impoverished view of the research subjects. The interpretive challenge is always to decide, from the subjects' bare responses, whether they understood their task in the way that it was intended; whether their responses were sincere, or whimsical or mischievious; whether, if their responses were sincere, they were intended literally or figuratively; whether they conceptualize life along veridical lines; and whether they understand the conventions according to which the word *alive* is used. Finally, the relationship between animism, biological understanding and metaphoric understanding may be obscured by epistemological complications.

The second theme of supplementation concerns the variability and evanescence of animistic phenomena, which has been very much underemphasized in classical accounts. If one wished to do a study on biological attributions of life, it would be easy enough to identify a panel of biologists, and to determine the bases on which entities were judged alive. It is not so easy to identify the animist, or to predetermine the criterial grounds of his animism, or even to predict the entities which he will regard as living. Animism is not always characterized by a categorical stance on the aliveness status of the world's entities. Animistic judgments of aliveness and the rationales offered for these judgments may change from one cir-

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cumstance to the next. It is well known that entities such as whirlpools and wind are likely to be judged alive by the young animist, but it is not necessarily the case that such judgments will be offered, or consistently maintained. The life status of every entity is to some degree open for review. Even stones and puddles and tweezers are sometimes judged to be alive.

Several loosely affiliated factors may modulate the degree to which animism appears in individuals. Individuals with more intuitive and impulsive mental styles are more likely to wax animistically than those with more reflective and analytic styles. Animistic tendencies appear to be abetted by withdrawal, and by an affinity for religion or poetry, while inhibited by scientific scruples. Animism is more prevalent among senescents and rural populations, where analytic norms are arguably more relaxed. The incidence of animism varies with the type and formality of the methodologies by which animism is experimentally investigated.

These kinds of variability indicate that animism is not appropriately characterized as a system of beliefs at all — much less, a system of biological beliefs. There is only just so much which is systematic or biological about it. In fact, the least systematic flashes of animism, such as when pebbles are said to be alive, must strike one as the best examples of animistic fiat. What else but a purely animistic impulse could account for them? The less systematic these assertions, the more demonstrably ascientific, abiological and animistic they must be. Animism emerges as less a system of beliefs, and more a pattern of sensitivities to the mutable dramatic foci of the ongoing world. It is difficult to regard the animistic outlook as any kind of biological or quasi-biological theory, since it is not obvious that there are determinative continuities between the set of beliefs which constitute biology and the set of situated phenomenological reactions which constitute animism. When the animist, in a certain circumstance, affirms that pebbles are alive, it seems doubtful that this constitutes an attempt at biology at all.

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The third theme of supplementation regards the complexity of relationship between animism on the one hand, and biological, causal, and metaphoric understanding on the other. The developmental course of animism is commonly represented as a set of linear connections between the child's animism and the adult's more refined systems of scientific and linguistic understanding. The effect has been to characterize animism in terms of the adult knowledge systems which are presumed to replace it. It is, after all, undoubtedly true that older children develop veridical systems of ideas about biology and causality, and that these developments coincide both with the disappearance of overt animism and with the emergence of related metaphoric understanding. Thus, animism has been regarded as if it were all along just a naive or mistaken theory of causality or biology, or a naive attempt at metaphor, or a captivating variety of early semantic confusion.

The hallmark of all these interpretations is that they have been unilaterally imposed from a perspective outside of the animistic system. Below, it will be argued that the animist is internally not confused, nor acting metaphorically, nor attempting to maintain a naive theory of biology or causality — even as metaphoric and biological and causal knowledge evolve and interact with animistic views. The idea has already been advanced that the ephemeral nature of animism makes it dubious that it can be regarded as any kind of a belief system at all. Neither is it obvious from animistic displays that animism is intended by the animist as any kind of a biological- or causal-theoretic stance at all: there is no obvious reason to characterize animistic views as mistakes in biology or causality when it cannot be demonstrated that the animist was ever 'doing' biology or causality. Even less attractive is the characterization of animistic displays as naive metaphors, since it is not sensible to suppose that an individual can act metaphorically while failing to distinguish literal meanings from metaphorical ones. An individual can only wield a word metaphorically when he holds the literal meaning in his other hand.

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Characterizations of animism as biological or causal or semantic confusion, or as an inability to distinguish between literal and metaphorical aliveness, are truisms whose terms are imposed from an adult perspective. A more appropriate characterization of the animistic mentality would focus on its internal constitution, rather than on its shortcomings when compared to the scientific and linguistic systems employed by mature adults.

The fourth theme of supplementation regards the necessity to reject the classical system of animistic stages and its attendant claims that adults and children conceptualize life in relativistically distinct terms. The validity of the classical stage system of development is an issue of particular importance, since the postulation of stages sets in place the principal theory-internal constraints on the variability of animistic response, and since what survives of the Piagetian claim of radical conceptual relativity between children and adults is concretized in the postulation of developmental stages. In §2.1, general arguments were advanced which undermined the general Piagetian claim of relativistic conceptual development. Below, it will be argued more specifically that the notion of animistic stages has never been internally coherent, and that the stages proposed are not properly isolable, nor properly associable with either chronological or mental age. It will be argued that the postulation of stages waylays our understanding of animistic sentiment by suggesting that response variability both between and within subjects is far less than has actually been observed, and by falsely proposing that animism reflects a style of thinking which is eliminated in the natural course of maturation. Evidence of perseverant animistic tendencies in adulthood will be presented from psychological studies, neuropsychological studies, and crosscultural studies of literature, religion and law.

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The supplementation process begins by addressing the difficulties of interpreting putatively animistic phenomena. It is impor-

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tant to consider how animistic thought tendencies may be revealed in experimental settings, and to sharpen the notion of what ought to count as an animistic display. It is not enough to simply tally up right and wrong answers to questions about the life status of things, since both animists and nonanimists are capable of coming up with right and wrong answers. What we are ultimately interested in is how life and how the meaning of the word *alive* is conceptualized by the subjects of these experiments. Our dilemma is how we come to this understanding given that most of the data available to us is constituted by right and wrong answers, and little else. We can improve our sensitivity to the interpretive dilemma by considering the different ways in which it is possible to come up with right and wrong answers when asked about the biological status of entities in the world.

First of all, it is always possible to get the right answer some of the time by guessing, though the success rate for this technique is low, and the discovery rate for the pretense involved is high. When individual interviews are employed, it is usually obvious to the investigator when the subject is merely guessing. Regardless of whether or not they chance upon the right answer, subjects who guess have neither scientific nor animistic conceptions of life, properly speaking.

Subjects might also get the right answer some of the time via inference from analogy or similar cases. A centipede may be judged to be alive 'because it walks' — which is to say, because an important positive feature of comparison can be found with humans, who are certainly alive. The use of analogy or of similarity gradients organized around exemplars almost always demonstrates some sensitivity to the clustering of key biological traits in prototypic living things. However, assessing biological status on the basis of similarity to exemplars can easily misfire, since similarity is itself so protean. There are innumerable contemplatable similarities (and dissimilarities) between any two entities. Compare a person and a car. A car may be said to be alive 'because it goes on trips' or not

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alive 'because it has no eyes.' In one case the judgment of life status is right. In one case the judgment is wrong. In both cases, the subject has failed to assess the life status of the car in a biologically respectable fashion. Whether or not the subject ought to be called an animist — that is, whether or not he conceives of life and the meaning of the word *alive* in a manner which deeply challenges biological and linguistic conventions — is a matter which calls for further data. Inference from analogy or similar cases is a cognitive strategy which may produce either correct or incorrect answers, and which may have either biological or animistic leanings.

As it turns out, there are only two ways to consistently get the right answer when attributing life and traits biologically affiliated with life to the world's entities. The first way, of course, is to determine attributions on the basis of real biological knowledge. In exalted cases, this knowledge might include some theoretical understanding of general biological principles. However, in every culture, the ordinary biological knowledge of the average adult is sufficient for a scientific assessment of biological status.

The second way to consistently get the right answer to biological inquiries is to employ class inclusion formulae. Class inclusion formulae are simply summary postulates about the characteristics of classes of entities, and about the inclusion relationships between these classes. The membership of the atomic classes in the system of inclusions is often classically defined, or perceived to be classically defined.

In the present connection, for example, a master formula must affirm that the category {living things} is constituted by the union of {animals} and {plants}.[19] The great familiarity of animals and

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[19]More biologically sophisticated readers may prefer some alternate classification system — for example, the system wherein the category of {living things} comprises the categories of {Plantae}, {Animalia}, {Fungi}, {Monera} (bacteria), and {Protoctista} (e.g., protozoa).

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plants and the overall clarity of the division between them gives rise to the supposition that these classes are determinate and have been classically defined by necessary and sufficient conditions of membership. In fact, establishing membership may have its problems, but these remain invisible in the hyperstabilized overview of the division between biological kingdoms. Ninety-nine times out of one hundred it just does not take a conference to determine whether something is an animal or a plant or neither. And once it is determined whether an entity is or is not an animal or a plant, its life status can be trivially determined by invoking the class inclusion formula which holds that all animals and plants, and only animals and plants, are living things.

Ancillary class inclusion formulae may predict, for adults, that living things can be born and can reproduce and can die, that they are genetically specified, that they have cellular organization, that they are excited by external stimuli, and that they can metabolize nutrients, maintain homeostasis, grow and develop, and evolve in interaction with their environment.[20] The formulae employed by children may be less sophisticated and less secure, affirming perhaps that all living things grow or eat or breathe or need water. At all levels of sophistication, class inclusion formulae provide a ready source of summarized biological knowledge, though the depth and quality of the knowledge provided is often not great.

To invoke class inclusion formulae is a form of seeking expert counsel: in this case the expert is constituted as a list of categorical and biological postulates. The problem with expert consultations is often that the quality of the consultation dialog is limited by the

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[20]Class inclusion rules can also predict certain traits of subclasses of living things: e.g., that plants photosynthesize (though some nonplants also photosynthesize); that animals require oxygen, or can move autonomously (though some nonanimals also have some powers of motion, and though a few animals do not move much, and though many move without much awareness of their motion). Properly attenuated, class inclusion formulae may also specify certain traits of subsets of these subclasses: e.g., that some animals might hear you if you speak; that some plants have roots; that some animals can get angry, etc.

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ability of the nonexpert to understand what the expert has to say. The individual who employs a class inclusion formula to effortlessly predict that a tulip must be able to maintain homeostasis, since what is called 'maintaining homeostasis' is something which all plants do, may in fact appreciate practically nothing about the mechanisms of plant metabolism. Paradoxically then, individuals who invoke class inclusion formulae may demonstrate biological 'knowledge' of a sort that is in fact unsupported by biological understanding. The superficiality of class inclusion formulae is, again paradoxically, a kind of virtue. It is because of their simplicity that formulae are accessible to the young and the naive, and this fosters categorical and linguistic consistency among individuals of highly disparate biological understanding.

In summary, a good number of superficially knowledgeable replies to questions about the biological status of entities in the world may actually be of spurious character. In the experimental setting, a little probing of subjects' responses may be of considerable value in assessing the actual depth of biological understanding and, hence, the actual range of biological commitments entailed when the word *alive* is employed. However, it should be noted that the solicitation of explanations increases many times the burden placed on the investigator, since it is he who must ultimately decide on the spirit in which the explanation is given. When a child asserts, for example, that trees are indeed alive 'because they have mouths in the ground,' it is the investigator who must determine whether this constitutes an animistic personification of trees, or a nonanimistic (if biologically naive) reference to the need of trees to take in nutrients from their environment. The solicitation of explanations may introduce many opportunities for misunderstanding and error at the same time that it safeguards against errors occasioned by relying completely on judgments.

Smeets offers some examples of seemingly mature judgments which, upon probing, turn out to be based on animistic thinking.

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Q: Does a cloud talk?
A: No, it just makes rain. It just cries and that is rain.
Q: Does a tree know how tall it is?
A: Of course not. Boys know how tall they are, trees don't.
Q: What makes you think so?
A: They are too stiff to look down, like I can. See, like this.
(Subject bends over.)
(Smeets, 1973:224)

Q: Does a cloud hear things?
A: No, there is not enough noise. It hears the airplanes though.
(Smeets, 1974:25)

DelVal offers some nice examples of questions whose answers ought to have been probed:

Do you think that an earthworm knows when it rains?
When we pick up a flyswatter, do you think that the flies around us realize this?
Does a house suffer when it is knocked down?
Many ships are lost in the bottom of the sea. We cannot find them. Do you think that the sea itself knows where they are?
Does the moon know that astronauts have landed on it?
(1975:319f, my translation)

One can think of a lot of reasons, some animistic and some not, why an earthworm might or might not know when it rained, why a house might or might not suffer, etc.

Let us turn now to ways in which subjects might come up with the wrong answer when asked about the biological status of entities in the world. First of all, it may come to pass that a child offers a pretend or playful response that he does not himself actually believe. That is, a child may possess accurate biological knowledge and yet answer incorrectly for some whimsical purpose. It is assumed here that a young child would not answer with an intention to maliciously deceive. This possibility we reserve for older children and adults. A related possibility for subjects of all ages is the case in which subjects respond figuratively while their answers are presumed to be literal. However, given reasonable care, none of these potential impediments to the interpretation of animism research are likely to have a large effect. Generally, when individual interviews

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are employed, cases in which subjects answer whimsically or deceptively or figuratively are detected without difficulty by the experienced investigator. In unclear cases, investigators often just ask the subjects whether they are responding literally, or whether they really think that such and such a thing is alive, etc. In addition, when examining a whole research literature, one is entitled to assume that subjects' responses are generally nondeceptive and literal, since subjects are generally cooperative, and since the generally accepted terms of cooperation specify literal and nondeceptive behavior (Grice, 1967; Sweetser, 1986).

Still, in interpreting animism research, close attention must be paid to the linguistic nuances of the questions asked of subjects. Young children in particular may be easily enticed into fantasy by suggestive instructions. Gelman et al. (1983) found, in interviews which were linguistically structured to encourage reflection and factuality, that preschoolers were surprisingly articulate about the animate-inanimate distinction. However, slight linguistic modification of their inquiries brought on classic animistic displays. Gelman et al. argued that preschoolers are capable of interacting in a play mode and in a non-play mode, and that the form of the questions that researchers asked might trigger one mode or the other. In particular, they suggested that the switch from a reality to a non-reality mode could be effected by predicate-complement constructions introduced by a verb of mentation.

> Consider the question "Does the wind know that it moves?" The wind can neither know or not know and hence the question is anomalous. However, the wind does move. If the child takes the mere posing of the question to mean that it is okay to think the wind 'knows' then why not allow that it also knows when it moves? (1983:320)

Gelman et al. observed that Piaget made broad use of constructions of this type in his clinical interviews, and hypothesized that the animistic profile that resulted was in fact to some large

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degree a profile of children at play.[21] To investigate this hypothesis, eight 5-year-olds were interrogated under two question format conditions. Linguistically neutral questions were followed by questions which linguistically presupposed the sentiency of the inanimates being considered. The effect of the alternation was striking.

> C.S. 66 mos: Can a rock talk? "No. Because it's not a person." Puppet? "Only when it's on the show." How about when it's not on the show. "It can't talk." Can a rock feel sad? "No. Because it's not a person." Puppet? "In the show, they could." Well, how about other puppets? "No. Because they are just toys." A doll? "No." Why? "Because she is just to play with." A cat? "Yes, if you bother him he can." Can a doll dream? "No — she's a toy." Puppet? "No. You use puppets." A rock? "No — it stays still every time. It can't move at all." A cat? "Yes — because a cat is alive."
>
> Do the clouds know that they're moving? "Yes." Does the rain like to water the flowers? "Yes." How come? "It likes flowers." Do the flowers like to be watered by the rain? "No. They don't want to be wet — when they get wet the leaves fall down and they're afraid" (321).

When previously asked the simple question, "Can flowers be afraid," the subject had sensibly answered in the negative. Here is a fine example of the ease with which children may slip into fabulist modes, especially when the experimental stimuli include toys, and when experimentation is conducted at preschools, which are in their essence play centers. The protocol cited shows further the advantage of probing a child's responses. Probing requires the child to give greater definition to his thinking, regardless of the mode in which he is operating. Above, it only by probing a scene involving flowers and rain that the fabulist nature of the child's responses becomes obvious.

A study by Nass (1956) reinforces the need for linguistic sensitivity in research design by pointing out that not all simple WH-questions are equally nonsuggestive. Nass hypothesized that how-

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[21]This point was not lost on Piaget, as Gelman et al. uncharitably imply. As discussed above, Piaget (1926b:249f) was aware of the problem of such constructions, and in fact provided a very penetrating analysis of the 'wind blowing' problem. Whether Piaget's clinical interviews were overly suggestive is another question.

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questions would encourage naturalistic responses, while why-questions would encourage nonnaturalistic ones. Regard the following:

> Why does the radiator get hot? v. How does the radiator get hot?
> Why does a clock tick? v. How is it that a clock ticks?
> Why do we have snow? v. How does snow come about?

It turned out that Nass was quite right. His why-questions elicited significantly more nonnaturalistic responses ($p < .001$). Looft and Bartz (1969:7) have suggested that

> A possible explanation for this finding might be that "Why?" and "How?" pose two quite different problems for the child. "Why?" may be interpreted by the child that he is to *justify* the categorization he just made (cf. the Russell-Dennis procedure: "Why do you say it is alive?"). This request for immediate justification may very likely have a higher probability of eliciting a superficial, immature (i.e., animistic) reply from the child. On the other hand, "How?" may indicate to the child that he is to support his categorization by more analytical means; therefore he may produce a more mature explanation.

Here, the obvious should be made explicit: that why-questions are the preferred vehicle for inquiring about sentient motives, while how-questions are the preferred vehicle for inquiring about physical causes and chains of events.

> How did M kill the dictator?
> With pruning shears.
> ! With hatred.
>
> Why did M kill the dictator?
> Because he hated him.
> ! Because the shears pierced his heart.

Since how-questions tend to preclude answers referring to mental states, even a crew of full blown animists would respond more naturalistically when asked for explanations in this fashion. Conversely, why-questions asked in connection with inanimates are much more apt to lead young subjects into a tangle of fantasy.

Two closely related sources of incorrect answers remain: biological confusion and semantic confusion. Biological confusion

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arises when the nature of biological life is incorrectly conceived. Semantic confusion arises when the use of the word *alive* is incorrectly understood; especially, when in literal use the word *alive* is not properly hooked up with and restricted to biological conceptions. In classic animistic affirmations — for example, "clouds are alive because they move" — these two kinds of confusion may be joined, or indistinguishable. Biologically, the life status of clouds ought not to be determined by their apparent ability to move. Linguistically, there is nothing here to guarantee that biology is being addressed at all: it may be that the word *alive* is simply applied to anything that moves, without its biological status being carefully considered. But while the balance between biological and semantic aspects of animism is elusive, it remains conceptually possible to separate the issues of biological and semantic confusion, and it is often analytically advantageous to do so. In part, this separation helps to demonstrate that not all misconceptions about life and about how the word *alive* is used are animistic.

There are many ways in which an individual might suffer from biological confusion. He might stumble in his biological reasoning. For example, he might erroneously regard as alive certain nonliving parts or products of living things; e.g., the lens of the eye, fingernails, hair, mucous, spittle, etc. Too, he might entertain fanciful biological beliefs. He might believe that crystal, like coral, is a collective expression of unobserved animals, and so affirm that crystals are alive. Or he might believe that mold is just a deposit of dirt, and so affirm that mold is not alive.

However striking, minor cases of biological confusion like these should not be regarded as animistic. The difference between mere biological confusion and true animism lies in how life is fundamentally conceived. The animist's conception of life is in some fashion orthogonal to biology; the merely confused or misinformed person's conception of life is not. Hence, when it is explained to an individual who is merely misinformed that no metabolic processes are conducted in hair and that crystals are not condominiums of

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protozoa and that mold is a collection of organisms rather than dirt, the individual may modify his assessment of the life status of these entities without having to modify his underlying conception of life. For the true animist, however, it is not just some detail of his conception of life or knowledge of entities which is misaligned with biological doctrine, but something essential about the nature of life per se. From the standpoint of biology, there is something irreparably amiss about the animist's conception of life; something that flouts biological doctrine; something that is beyond mere correction; something that must be cast off.

When an individual affirms that lightning and wind and rivers are alive, this strikes us as prima facie evidence of animism because it is inconceivable that the individual who holds forth in such a way could be suffering only from some small misconception about the nature of these entities' biology, or about the nature of biological life in general. It is just inconceivable that the conception of life underlying such affirmations could conform to scientific biological constraints, even approximately. This compells our credence in animism in general, since dramatic cases such as these are everywhere in the body of animism research.

Here, an interpretive irony emerges. While animism is said to have some roots in biological confusion, the confusion is said to be so radical as to elude biological correction. The incongruity arises because the characterization of animism as biological confusion is a characterization imposed by biological theorists from outside the animistic system, while the internal facts of the system demonstrate considerable independence from biological theory. Since animists do not analyze their own animistic activities, animism has only been characterized by nonanimists. These nonanimists have naturally employed nonanimistic biological models as the reference points for their outsiders' view of animism. Hence, what have passed as characterizations of animism have mostly been characterizations of how animism looks to nonanimists, rather than characterizations of how animistic thought is internally constituted and experienced.

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Viewed from without, animistic behavior necessarily appears as biological confusion; viewed from within, animistic behavior must achieve coherence via nonbiological means. One may certainly choose to interpret animism either from without or from within, though it appears a more interesting challenge to explicate animism in terms of its own internal coherencies.

A similar choice arises when assessing animism in terms of semantic confusion. In cases said to involve semantic confusion, the individual possesses a veridical (even if rudimentary) understanding of biology, but there is something amiss about the connection between the word *alive* and his biological conceptions. That is, he does not misinterpret the biological nature of entities around him, but he does misinterpret how the word *alive* is to be used. One must take care to remember that not all cases of semantic confusion are evidence of animism, and that the characterization of animism in terms of semantic confusion is, again, a characterization made from outside the system rather than within it. The animist may use the word *alive* aberrantly without himself suffering any confusion about what he intends by the usage. The system-internal question is always what the animist means.

In the clearest but rarest cases, semantically confused subjects will demonstrate some unique personal conception of how the word *alive* should be used. DelVal (1975:182ff) encountered two subjects who only used the word *alive* to refer to animals and plants which had been seriously wounded. In effect, their usage narrowed the sense of the word from 'not dead' to 'not *yet* dead' (or from 'alive' to '*still* alive'). Bruce (1941) encountered one subject who restricted the word *alive* to things that were standing up.

In other cases, the semantic faux pas of experimental subjects may be traceable to instructions or questions that have led them astray. Consider the introductory remarks offered by Russell and Dennis (1939:392) in their 'standardized procedure for the investigation of animism.'

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> We are going to play a game. I am going to ask you some questions and we will see how many you can answer. You know what living means? A cat is living but if an automobile runs over it, it is dead.

These instructions were misleading in two respects. First, the experimental interview was represented to subjects as a game, which may have had the unintended effect of liberating them to answer all questions in a play-mode manner. Second, the exemplification of the concept focussed on the alive-dead distinction and ignored the alive-inanimate distinction. If the thinking of young subjects was thereby restricted to the alive-dead contrast, then they naturally would be hard pressed to respond sensibly when asked about the life status of combs and broken dishes and mirrors, etc., since these are neither alive nor dead.

Sometimes it is not the instructions given, but the entities asked about which create semantic confusion. When Papalia-Finlay (1978) inquired about the life status of a 'bicycle being ridden,' it was not quite obvious whether the rider was to be included or not. In other cases, the choice of entities presented may be unduly suggestive. When Bell (1954) asked subjects to judge the animacy of both a lighted match and an unlighted match, it seems certain that some were encouraged to acknowledge the pointed contrast between these entities via contrastive judgments of aliveness. Other entities may be problematic in unintended ways because their relationship with living entities is in some way problematic; e.g., a pearl, the earth, atoms, blood. Pearls are problematic for the naive because they may be thought to be a part, or appendage, of the oyster. Pearls remain problematic for more sophisticated subjects because they never quite achieve the kind of independence from living things that inanimate entities ought prototypically to have: they are constituted by excretions from living things, and living things provide an environment for them. Living things are themselves provided an environment by the inanimate earth, which complicates the status of the earth — especially since the earth is also, in the broad sense of the word *earth*, partly constituted by the living things it hosts. Since everything is constituted by atoms, some subjects may be tempted

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to regard atoms as being alive. They may reason that, if life is a real quality, then its real ground must ultimately be traced to atoms, since references to atoms can provide a complete reductionist description of reality. Blood is problematic because it is a nonseverable component of living beings whose life status is not easily assessed in isolation, and because blood itself is made up of both living and nonliving components.

In some of these cases one might suggest that individuals have metonymically extended the meaning of the word *alive*. Metonymies in which mention of a general location evokes the animate entities therein located are common in English. When it is affirmed that Wall Street is in a panic, it is intended that stockbrokers — and not the very cobblestones of Wall Street per se — are in angst. When we note that it is common enough for research subjects to affirm that the earth and oceans and rivers and mountains are alive, we must wonder whether the subjects are innocently indulging in a metonymy wherein the environments of living entities are said to be 'alive' as a manner of speaking.

A second metonymy may be operating when experimental subjects affirm that entities which are consequences, products, or remains of life are living (e.g., skeletal bones, sea shells, fingernails). In this case, the word *alive* might be used in roughly the way that the word *organic* is used, to mean 'is living or once was living.' The aberration might be regarded as linguistic rather than biological, though it is possible that biological misconceptions may be co-partners in such confusion.

A third metonymy may be operating when experimental subjects affirm that entities which are in some way sources of life or necessary for life are living (e.g., the sun, air, water, blood, pollen, DNA, atoms). Here, again, it is quite possible that the subjects' semantic confusion is joined by some kind of biological confusion. That is, the manner in which the sun and air provide for life may itself be conceived in animistic terms: the sun and air may themselves be

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animistically vitalized, and it may be for this reason that subjects believe it appropriate to extend the word *alive* to them.

In an effort to elaborate the biological views of subjects, investigators sometimes ask questions about entities which range beyond the simple matter of their life status; especially, subjects may be asked whether the entities being considered possess different traits biologically associated with life. These studies have the advantage of providing greater information about subjects' biological views, but they also have the liability of opening up new opportunities for semantic confusion. 13% of Klingensmith's (1953:56) 5:10-12:10 subjects proclaimed that a candle could 'breathe,' but it is likely that this kind of 'breathing' was distinguished from biological respiration. Probably, affirmations that a candle could 'breathe' indicated little more than knowledge that a candle used up air.

When Inagaki and Sugiyama (1988) asked their 4-, 5-, 7-, 9-, and 20-year-olds whether a fish and a tulip and a tree 'breathe,' they had decided in advance that the biologically correct answers would be in the affirmative. However, there is nothing really biologically disreputable about restricting the sense of *breathing* to that activity which is conducted on land by animals with lungs. But if subjects used the word *breathe* in this way, denying that fish or tulips or trees breathed, they were said to have answered 'incorrectly.' Similarly, if a 'heart' were naively conceived as something which must pump blood, then grasshoppers would be naively said to lack hearts given the fact that they lack blood. Surely many of the responses labelled as biological errors by Inagaki and Sugiyama were actually definitional mismatches of this type.

Carr (1979) unintentionally collected several such mismatches in a study where children 2:0-5:0 were asked to judge the acceptability of sentences whose predicates required animate or inanimate subjects. For example, one child said that every entity probed was capable of 'hiding.' But when the child spoke of a cup or a ball 'hiding,' it is likely that he merely meant that these things could be

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put away out of sight. Comparably, one child said that a dog could 'get torn,' which ought to have suggested that the child thought of getting lacerated as one way of 'getting torn.' In fact, when asked if a rabbit could also be torn, the child responded, "Yes, get their heads off." Here the child is actually not far off adult collocational references to grievous harm: cp. *tear its head off*; *rip its heart out.* Studies of this type often derail because they fail to adequately distinguish between errors in judging the animacy status of entities, and errors in applying the predicates which are animacy-sensitive in literal adult speech. Presumably, the child above was using the verb *tear* in an extended fashion, rather than misjudging the animacy of the rabbit. In other cases, interpretation may be more difficult. When Carr's subjects affirmed that a bus was capable of 'waking up,' how could one know whether sleep and waking were being posited of the bus, or whether *waking up* was being extended to apply to diverse sorts of activation, including the starting up of motor vehicles?

Naturally, the more linguistically elaborate the predicates being employed, the more opportunity there arises for ambiguity and confusion. Tunmer (1985) presented semantically anomalous and nonanomalous sentences whose predicates required animate or inanimate subjects to 4-, 5-, 6-, and 7-year-olds, and elicited their acceptability judgments as an index of their animism. However, the tenuous relationship between animism and semantic judgments is apparent from Tunmer's single example of an anomalous sentence: 'The pencil ate the piece of cake on the table.' Tunmer's expectation was that nonanimists would reject this sentence while animists would accept it. But even if pencils were regarded as alive, this sentence might be scorned because, as everyone knows, pencils don't eat cake.

Berzonsky et al. (1988) refer to such sentences as 'function-incongruent.' In contrast, an anomalous function-congruent sentence might be, 'The bed slept all night.' Berzonsky et al. found that their 4- and 5-year-old subjects did well at judging the acceptability of

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both kinds of sentences, with error rates ranging from about 6% to 10%. However, subjects did appear more willing to accept animistic anomalies which took a function-congruent form ($p < .07$).

Most of the work in this field points to an interpenetration of biological and semantic confusion in animistic phenomena. Carey (1985a:25-29,34f) has suggested that children become confused when addressing the alive-dead and alive-inanimate distinctions, not only because their understanding of animacy and death is fragile, but also because these distinctions are blended in their mind with others.[22] The child may use the word *alive* to address:

the extant v. extinct distinction
(e.g., pelicans v. dodo birds);
the real v. imaginary distinction
(e.g., parapsychologists v. ghosts); and
the real v. representation distinction
(e.g., actual people v. people on TV),

as well as distinctions which, in adult speech, discriminate between metaphorical and literal senses of the word:

active or motile v. inert
(e.g., live v. dead embers);

functional v. broken
(e.g., live wire v. dead circuit).

Comprehension of the first three distinctions requires that biological and ontological knowledge be acquired. Understanding of the last two distinctions additionally requires the acquisition of linguistic

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[22]For data regarding the development of the concept of {death} in children, see Safier (1964), Holland & Rohrman (1979), Gorman (1983), and Dolgin & Behrend (1984).

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knowledge regarding the distinction between literal and metaphorical uses of the word *alive*.

There is good reason to believe that the acquisition of all these distinctions proceeds as a unitary, if complex, process. Carey (1985a) has correlated the disappearance of childhood animism with the acquisition of biological knowledge. Schecter (1980; cf. Keil, 1986; Engel, 1988) has correlated the disappearance of childhood animism and the emergence of related metaphoric understanding. Animism disappears; biological and metaphoric understanding emerge.

Curiously, these facts are often taken to imply that animism is really 'just metaphor,' as if the animist simply did not recognize that he was speaking metaphorically, since he was unable for want of biological understanding to distinguish metaphorical and literal speech. The problem with this interpretation of animism is that it wishes to characterize as 'just metaphorical' that which it also wishes to say exists before metaphoric understanding. What does it mean to say that animists speak metaphorically without knowing that they do so? If animists believe what they say to be literally true, then who are *we* to say that they are speaking metaphorically?

In contemporary treatments, it is affirmed that some metaphor is not consciously recognized because the terms of the metaphor are established at an unconscious cognitive level. But here too, it is hard to support the notion of a literal-metaphoric distinction which the speaker himself is unable to recognize, and refuses to endorse. Whether metaphor is thought to ensue at a conscious or unconscious level, there must always be a distinction between the literal and the metaphorical, if the word *metaphor* is to retain any semblance of its traditional meaning. The problem with speaking about metaphor in connection with animism is that there is no evidence that this distinction has been made at the tender age when animistic expression begins.

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The interpetive dilemma regarding the relationship between animism and metaphoric understanding can be made a little plainer by taking a concrete case. Klingensmith (1953:58ff) suggested that, because the child has a limited vocabulary, he says that an entity is alive whenever it evinces some activity or function, and means no more by this usage than that the object is 'lively.' In essence, Klingensmith affirmed that animists naively use the word *alive* in a metaphorical fashion. For Klingensmith this indicated that his subjects did not suffer from a "gross misrepresentation" of reality. But if the concept {alive} is amalgamated with the concept {lively}, aren't bona fide animistic inclinations in force? And is it accurate to regard such aberrant word use as evidence of only linguistic confusion?

The Klingensmith position points out an epistemological problem. How can an investigator know whether an individual uses the word *alive* to mean 'lively' because he fails to map the word onto his literal scientific biological conceptions, or whether the word is used in this way because his biological conception of life is so simplistic in its animism that liveliness is taken to be veritable evidence of life?

Klingensmith was confirmed in his view that 'animistic' uses of the word *alive* were the result of linguistic confusion (i.e., were naively metaphorical) by the fact that his subjects affirmed that many entities were alive while at the same time denying that these entities could grow or breathe or feel or know something, etc. Klingensmith reasoned that true animism would involve more farreaching biological commitments than he observed. But who is to say that an animistic conception of life should be constituted by the same biological features as a scientific conception of life? Unlike the biologist, the animist is under no obligation to regard all living things as capable of growth, genetically determined, etc. Further, as it shall become clear in succeeding sections, it is very commonly the case that animists *do* attribute at least some of the traits which

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they associate with their own life to entities which they label as 'alive.'

A conceptually similar problem arises in assessing the view of some investigators that animism is not a genuine phenomenon, but just a label given to the expression of indistinct conceptions of life. Beginnning with Bruce (1941), investigators have cited the "hazy and often confused" (83) responses of subjects as evidence that subjects were more befuddled than animistic. Huang (1943:112) found, in younger children, that "[t]he picture presented is not one of mystic precausality, but the *absence of any definite idea.*" Huang warned against

> [a]n inclination to find systematic coherence in the child's inconsistent responses. ... [Such an effort] often shows more the ingenuity of the scholar than the mentality of the child. It seems a much safer policy to accept lability and inconsistency as the true characteristics of childish responses and attempt to understand them as such ... (116f)

But who is to say what standards of consistency should be applied to animistic conceptions? How consistent does an animist have to be?

Bruce (1941), Huang (1943), Huang and Lee (1945), Klingensmith (1953), Klingberg (1957), Carr (1979), and Holland and Rohrman (1979) have all argued that animism is better conceived of as mere mistakenness than as a self-sufficient state of mind. But the observation that animistic phenomena can be regarded as an inconsistent or hazy set of biological and semantic errors should be the beginning rather than the end of an interpretive effort. It is just a truism that animism is misaligned with conventional biology and semantics, and that scientific and linguistic conformity increase with age (cf. Jahoda, 1958a:204). The issue of interest is not whether animism violates the tenets of biological science or the conventions of literal speech, but whether animism is a thought syndrome with its own first principles, and whether these principles can be specified. In advance, there is no guarantee that the characterization of animism as mistaken biology or naive metaphor

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will add anything substantial to an understanding of what the animist is thinking when he animistically deploys the word *alive*. The interpretive challenge is to winnow the animistic phenomena from the right answers and wrong answers and terse explanations of research subjects, and to infer from this essentially bare data what the qualitative character of the animistic mentality must be in order for such animistic positions to be taken up. Ultimately, we should like to see reflected in our characterization of the animistic mentality an appreciation, rather than a dismissal, of the haziness and variability of animistic inclinations, and of the complex tension between biological, metaphorical, and animistic styles of thought.

2.233

Taking Huang's (*op. cit.*) remarks to heart, we begin here a review of animism research which will attempt to properly acknowledge the variability, asystematicity and evanescence of animistic displays. Let us begin with the observation that many factors may alter the frequency with which individual entities are animistically appraised. The classic postulation of a stage system tends to give the impression that, at any given stage of development, all entities which meet the criteria characteristic of that stage are equally likely to be regarded as alive. In fact, there is no real support for the notion of isolable stages of animism cohering around a few criterial considerations such as whether an entity can move autonomously or not. Throughout the developmental period in which overt animism thrives, numerous factors may influence an animist's attributions of aliveness. Different considerations favor the animistic appraisal of different entities. As a consequence, it is hardly the case that any two entities — much less a whole set of entities — are equally likely to be regarded as alive.

There is, however, an overall tendency to favor a certain tenuously coherent set of entities over others, since the factors that an animist is likely to consider are not themselves random, but rather tend toward a loose association of their own. Animistic appraisals

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are least frequent, and first disappear, in connection with entities which are inactive, unimportant, familiar, manipulable, simplex in construction and causally transparent. Conversely, animistic appraisals are most common and most persistent in connection with entities which are active, purposive, constitutionally complex, and causally enigmatic. This is especially true when these entities — like humans — are not constructed of simple materials, but are rather products of nature which are irregular and unique, and which move autonomously, make sounds, have parts, interact with other entities, adhere to routines (or act unpredictably), and are in some ultimate sense unconstrained or indeterminately structured or wild. In short, animistic projection thrives in cases where some aspect of the entity invites anthropomorphic projection at the same time that projection is not suppressed by concrete causal or biological knowledge.

There are great consistencies in the way that young people of different cultures and different times grow oriented to the physical world. Accordingly, the entities favored and disfavored for animistic projection are pretty much the same from culture to culture and from time to time. One can pretty much count on the sun and autos and wind to outdo stones and bottles and sticks. Below, research data is presented which demonstrates what might be called a cross-cultural animism hierarchy. This hierarchy is topped by powerful, causally opaque natural entities with a capacity for movement and for influencing human affairs. One might refer to these entities, which classically include the sun, the moon, lightning, wind and rain, as the 'noble inanimates'. The midrange of this hierarchy is studded with less impressive, less causally mysterious natural entities, and with large, complex and useful machines. The lower range of this hierarchy finds inert and useless natural entities such as puddles and stones, and artifacts of simplex construction such as pots and knives. While prototypical animals are almost always said to be alive, nonprototypical animals such as insects may sometimes be denied life, and it is common for young children to deny life to plants. Among plants, trees are particularly disfavored, presumably

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because they are perceived as being more static than flowers, grass or bushes. The degree to which plants are animistically denied life by young children varies from medium to high. Following, some data supporting this crosscultural animism hierarchy.

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GRANICH (1940)

Percentage of total responses which judged the aliveness of the test entity animistically:[23]

Test Entity:	Younger Normals	Retardates	Older Normals	Average of Groups
moon	56	61	17	45
wind	44	61	25	43
automobile	56	56	17	43
electric light	44	50	25	40
rolling bead	33	44	0	26
squeaking doll	33	44	0	26
tree	50	28	8	29
flower	33	17	0	17

HUANG & LEE (1945)

Percentage of total responses which judged the aliveness of the test entity animistically (i.e., where judgments were classified as 'wrong' or 'doubtful'):[24]

Test Entity	"Is it alive?"	"Has it life?"
moon	72.2	58.4
watch	72.1	20.0
bicycle	49.4	2.8
auto	48.8	14.8
ball	35.4	12.1
river	17.2	0.0
pencil	9.5	2.4
stone	0.8	2.4
tree	55.4	70.2
dog	0.0	0.0

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[23]Ss: three groups from similar New York City neighborhoods: mental retardates; younger normals of comparable mental age; older normals of comparable chronological age. The retardates: 18 boys 13 and 14 years old of mental age 7-8 years old and IQ 50-60 (Kuhlmann-Anderson). The younger normals: 18 boys 7:1-8:3. The older normals: 12 boys 13:2-14:4.

Here, and below, responses which denied life to plants or animals were counted as animistic responses, since the grounds for denying life are typically of the same kind used to accord life to inanimates; e.g., a tree might be denied life because it does not move, or a worm might be denied life because it has no face.

[24]Ss: 40 Chinese children, half 3:5-5:11; half 6:0-8:7.

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KLINGENSMITH (1953)

Percentage of total responses which judged the aliveness of the test entity animistically:[25]

Test Entity	In Response to Question 1, at Session Beginning	In Response to Question 10, at Session End
candle	54	30
clock	46	24
comb	15	4
knife	13	4
dish	7	3
match	6	3
flower	23	33
fish	0	0

KLINGBERG (1957)

Percentage of total responses which judged the aliveness of the test entity animistically:[26]

Test Entity	"Is it living?"	"Has it life?"
moon	67.0	61.0
river	37.5	25.5
watch	37.5	22.5
automobile	33.0	21.0
bicycle	21.0	13.5
ball	16.5	10.5
pencil	12.0	13.5
stone	6.0	4.5
tree	12.0	25.5
dog	6.0	7.5

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[25]Stimuli were varied as to their real/apparent animation and functional value: burnt kitchen match, broken dish, opened pocket knife, comb, loudly ticking alarm clock, lighted candle, goldfish in bowl, petunia in pot. Ss: 142 Pennsylvanian schoolchildren evenly distributed in grades K, 1, 3, 5, 7 (average age of groups ranging from 5:10-12:10), of normal IQ. Questions 2-9 asked about the presence of traits biologically affiliated with life, such as the ability to feel, breathe, see, etc.

[26]Ss: 97 7-10 year old Swedish children. Figures given are for the 67 7-8 year olds.

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KING (1961)

Percentage of total responses which judged the aliveness of the test entity animistically (i.e., where judgments were classified as 'incorrect' or 'unsure'):[27]

Test Entity	6-Year-Old Subjects
sun	75
fire	similar to sun
"moving things"	72
candle	app. 35
tree	63
flower	42
dog/bird	app. 13

LAURENDEAU AND PINARD (1962)

Percentage of total responses which judged the aliveness of the test entity animistically:[28]

Test Entity	All Subjects
sun	43
wind	35
cloud	29
rain	25
automobile	25
fire	23
airplane	23
bicycle	20
watch	19
bell	19
mountain	14
lamp	13
pencil	12
table	5

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[27]Ss: 1811 English schoolchildren classified as 6-, 7-, 8-, 9-, 10-, and 11-year-olds.

[28]Ss: 500 French Canadian children 4:0 to 12:0. See preceding note.

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SMEETS (1974)

Percentage of total responses which judged the aliveness of the test entity animistically:[29]

Test Entity:	Younger Normals	Retardates	Older Normals
cloud	50	50	15
automobile	30	20	15
river	30	15	10
table	15	15	5
bottle	10	15	5
tree	75	45	15
flower	45	10	5
fish	15	5	0
cat	5	0	0

DELVAL (1975)

Percentage of total responses which judged the aliveness of the test entity animistically:[30]

Test Entity:	All Subjects
sun	48.8
moon	44.7
river	44.4
match	41.9
wind	40.2
stars	38.9
sea	37.1
lightning	35.9
electric light	31.0
rain	27.5
car	21.0
fire	19.2
bicycle	16.9
television	14.0
table	6.8
stone	4.0
mountain	2.0
doll	0.0

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[29]Ss: three groups of 20 each: mental retardates; younger normals of comparable mental age; and older normals of comparable chronological age. The retardates: CA 11:0-12:0; MA 5:10-7:2; IQ 50-65. The younger normals: CA 5:10-7:2; MA 5:10-7:2; IQ 90-110. The older normals: CA 11:0-12:0; MA 11:0-12:0; IQ 90-110.

[30]Ss: 130 Madrid children 4:0-12:0.

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Percentage of total responses which judged the aliveness of the test entity animistically:

Test Entity:	All Subjects
tree	42.7
grass	40.4
flower	29.2
you (the subject)	7.3
tortoise	2.5
dog	1.7
fish	0.0
"people"	0.0
"animals"	0.0

The data presented above describe just one dimension of a crosscultural animism hierarchy. In this first dimension, the likelihood that an entity will be called alive is variable. There is a second dimension, highly related to the first. In this second dimension, there is variability in the *degree* to which entities are thought to be alive. That is, some entities are thought to be *more* alive than others. Underlyingly, these two phenomena appear to be driven by the same force of animism. The rationales offered for calling an entity alive or for calling one entity more alive than another are of like kind (Piaget, 1926b:196f; Honkavaara, 1958; Laurendeau and Pinard, 1962:68,152f,266; Nurcombe, 1970:76; DelVal, 1975:194-200; Cherry, this volume). And crucially, the likelihood that an entity will be regarded as living covaries with the likelihood that the entity will be regarded as more living than other entities (DelVal, 1975:194-200; Cherry, this volume). Thus, the sun is not only regarded as being alive more frequently than most other inanimate entities; it is generally regarded as being more alive than most other inanimates.

The animistic view that aliveness can be graded is consonant with those linguistic systems in which entities are assigned to ANIMACY classes arranged in a hierarchy. It will be shown in the next

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chapter that the entities favored by animists turn out to be the very entities favored in these ANIMACY hierarchies.

The animistic view that aliveness can be graded is quite dissonant with biological doctrine. The animist's view that some things are more alive than others undermines the notion that animism is a naive biology, since even primitive biologies represent aliveness as a binary status. If the essentially binary distinction between living things and nonliving things is given up, it is hard to say that what remains is a biology at all. This is to say that the word *biology* refers, first and foremost, to just that theoretical exercise according to which the entities of the world are divided into living and nonliving groups. *That's* what biology is — but that is not necessarily what animism is.

The notion that animism is a naive biology is further undermined by the asystematicity in animists' attributions of aliveness. In any biology, naive or sophisticated, it is always the case that clear examples of living entities and clear examples of nonliving entities can be produced, and must be produced. We require of a biology that it pick out a set of entities in the world — viz., the set of entities said to be biologically alive. It is not acceptable for a biologist to say, "I have a conception of life but I cannot give you a specific example of something which is definitely alive, or not alive." Even if there is controversy in the assignment of life to some entities, and even if the transition from being alive to being dead is problematic, and even if other complications arise, it remains the case in any conceivable biology that some secure examples of living and nonliving things can be produced. Where the set of entities at issue cannot be made explicit, even in terms of its exemplars, the whole status of a biology as a system of beliefs is imperiled. There cannot be any definite biological beliefs in the case where it cannot be definitely said that there are entities which exemplify the belief. It is in the requisite nature of a biological belief to be *about* a set of entities whose definition meets certain standards of stability.

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In animism, it turns out, there may be no ultimately secure examples of living and nonliving entities. It is often observed that animists oscillate in their appraisals of aliveness, and in the course of these oscillations even stones may be said to be alive, and even humans may be said to be nonliving. To the degree that it remains unpredictable what entities animists will regard as alive, it can hardly be maintained that animism is a system of beliefs at all — much less, a system of biological beliefs.[31]

The potential for even quiescent entities to be judged alive can be seen in Harris (1975), where 5 of 32 subjects 4:6-7:4 said that a drink was alive, and where 3 of 16 subjects 4:6-5:4 said that a house was alive. Inagaki and Sugiyama (1988) found, in questioning 4-year-olds, that 3 of 20 said that a stone could think and had a heart, and that 8 of 20 said that a stone could feel happy. Ezer (1962) found that of 153 boys six to eight years old, 36 (24%) believed that the sea knows where sunken ships are, that a balloon feels it when it is burst, and that a stone thrown in the air feels its crash upon the earth. 60 (39%) additional subjects subscribed to one or two of these animistic views.

The potential for even animals to be judged nonliving is demonstrated in Laurendeau and Pinard (1962:151f), where 11 subjects (2%) were found to deny life to one or more animals. In almost every case, these were nonprototypical animals; e.g., a snake, a fly. However, among animists, even humans may occasionally be denied life. Honkavaara (1958) individually interviewed 61 'bright' and 61 'dull' children (as identified by teachers). In the course of each session, the investigator put a sack over her shoulders and asked, "Am I alive or not?" 33 (18 Piagetian Stage I; 8 Stage II; 5 Stage III; 2 Stage IV) of the children regarded the investigator as not alive in

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[31]Regarding retesting and reliability, see Piaget (1926b:190), Keen (1934), Russell and Dennis (1939), and Russell (1940a), Klingensmith (1953). Regarding logical inconsistencies within a single session, see Cherry (this volume, Appendix D). Regarding children's tendencies to view death as an intermittent status, see Safier (1964:291).

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this condition. 8 of these children were bright; 25 were dull. When the investigator presented herself in a common dress and asked if she was alive or not, only one dull subject responded that she was not. DelVal (1975:234) encountered subjects who denied that they themselves were alive.

The asystematicity of animistic attributions of life arises because animists are influenced by situational factors in a way that no biologists would ever be. A biology concerns itself with a set of living things which is determined only by features of the things themselves. In establishing the membership of this set, a biology does not concern itself with the accidental circumstances in which things happen to turn up in the world. In particular, a biology does not allow the life status of an entity to circumstantially vacillate between being alive and not alive: for any given entity, life is a one-time event. Neither does a biology pay heed to the subjective reactions which a biologist might have to an entity in varying circumstances. As a science, biology is committed to the elimination of factors circumstantial and subjective. Animists, on the other hand, often regard the circumstantial activities of entities as relevant to determinations of aliveness. And since these determinations are largely matters of projection, they are subjectivized through and through.

DelVal (1975:240,242) encountered subjects who would attribute consciousness to an entity if it was undergoing change, but not if it was in a steady state. Piaget (1926b:196) noted that Vel (8 1/2 y.o.) maintained that a candle was only alive when giving light; a bicycle, when it goes; a tree, when it has fruit. Tann (8 y.o.) said that a stone was alive "if you throw it, or if you kick it to make it go" (1926b:196). Kenn (7 1/2 y.o.) believed that a stone would not feel a prick, but that it would feel itself getting burnt in a fire (1926b:176). Juill (7 1/2 y.o.) affirmed that a table felt nothing ordinarily, but would feel itself being broken, just as walls would feel themselves being knocked down (1926b:176f). Sart (12 1/2 y.o.) allowed that bodies of water could feel it when the wind whipped up

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waves (1926b:180). Vel affirmed that a bench would feel itself getting burnt, that a wall would feel itself getting knocked down, and that a button would feel itself getting ripped from a coat — though ordinarily these entities would feel nothing at all (1926b:174f). Piaget observed further that

> [I]t may easily happen that a child who has just attributed consciousness to a particular object denies it directly after; a new factor need only intervene to upset the earlier view and make the child forget all he has said, contradict himself, change his beliefs, etc. (189)

Laurendeau and Pinard (1962:152f) found that some children would affirm that one entity was more alive than another and then, in the next moment, deny that the supposedly superior entity was alive at all. DelVal (1975:180ff,229f) also encountered subjects who vacillated in their attribution of consciousness or life, and in the reasoning behind their attributions.

The upshot is that, again, animism cannot be said to be about a set of entities in the same way that a biology is said to be about a set of entities. To the degree that animistic judgments of aliveness are swayed by circumstantial and subjective factors, the aliveness of every entity may be indeterminate when posed in the abstract. Further, there is a sense in which the animistic characterization of a thing as alive may carry with it a characterization of the circumstances which affected the judging. That is, an animistic attribution of life may be more than just an attribution of a quality to an entity: it may be an attribution of a quality to the whole interactive complex of circumstances in which that entity comes to the attentional fore.

The difference between the way that biology is about a set of entities and the way that animism is about a set of entities may be something like the difference between the way that the word *wooden* can be about something and the way that the word *pleasant* can be about something. Both of these words are attributive adjectives; however, the word *wooden* addresses the intrinsic constitu-

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tion of a thing, and hence specifies a determinate set of entities in the world, while the word *pleasant* addresses a quality which is always determined by the beholder of a thing, and hence fails to specify a determinate set of entities. A cantata is said to be pleasant, partly to be sure as a result of the intrinsic construction of the cantata, but crucially because it is pleasant *for* some particular listener. Hence, the word *wooden* can be said to be about some definite set of entities, and about those entities and nothing else, in a way that the word *pleasant* can never be. It is always part of the meaning of the word *pleasant* that some judge has so regarded the thing so described: an attribution of pleasantness is in part a revelation about the nature of that judge. The pleasure of the judge is an implicit but essential part of what is predicated when the word *pleasant* is employed, even though the word *pleasant* is advanced by the judge as a description of the entity under consideration.[32]

Similarly, an animistic attribution of aliveness may assert a state of affairs involving more than just the intrinsic constitution of the entity said to be alive. It has always been tacitly assumed that, *in spite of* animism being a projective activity, animistic attributions of aliveness were only *about* the entities assessed. Rather, it should be explicitly acknowledged that, *because* animism is a projective activity, animistic attributions of aliveness must in some way be *about* the animist doing the assessment. It is precisely because factors extraneous to the entity proper may be relevant to animistic attributions that different animists may not agree on the aliveness of different entities, and that a given entity may be viewed as alive in one context and then later not alive in another. And it is partly because of the inclusion of circumstantial and subjective factors in animistic judgments that animism fails to be scientific, and cannot be legitimately regarded as a biology, naive or otherwise.

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[32]On this semantic distinction between adjectives like *wooden* and *pleasant*, see Vendler (1968) and Farsi (1968).

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Once we abandon the presupposition that an animistic attribution of aliveness is only about the entities being appraised, we empower ourselves to begin to address the complete phenomenology of the animistic episode. In particular, factors relating to the circumstances of appraisal and to the character of the appraiser may be freshly and more openly assessed. While some factors such as gender or race do not appear to affect animistic expression,[33] other factors relating more directly to conceptual style definitely do. Let us consider a few of these factors.

Nass (1956) posed questions about the causes of various phenomena to 120 New York City schoolchildren 8:0-10:0, of average intelligence. 60 of the children were of normal emotional adjustment, while 60 had emotional problems related to withdrawal. The normally adjusted children produced nonnaturalistic explanations 18.9% of the time, while the withdrawn children produced nonnaturalistic explanations 45.6% of the time, a difference which was highly significant ($p < .001$). Since the personality assessment of the subjects was neither very formal nor very explicit, it is difficult to interpret Nass's findings. One suspects immediately that the more

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[33]Bruce (1941) did report differences between her Black and White subjects in rural Virginia, but the cause of this difference is here believed to be socioeconomic and educational factors, rather than race. The inconsequence of racial differences is demonstrated in Tomlinson-Keasey and Keasey (1972). The inconsequence of gender is evident from, in connection with juveniles: Russell (1940a), Looft and Charles (1969), Howe and Hillman (1973), James and Miller (1973), Berzonsky (1974), Looft (1974), Gann (1980), Dolgin and Behrend (1984), Tunmer (1985), Khalil (1987), Berzonsky (1988), and Berzonsky et al. (1988); and, in connection with adults: Dennis (1957), Simmons and Goss (1957), and Mikulak (1970). Of all the studies cited in this volume, only one found a difference in animism between the sexes. Sheehan and Papalia (1974) observed in a small group of seniors (65+ y.o.; N = 18) that the women responded more animistically than men. One wonders if women of this age were less educated than their male counterparts, although the results of this and other younger samples indicated to Sheehan and Papalia that the level of animistic response was not related to the level of educational attainment. Neither did the senior women's increased animism relate to an increase in field-dependence, as determined by Witkin's Embedded Figures Test. The research team speculated that nearness to death and 'terminal drop' may contribute to a loss of analyticity; however, logical classification ability did not in fact decline in the group of seniors. Why the women in this study were more animistic than men (or more willing to say animistic things than men) remains a mystery. If the phenomenon is genuine, one would like to see it replicated in a larger sample.

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withdrawn children were more given to fantasy, more prone to projection, and in a myriad of ways less bound by mainstream conventions and more prone to idiosyncratic intrerpretations of phenomena.

Berzonsky (1974) investigated whether variability in animism was related to differences in children's conceptual tempo. 67 6- and 7- year-olds were given Kagan's Matching-Familiar-Figures Test of reflectivity. 22 youngsters were classified as Reflectives (they worked slowly and made few errors), and 22 youngsters were classified as Impulsives (they worked quickly and made many errors). The Nowicki-Strickland locus of control scale for children was also administered, to determine whether subjects believed that what happened to them was primarily determined by internal (personal) or external (environmental) factors. The two variables, reflectivity/impulsivity and internality/externality, were independently distributed. Subjects were asked to determine the life status of four inanimates (sun, cloud, car, watch) and four animates (cat, flower, tree, grass). Analysis indicated that the Laurendeau and Pinard stage attainment of the Reflectives was significantly more advanced than that of the Impulsives ($p < .01$). No significant differences related to the internality/externality variable.

The positive finding was replicated in Berzonsky et al. (1977), where again Reflective 6- to 7-year-olds tended to be more advanced in their conception of life than Impulsives ($p < .01$). In this later study, it was further found that Reflectives showed greater improvement in assessing life status than Impulsives following an 11-minute educational biology film.

Berzonsky (1988) administered Witkin's Embedded Figures Test to 13 5-year-olds, 17 6-year-olds, and 10 7-year-olds. The test was designed to assess field dependence, an aspect of cognitive style. The field independent individual has a greater ability to inhibit an incorrect response suggested by salient perceptual data in favor of a more logically based correct response. In short, field dependent subjects rely relatively more on cues afforded by the per-

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ceptual field, whereas field independent subjects are more analytical. Berzonsky's subjects were then asked to assess the life status of a collection of entities which were presented in a moving state as well as a stationary state. Among those 13 (32.5%) subjects disposed to make animistic responses, field dependence did significantly mediate the effect of the motion state manipulation. As one would expect, the field dependent subjects were more likely to be animistically influenced by a portrayal of an entity in motion.

Sheehan and Papalia (1974; see summary in Papalia and Del Ventro Bielby, 1974:434) assessed the field dependence and field independence of subjects across a wide age range, and investigated whether this factor promoted or inhibited animistic behavior. As in the Berzonsky study, field dependence was determined by Witkin's Embedded Figures Test. There were 18 subjects in each of five test groups. The groups contained individuals 6-7 years old, 11-13 years old, 18-21 years old, 30-64 years old, and over 65 years old. Field dependence was generally unrelated to the ability to accurately classify objects as living, except in the case of the 11- to 13-year-old males. In this group the field independent boys were more likely than the field dependent boys to solve the animism problems correctly. The small size of the samples in Berzonsky (1988) and in Sheehan and Papalia (1974) cannot really support a strong generalization, though the studies taken in tandem certainly offer some evidence in favor of a relationship between field dependence and animism.

The relevance of subjective factors was confronted very directly by Honkavaara (1958), who undertook a study to determine whether simply liking an entity might foster an animistic appraisal of its life status. Honkavaara's subjects were 61 bright and 69 dull English schoolchildren 5-8 years old. Mental acuity was informally judged by the children's teachers. The subjects were classified according to the Piagetian stage system. The subjects were individually interviewed, and shown fourteen pairs of inert objects: two bottles, two thimbles, two eggs, etc. In each case, one pairmember

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was plain, but the other was quite gaudy. Subjects were asked which of the pair they liked best and whether each pairmember was alive. If both pairmembers were said to be alive, then subjects were asked whether one of the pairmembers was more alive. The Stage I and II subjects judged the liked pairmember as being the pairmember which was alive (in 90% of such judgments), or as the pairmember which was more alive (in 87% of such judgments). Even when only bright Stage I and II subjects were considered, the liked pairmember was significantly more often judged to be the alive pairmember (in 79% of such judgments), or the pairmember which was more alive (in 78% of such judgments).

Honkavaara affirmed that the more liked object was not always the more decorated one, and that even a plain object would be animistically favored if it was more liked. However, no figures are given to indicate how well plain objects actually fared against gaudy ones. One suspects that, on the whole, the gaudy ones were much better liked. Wasn't that really the inspiration for making them gaudy in the first place? To the degree that the more gaudy pairmember was the more liked pairmember, one might reasonably suspect that being gaudy was the cause of being liked, and that being gaudy (rather than being liked) was also the cause of being assessed as alive, or more alive. Too, methodologically, it would have been better if Honkavaara had not asked his aliveness questions and his preference questions at the same time, since this may have encouraged perseveration. But if we can see our way clear to setting these reservations aside, Honkavaara's data do suggest that affective appreciation of an object can intensify an animistic sense that the object is alive.

To some, the Honkavaara findings may seem to lampoon and undermine the whole notion of an animistic mentality. They may be taken to suggest that children are baffled by questions about the aliveness status of inanimates, and are driven in desperation to respond on the basis of whatever rationale is closest at hand — in many cases, on the basis of their overall liking or disliking of the

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objects being assessed. In support of this view, one might point out that Honkavaara used the problematic and baffling instructions of Russell and Dennis (1939) — certainly the worst instructions for use with a set of inanimate objects since, as discussed above, they focus attention on the alive-dead distinction rather than the alive-inanimate distinction.

Two points need to be made in response to this position. First, the importance of liking or disliking an object should not be overstated. There are plenty of things, like spiders and rain, that children dislike (or are neutral to) and yet regard as living. And there are plenty of things, like flowers and dolls, that children like and yet regard as not living. There can be no credence given to the cynical position that animism is 'nothing more than' a covert expression of attraction or attachment to objects. Note well that Sharpe et al. (1985) found that only four of 57 5- to 9-year-old subjects said that their favorite toy was alive, and that the incidence with which the subjects' family car was said to be alive was no greater than the incidence with which cars and airplanes in general were said to be alive.

The second point that should be made takes the form of a caveat that we not be put off by the vagueness of Honkavaara's findings. Honkavaara shows us an affective aspect of animism, but he does so with very low resolution, since 'liking' is a low resolution affective state. Probably, Honkavaara's findings can be sharpened to make the animist's affective sensitivities more explicit. When the affective aspects of animism are made more specific (as they will be in §2.3), there will be less of a temptation to dismiss animistic attributions as 'no more than' an expression of liking the objects at hand.

As a means of summarizing the studies just presented, let us schematize some of the subjective factors which influence animistic judgments.

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	More Animistic Subjects	Less Animistic Subjects
Nass, 1956	withdrawn	normally adjusted
Honkavaara, 1958[34]	more attracted to object	less attracted to object
Berzonsky, 1974; Berzonsky et al., 1977	impulsive	reflective
Sheehan & Papalia, 1974; Berzonsky, 1988	field dependent; less analytic	field independent; more analytic

Table 3. Conceptual Differences between More and Less Animistic Subjects

The primary contribution of these studies just reviewed, and of Honkavaara's study in particular, is their affirmation that the affective terms of engagement between animist and object are important to an understanding of animistic phenomena. Not surprisingly, more animistic and less animistic subjects appear to be distinguished by behavior which is more intuitive in the first case and more analytic in the second. It is analytic behavior which is detached, conventionalized, and normal. It is intuitive behavior which is situated, spontaneous, and personal. The animistic judgment of life status is likely to be an impulsive rather than reasoned act, rooted in the sensory reactions and the affective milieu of the moment. In this way the animist in some sense claims his right to call it the way he sees it. On the other hand, the more he reflects and reasons, and detaches himself from a direct regard for the object at hand, the more his animistic positions must come into alignment with normative knowledge. One might say that animism arises from a kind of personal engagement with the object, and declines from a kind of apassionate and socially sanctioned reasoning about it.

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[34]It is acknowledged that a slight transformation of Honkavaara's findings has taken place here. Honkavaara established a relationship between an entity's being liked and its being judging to be alive, or more alive. Here it is inferred that subjects act more animistically when they are more attracted to the objects being appraised.

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When animism is viewed in terms of conceptual style rather than in terms of mistakenness or cognitive immaturity, many studies take on new relevance. Numerous psychological, sociological and methodological factors may influence the degree to which subjects are analytic or intuitive, and hence the degree to which they might animistically engage with objects. For example, numerous studies have demonstrated that low IQ samples test more animistically than samples of normal intelligence.[35] Classically, these studies might be interpreted as confirmation that animism was an artifact of a cognitively immature world view. A more current interpretation might be that intellectually impaired populations are more animistic because, as a matter of capacity and style rather than world view, they are less given to the analytic thought modes that actively suppress animistic intuitions.

In a different but parallel vein, there has been some indication that individuals from more fundamentalist religious backgrounds are more prone to animism (Ezer, 1962; Sharp et al., 1985). While no one would expect religion to affect the maturational process, the relevance of religious training to matters of conceptual style is easily envisioned.

Ezer surveyed 153 6- to 8-year-old Protestant, Catholic, and Jewish schoolboys from both public and religious schools, and from more devout and less devout homes. The boys were given a multiple choice test which asked whether the sea knows where sunken ships are, whether a balloon feels it when it is burst, and whether a thrown stone feels its crash upon the earth. Attendance of a religious school, and greater devoutness in the home were both posi-

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[35]See Granich, 1940; Russell, Dennis and Ash, 1940; Honkavaara, 1958; and Smeets, 1974. With the exception of Honkavaara, these studies include some indication that the curtailment of animism results as much from the acquisition of specific knowledge as from the acquisition of general cognitive maturity.

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tively and significantly ($p < .02$) related to the tendency to give anthropomorphic or animistic answers.[36]

Sharp et al. asked 114 Northern Unitarian and Southern Baptist 5- to 9-year-olds to judge the life status of various entities in both a moving and a nonmoving state. In both groups, a significant number of children changed their judgment of aliveness when entities were considered in the moving state. There were, however, differences between the groups. Animism was more prevalent in Baptist children, especially among the older children, and Baptist children were more likely to change their judgments in consideration of motion. Also, the rationales given by Baptist children for their judgments were more miscellaneous than those offered by Unitarian children. On a questionnaire which elicited background information about homelife, most parents in both groups indicated that they had discussed life and death with their children. More Unitarians had tended toward biological discussions; more Baptists had tended toward religious discussions, including talk of an afterlife.[37]

Ezer suggested that religion encouraged animism, especially among fundamentalists, because of animistic and anthropomorphic features of religious doctrine, and because religiously oriented individuals might be less motivated to seek scientific explanations since they have other means of satisfying their curiosity. A supplementary explanation might be that religion provides a kind of training and reinforcement in intuitive or nonanalytic thinking and that, the specific content of the religion aside, this encourages animistic mentation.

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[36]No significant differences were found between the boys of different faiths. Note also that Dennis (1957) found no significant differences in animistic behavior among Christian and Moslem adults.

[37]The relevant factor here is presumed to be one of religion rather than geography: Russell (1940a) did not find significant differences in the level of animism in Northern and Southern samples of schoolchildren 6:0-13:11.

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If exposure to religion constitutes effective training in intuitive thinking, one might expect that overt science education would constitute equally effective training in more analytic modes of thought. Actually, the effectiveness of science education is harder to assess than one might think. Looft and Charles (1969) demonstrated significant decreases in animism among 7- to 9-year-old schoolchildren following an 11-minute instructional film on life ($p < .001$). The film covered biological traits such as growth and reproduction, and talked about plants and animals as living, and talked about kites and engines and crystals as nonliving. The absolute mean change effected by the film was not great, however, and 14 of the 35 subjects showed no change at all. Further, the depth of learning appeared questionable. In the post-viewing test, the children were asked to judge the life status of entities which were identical to, similar to, and unlike entities appearing in the film. For example, fish appeared in the film, and the test included a fish as well as a frog (similar to a fish) and a bird (unlike a fish). There were significant differences relative to whether the same, similar, or unlike items were being judged ($p < .001$). Performance was best with the same items, intermediate with the like items, and poorest with the unlike items. Clearly, some training did occur with some subjects; however, the knowledge acquired did not have the general character which the filmmakers must have hoped for. It is not obvious that the children's responses after viewing the film were impressively more analytic than they were beforehand.

Berzonsky et al. (1977), using the same 11-minute film with 6- to 7-year-old Reflective and Impulsive subjects, found a significant overall decrease in animism after viewing ($p < .05$). However, the overall improvement was principally the consequence of improvement on plants ($p < .01$): only the Reflective children showed significant improvement in connection with inanimate objects ($p < .05$). It is possible here that the children were trained more easily in connection with plants because of the availability of a superordinate category, {plants}, which could act as a term in a class inclusion formula such as, 'All plants are alive.' For the child, there is no

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comparable category, {inanimates}, which could be mentally elicited by the film's mention of kites, etc., and then used in a general postulate about the life status of inanimates. Even for adults, the category {inanimates} is probably defined by exclusion rather than inclusion; i.e., as the set of things which are neither animals nor plants. This suggests that the film, to be effective, should not have tried to exemplify inanimates by kites and so forth, but rather should have defined the life status of inanimates by exclusion; i.e., by simply asserting to the children that *only* animals and plants are alive. At any rate, it is apparent from this study, as from the study by Looft and Charles, that not all children are equally capable of benefiting from even the most basic scientific instruction, and that scientific knowledge can be conveyed in an analytic form without its analytic content necessarily being appreciated.

When incidents of apparent animism in adults are considered, it becomes even more difficult to interpret the effectiveness with which science education suppresses animism. On the one hand, adults can pretty uniformly give good evidence of competence in biology. On the other hand, a dozen or more studies have demonstrated that, given an opportunity to do so, a sizeable proportion of adults will advance animistic judgments of life status, even when the adults have postsecondary education in biology, and even when the circumstances would seem to encourage biological rigor. Thus, even when analytic capacity is acquired via maturation and education, it may not completely inhibit animistic inclinations. A full explication of these research reports is left for a little later (§2.2362). Here, the point will just be made that, since most adults of these studies are capable of giving scientific responses, one has to suppose that they have other motivations for responding animistically. At the same time, however, among the adults studied (principally college students), it was clearly the individuals who were most adept at analytic thinking who most often favored scientific positions over animistic ones. Consider the following reports.

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Crowell and Dole (1957) questioned a sample of psychology students about the life status of 13 inanimates. Subjects were divided into two groups: those without errors, and those showing at least one animistic response. Those who showed no animistic thinking averaged about 14 points higher on the Ohio State Psychological Examination, Forms 23 and 24, which measure aptitude for college study. Bi-serial correlations indicated a moderate relationship between aptitude score and the total absence of animistic answers.

Lowrie (1954) questioned college students in a class on general biology. He found a relationship between doing well in the course and being disinclined to respond animistically:

N	Course Grade	Percentage Giving Animistic Responses
4	A	0
19	B	5
26	C	38
20	D	65

Bell (1954) obtained analogous results when he questioned college students completing courses in biology or botany. 66.7% of the students who received an A course grade gave no animistic responses, while only 16.7% of the students who received an F course grade answered nonanimistically.

In assessing these studies, it is not really credible to maintain that the superior college students just knew better when it came to judging the life status of five-cent pieces, electric clocks, etc. It is more plausible to believe that the students' interpretation of the experimental task given them was influenced by a difference in conceptual style, and that this conceptual difference also affected the students' ability to score well on college aptitude tests and to excell in science classes. In short, a more credible general interpretation of these findings is simply that students with a gift for analytic thinking were less given to animistic mentation. It might fur-

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ther be supposed that science education reinforces and consolidates analytic tendencies of thought. Hence, education in general and science education in particular may be relevant to animism, not so much for their specific content, but because they nurture analytical thinking as the cognitive style of choice in the educated class.

Analytic mindedness appears as both a class consciousness and a class ideal of educated folk. If the analytic ideal is best realized in science, and if having analytic ideals diminishes one's openness to animistic thinking, then one might expect that students outside of scientific disciplines would be less inhibited about displaying animistic inclinations. In point of fact, Bell pointed out that students from different fields of specialization were not all equally inclined to take the animistic point of view (cf. Dennis, 1953):

N	Specialization	Percentage Giving Animistic Responses
151	Education	62.2
50	Physical Educ.	52.0
194	General	49.5
97	Agriculture	45.3
27	Science	29.6

This disciplinary hierarchy of animistic response is at the same time, roughly, an inverse disciplinary hierarchy of analytic rigor, and an inverse disciplinary hierarchy of scholastic and social prestige.

Historically, the educated class has been made up of folk who have secured an education as both a prerequisite and consequence of their socioeconomic advantage. Given the significant overlapping between the educated class and socioeconomically advantaged classes, one might expect the conceptual style of the middle and upper classes generally to be more analytical than that of the lower classes, and consequently less animistic. There is some American

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data which indicates that this is the case, from a time when class distinctions were more sharply drawn than they are today.

Lerner (1937) read to 389 children the broken bridge story which Piaget (1932:250f) used to investigate moral realism. In the story, a boy had done wrong and on his way home he crossed a bridge which broke and dropped him into a stream, where he got wet. Lerner asked his subjects whether the bridge knew that the boy had done wrong and whether the bridge could punish the boy. Lerner found the following percentage of lower class and upper class subjects offering animistic responses:[38]

	6-7 y.o.	8-9 y.o.	10-11 y.o.
lower class	82	70	31
upper class	62	50	15

In a study conducted in 1936, Bruce (1941) used informal individual interviews to assess the life concept of Whites and Blacks in rural Virginia. In the youngest age group, 6:0-7:11 MA, the Whites clearly had more advanced concepts than the Blacks. The percentage of Whites and Blacks in the lowest and highest Piagetian stages of development is given below:

	No Concept / Stage I	Stage IV
Whites	8	65
Blacks	32	24

Given the time and the place, it is here assumed that Bruce's White sample represented a significantly higher socioeconomic stratum

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[38]Though the class differences here are certainly real enough, one must recognize that studies such as these do not constitute direct investigations of animism, and that their findings are difficult to interpret. For example, if one recognized the bridge story as a 'moral tale,' then one might well affirm that the bridge knew about the boy's misdeed and punished him for it, even if one did not really believe in the animacy of bridges.

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than her Black sample: the racial difference is here interpreted as an educational and socioeconomic difference only.

In this vein, it is worth noting that Russell (1940a:358) found differences between subjects from rural/suburban v. urban localities. While 24% of the youngest nonurban subjects 6:0-7:11 failed to employ the word *alive* in a coherent fashion, none of the urban subjects failed in this regard. Also, the oldest urban subjects 12:0-13:11 were twice as likely to have ascended to the highest developmental stage as their nonurban counterparts. All three of these studies suggest that factors of social circumstance that might reasonably be connected to the issues of education, analyticity and conceptual style may significantly influence the expression of animism.

Different methodologies vary in the degree to which they encourage analyticity, and hence in the degree to which animistic thinking is likely to be expressed. When subjects are specifically instructed to employ or not employ analytic norms to the task of judging life status, the effect may be marked. Simmons and Goss (1957) instructed one group of introductory psychology class students to respond "as if you were a scientist, e.g., Newton, Madame Curie, or Darwin." Under a second condition, subjects were asked to respond "as if you were a poet, e.g., Shakespeare, Frost, or Wordsworth." Under a third condition, control subjects received only general instructions, without any encouragement to adopt either a scientific or a poetic point of view. The instructions to respond like a poet significantly ($p < .01$) increased animistic responses above those in the control group. The instructions to respond like a scientist did not have a significant effect: i.e., subjects given only general instructions responded in a manner much more similar to the 'scientists' than the 'poets.'

DelVal (1975:253-257) reinforced Simmons and Goss' findings in a study of 130 second year psychology students at the Universidad Autónoma de Madrid. When one group of subjects was instructed to "respond as a biologist," the level of animistic responses was re-

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duced by one-half or better, depending on the entity being addressed ($p < .01$-$.05$).

Studies by Russell (1940a; 1942) give evidence that animistic response is greater in individual interviews than when subjects are administered a written group test. Russell (1940a) used the Piagetian interview methodology described in Russell and Dennis (1939). Russell (1942) also used this method, modified for group testing. Subjects were gathered together and given a mimeographed sheet which listed the test entities and provided space for written responses. The subjects were instructed to indicate whether each item was "living or sometimes living" or, alternately, "never living," and to provide a reason for this judgment. Ss were also told: "This is not a school test. Just write down what *you yourself* think." However, the group session proceeded in every way as if it were a school test of some importance, and there was certainly no escaping the formality of the test's written format. One would expect therefore that the normative analytical values of the classroom would be regarded by the subjects as more relevant in the written group test than in the individual verbal interview. And, in fact, animistic positions were seldom registered in response to the written questions. Below, the percentage of subjects in Piagetian stage I according to age and to methods of testing.

Chronological Age Groups	Individual Interviews (Russell, 1940a:358)	Written Group Test (Russell, 1942:332)
8-9	43	0
10-11	40	0
12-13	29	0.5

Other methodologies which appear to encourage analyticity and hence discourage animistic expression include the use of how-questions as opposed to why-questions (Nass, 1956), and the probing of children's responses. While it is certainly possible to probe children's ideas in a careful and overtly neutral way, and while probing may bring both animistic and nonanimistic beliefs into greater re-

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lief (Berzonsky, 1970; Berzonsky et al., 1988), the probing process itself is likely to encourage the kind of reflectivity which disarms animistic positions.

In addition, probing processes may act suggestively on subjects, encouraging them to consider particular criteria in making their responses. If one asks a child whether a toy car is alive when it is moving, it is possible that the child will infer that motional state ought to be considered when judging aliveness. In this case, the probe might have the effect of encouraging animism by encouraging consideration of motion. It is the general case that childrens' views are probed to find out how closely they approximate the mature concepts of adults, and this entails that the probes make an issue of the concepts and criteria used by adults, and this entails that the criteria most likely to be suggested by probes are nonanimistic.

Klingensmith (1953) appears to provide a demonstration of the criteria building effect of probing. Here, young subjects were asked several yes-no questions about the biology of six inanimates, a flower and a fish. The questions:

1) Is ____ alive?
2) Would ____ feel pain if I stick a pin in it?
3) Does a ____ grow?
4) Can ____ hear us talking?
5) Does ____ breath?
6) Does ____ think?
7) Can ____ see?
8) When ____ moves, does it know that it moves?
9) Can ____ make a wish?
10) Is ____ alive?

Question 1 was asked about each of the eight test entities before going on to question 2, and so forth. The asking of questions 2-9 constituted an extended probe of the subjects' biological commitments when they said that test entities were alive. Reasonably, one might assume that the probing process itself introduced biological criteria for judging aliveness which might not have otherwise been considered. In apparent support of this scenario, Klingensmith found

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that subjects were much less inclined to regard inanimates animistically after they had pondered these biological points, as shown below.

Percentage of total responses which judged the aliveness of the test entity animistically:

Test Entity	In Response to Question 1, at Session Beginning	In Response to Question 10, at Session End
candle	54	30
clock	46	24
comb	15	4
knife	13	4
dish	7	3
match	6	3
flower	23	33
fish	0	0

In the following table, the sketch of the animist which was presented earlier is elaborated to acknowledge how animism may be influenced by factors of education and social environment:

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	More Animistic Subjects	Less Animistic Subjects
Nass, 1956	withdrawn	normally adjusted
Honkavaara, 1958[39]	more influenced by attraction to object	less influenced by attraction to object
Berzonsky, 1974; Berzonsky et al., 1977	impulsive	reflective
Sheehan & Papalia, 1974; Berzonsky, 1988	field dependent; less analytic	field independent; more analytic
Granich, 1940; Russell, Dennis & Ash, 1940; Honkavaara, 1958; Smeets, 1974	depressed IQ	normal IQ
Ezer, 1962; Sharp et al., 1985	more influenced by religion	less influenced by religion
Lerner, 1937; Bruce, 1941	lower socioeconomic class	higher socioeconomic class
Crowell & Dole, 1957	lower college aptitude	higher college aptitude
Bell, 1954; Looft & Charles, 1969; Berzonsky et al., 1977	less exposed to science	more exposed to science
Lowrie, 1954; Bell, 1954	lower achievement in science courses	higher achievement in science courses
Simmons & Goss, 1957; DelVal, 1975	less like a biologist; more like a poet	more like a biologist

Table 4. A Summary of Differences between More and Less Animistic Subjects

A few summary remarks are in order about what is consistent and what is variable in animism. Universally, animistic attributions

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[39]It is acknowledged that a slight transformation of Honkavaara's findings has taken place here. Honkavaara established a relationship between an entity's being liked and its being judging to be alive, or more alive. Here it is inferred that subjects act more animistically when they are more attracted to the objects being appraised.

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of life are subject to the overall norms embodied in the crosscultural animism hierarchy. It is universally the case that whirlpools would be more likely than puddles to be judged alive, and also more likely to be judged more alive than puddles than vice versa. However, at the level of groups and individuals, the degree of animism exhibited may vary considerably due to factors of personality, conceptual style, education, and socioeconomic class, and also due to circumstancial factors which may be specific to each experimental session. In cases which are extreme but not rare, subjects may be asystematic in their attributions of aliveness, contradicting themselves from one moment or one session to the next.

The picture which emerges is at odds with the classical view that the level of animism varies as a function of cognitive maturity, since many of the factors which demonstrably influence animism have nothing to do with mental development. The picture which emerges is also at odds with the conventional view that animism represents an alternate system of beliefs regarding the entities which are alive; i.e., a naive or mistaken biology. In fact, the dissonance between animism and any kind of biology — naive, mistaken, protoform, whatever — is too substantial to permit such a view. Neither is it credible that animism becomes transformed into biology, since no transformational process could produce a biology from a thought system in which

> entities may have graded life status;
> entities may have intermittent life status;
> entities may have context-dependent life status; and
> there may be no completely secure examples of living things.

Unlike biology, animism does not appear to be constituted as a set of relatively determinate beliefs about a relatively determinate set of entities. The evidence suggests that animism is not so much a theory as an activity, a mode of engagement with entities in the world, and that the word *alive* is used to gauge the intensity of that engagement. Hence, the tension between animistic appraisal and bio-

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logical appraisal is first and foremost related to how entities are to be entertained in general. The animistic tendency is to regard entities from the perspective of a greater intuitive situatedness; to regard entities in terms of the immediate and subjectivized whole of context and activity. The biological tendency is to regard entities in terms which are more essentialist, analytic, and context-independent. This is a very intriguing kind of tension, but it is not a tension between two forms of biological thinking, one sophisticated and one naive. Neither is it a tension which is of necessity derived from the cognitive differences between children and adults. When an animist proclaims that an entity X is alive, there is no evidence that he means something that *only* a child could mean. In the following sections we shall see additional ways in which animism may be independent from biology.

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What then is the relationship between animism and biology as they vie for first rights to the use of the word *alive*? As touched on above, the problem of making plain how animism and biology interrelate first arises in the question of whether animism should be viewed from the perspective of biology, or from the perspective of semantics. Does animism consist in a particular way of conceptualizing life, or in a particular way of conceptualizing the meaning of the word *alive*? The distinction may seem artificially analytic, since classic animistic demonstrations seem to involve both biological and semantic aberrance. Nevertheless, the point remains that individuals may to varying degrees map the word *alive* onto their biological conception of life, and may to varying degrees possess a biological conception of life which is congruent with biological facts.

In practice, the distinction between biological aspects of animism and semantic aspects of animism can be tricky. When the word *alive* is being used animistically, we know that it cannot have the same meaning as when it is used in the expression of a mature

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biology. When a child affirms that lightning is alive, he cannot be according to lightning the same biological status that adults accord to animals and plants, since *that* biological status is in its very nature restricted to animals and plants. Nevertheless, we generally feel that the animistic use of the word *alive* connotes more than just, for example, autonomous movement; we feel that some kind of quasi-biological assessment is being advanced. In other words, when confronted with a case of animistic word use, we generally have the sense that some kind of animistic biology is behind it. This intuition is reinforced when subjects additionally attribute such traits as knowing and feeling to the entities which they label as alive. On the other hand, we receive a contrary impression when we encounter subjects who deny such traits as knowing, feeling, growing, etc. to the inanimates which they label as living (e.g., Holland & Rohrman, 1979), or stipulate that these inanimates are not living "in the same manner" as animals and people (e.g., DelVal, 1975: 187-200 and Schechter, 1980:83,86,124 with children; Brown and Thouless, 1965:37 and Voeks, 1954:407 with college students).

The more one looks into the relationship between attributions of aliveness and attributions of biologically affiliated traits, the more intriguing the situation becomes. As with attributions of life, some entities are more likely than others to be attributed traits biologically affiliated with life. Once again, it is the more dramatic and elusive entities which are favored. Entities of natural origin are more likely objects of animistic projection than manmade artifacts. Entities which are more remote and less manipulable, and whose causal mechanisms are therefore more opaque, are more likely to be entertained animistically than familiar entities of simplex composition. Again, animists equivocate on the status of plants.

Smeets (1974)[40] provides illustrations of the advantage accorded by causal opacity or natural origin. He found that that a bot-

[40]The subject group being discussed here comprised 20 American children 5:10-7:2.

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tle was only one-third as likely as an automobile to be judged alive, and only half as likely to be granted the capacity to know or to feel. While a river was thought to be alive by the same number who judged an automobile to be alive, it was half again more likely than the automobile to be thought to feel, and four times as likely to be accorded the ability to hear. When it came to feeling and hearing, rivers performed almost as well as clouds, which were said to feel by 60% of the respondents, and said to hear by 25%. Smeets did not include extraterrestrial objects among his stimuli. However, among inanimates, it is well known that the sun and the moon are highly regarded. For example, Huang and Lee (1945)[41] reported that the moon was said to possess sensation and intention twice as often as a river.

The animistic superiority of natural phenomena is only really challenged when the traits being attributed have to do with intelligence and purposiveness. Smeets' data indicated that the automobile was able to best the cloud and the river only when the capacity to know was considered. Surely the child first associates 'knowing' with knowledge rather than simple awareness, and this can only enhance the status of artifacts. Entities which are designed and utilized for specific (and adult) purposes would naturally, in the course of projection, be accorded greater perspicacity than the brute phenomena of the natural world. In Huang and Lee's sessions, which mainly focussed upon purposive mental states, it was found that a watch was credited with intention just as often as the moon (scil., in about 44% of all responses to five different questions). Even relatively disfavored entities can be ennobled by utility. Huang and Lee found that the lowly stone and pencil were said to be alive just 9-10% of the time. However, while it was said only 11% of the time that the useless stone could feel pain, could want something, could be good, could do things on purpose, or had something it must do, the

[41]Subjects were 40 Chinese children, half 3:5-5:11 and half 6:0-8:7.

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handy pencil was said to possess these traits in a comparatively whopping 27% of all responses.

When natural entities and manmade objects are balanced with respect to their motility and the abstruseness of their causal mechanisms, and tested across a wide range of attributes, it is almost certain that the natural entities will incite greater animistic activity. Dolgin and Behrend (1985) found, for example, that 5-year-olds appraised a promontory and a rock more animistically than a crayon or a chair, and also appraised a cloud and the moon more animistically than a car and an airplane.

The biological status of plants is often only minimally appreciated by children. Plants may be as disdained as rocks and other inert phenomena. However, the attributive treatment plants receive is somewhat mixed. On the one hand it is common enough for children to refuse plants even the most biologically rudimentary traits. Looft (1974) found broad resistance among second graders to the idea that plants have nutritional and respiratory needs. Many children deny that plants grow, or they will allow that grass and flowers grow while presuming that trees do not. At the same time, it is common enough for plants to be accorded the capacity to feel. Klingberg (1957) found that fully one-quarter of his 7- to 8-year-old Swedish subjects believed in the sensitivity of trees. Smeets (1974:21) found that the ability to feel was granted to trees by 55% of his subjects, and to flowers by 35%. (See also Granich, 1940:25f; Del-Val, 1975:261; Carey, 1985a:80.)

The confusion with which children assess the biological traits of plants attests to the zoocentricity of their early biological views. For example, respiring and internalizing nutrients do not seem to be initially conceptualized as universal biological necessities, but rather as animal behaviors which employ specific basic animal body parts: viz., mouths, and lungs or chests. When children address the question of whether plants take in nutrition or respire, they may either conclude that plants do not engage in these activi-

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ties since they lack the requisite body parts, or they may create fabulous biological doctrines that affirm, for example, that plants have mouths hidden in the soil, or that their breathing is connected with the blowing of the wind. Here are classic cases of exiguous biological knowledge actually abetting animistic projections. The child may reason that, since living things must eat and breathe, plants must either be nonliving, or they must have hidden mouths and lungs.

The zoocentricity of children's early views is emphasized even more pointedly by their tendency to grant sentiency to plant life. Given the total unresponsiveness of plants, it is quite remarkable that children hold out so much hope for their ability to know and feel. There is just no reason for children to regard plants as sentient — unless children zoocentrically reason that sentiency is a property of all living things.

Overall, it should be stressed that children are quite ambivalent about the life status and biological trait status of plants. Smeets (1974:21) has produced a nice emblem of this ambivalence in his finding that a flower was judged to be alive twice as often as a tree, and that both these plants were said to be able to die much more often than they were judged to be alive. It appears that the asystematicity of children's early biological views is most marked in connection with plants.

Speaking generally, just as it is the less manipulable entities which are more likely to be judged alive, it is the less tangible biological traits which are more likely to be joined with animistic attributions of life. Mental capacities (knowing, feeling, etc.) are more likely to be animistically attributed than traits addressing general biological capacities (growing, reproducing, etc.).[42] These

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[42]Adults so automatically credit animals and plants with such capacities as growth and reproduction that they must take a moment to reflect that these capacities are not obvious to the child. Looft (1974) reported that, in a sample of 39 second graders

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are more likely to be attributed than traits addressing more concrete and specific biological behaviors (breathing, eating, hearing, talking, etc.). And these are in turn more likely to be attributed than traits addressing specific physical characteristics (having eyes, a heart, a brain, etc.). Again, the traits which are more favored in animistic projection are those which are more causally and biologically opaque, and difficult to confirm or disconfirm. Following, a few attribution hierarchies are presented. The traits listed first were more often attributed animistically than the traits listed beneath them.

HUANG AND LEE (1945)

has something it must do
can perform purposely
can be good
can want something
can feel pain

KLINGENSMITH (1953)

feeling
knowing
breathing
wishing
growing
hearing
seeing
thinking

LOOFT (1974)

ability to reproduce
need to breathe
need for nutrition

SMEETS (1974)

feeling
knowing
hearing
talking

HOLLAND AND ROHRMAN (1979)

sleeping
growing
dying
breathing
eating

KAWAMURA (1987)

ability to feel sad
having a brain

Of all the traits affiliated with life, it is consciousness, characterized as the ability to know or to feel, which has attracted the

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(mean age 7.15) from a semi-urban Midwestern parochial school who had correctly judged the life status of 16 diverse entities, only 4 subjects could correctly judge the ability of all these entities to reproduce. Even when asked about 'a woman,' it appears from the partial data presented that 12 subjects (31%) failed to credit the woman with the ability to reproduce.

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most research attention. It is consciousness which is the least tangible of biological traits and hence the trait most likely to be attributed animistically to inanimate entities or plants, and it is consciousness which is the most poignant characteristic of our own lives. It is an everpresent fact of our being alive that our life comes before us as an issue illuminated by the light of consciousness and intentionality. Alongside this central fact of consciousness, everything else — breathing, eating, having arms and legs and noses — seems accidental. It is not surprising then that we find ourselves best convinced that a bona fide animism is in force when attributions of aliveness are amalgamated with attributions of consciousness. Some researchers, notably DelVal (1975:209-213,233,238), even argue that only those attributions of life which are accompanied by attributions of consciousness can be regarded as genuine instances of animism. The argument affirms that if only life and not consciousness are ascribed to inanimate entities, then nonanimistic interpretations of the child's statements are possible. In particular, the child may be semantically confused about how the word *alive* should be employed. On the other hand, since the words *know* and *feel* are experientially more concrete relative to the word *alive*, and since these words are not so subject to ambiguity and to metaphorical interpretation as the word *alive,* it is assumed that even the young child can use these words without confusion. Therefore, if a child attributes consciousness as well as life to an inanimate entity, it is taken as an incontrovertible display of animistic projection. It is a conservative approach to investigating animism, but it is felt to have the advantage of being a secure approach.

The frequency with which children attribute consciousness to inanimates can be surprising. Ezer (1962) asked 153 6- to 8-year-olds three multiple choice questions about whether the sea knows where sunken ships are, whether a balloon feels it when it is burst, and whether a thrown stone feels its crash upon the earth. 36 (24%) subjects responded to all three questions in an animistic fashion; 96 (63%) gave at least one animistic response.

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However, there are at least two reasons for caution when interpreting children's attributions of consciousness. First, researchers should not discount the possibility that young subjects will misconstrue the intended meaning of the words *know* and *feel.* There is a distinction between the ability to know in general, as a basic sentient capacity, and the possession of specific knowledge. Thus, if a child denies that a tree knows that it is in a forest, one must probe to determine whether the child believes that the tree is nonsentient, or whether the child believes that the tree is in fact sentient but ignorant of its forest surroundings because it has not been taught that a collection of trees is called a forest, or because it does not have the eyes required to visually observe the surrounding trees, or because it is just too stupid to know where it is, etc.

In connection with the word *feel,* there is a distinction between the general capacity for sensate experience and the act of touching which, for human beings, forms a primary access to such experience. Even in adult language, we can observe a virtual convergence of these two senses of the word in sentences such as 'The blind man feels the path with his cane.' The word *feel* in this sentence seems to do double duty, referring both to the experience of the blind man and to the physical contact between cane and path. It seems very likely that, for the child, *feel* may be used sometimes interchangeably with *touch*, which need mean no more than 'physically contact.'

For children as well as older and deeper thinkers, states of awareness may seem to be just particularizations of the basic state of sensitivity to externals which characterizes all physical structures at all levels of analysis. Adult thinkers might affirm, without any animism intended, that Pluto knows where the sun is or can feel the sun, since it is clear that Pluto must be gravitationally sensitive to solar position. These are simply cases in which the ordinary semantics of the words are stretched. When children affirm that a car can feel the load of extra passengers, we must assume that they sometimes mean no more than something along these lines.

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Aside from these semantic considerations there is a second reason for caution in interpreting children's attributions and nonattributions of consciousness. Simply, it is not guaranteed that a particular animist's conception of life will require that life be accompanied by consciousness. Developmentally, children are reasonably quick to acquire an appreciation of the zombie status of plants, whether or not they regard plants as living, which suggests that they are well able to separate the issues of aliveness and consciousness. Children also give evidence that they are aware of the relative differences in intentionalistic capacity between, for example, people and pets, which suggests that from an early age they may conceive of the capacity for consciousness in gradient terms. Therefore, for the animist no less than for the biologist, the precise relationship between consciousness and life may be enigmatic.

While Piaget found that only two-fifths of his subjects attributed consciousness in a manner that was stage-consistent with their attributions of aliveness (1926b:204-206),[43] his general position was that children's conception of consciousness developed alongside their conception of life. The work of Russell (1940b), Huang and Lee (1945), and Berzonsky et al. (1988) has supported Piaget's claim that judgments of aliveness and judgments of sentiency go arm in arm.

Russell (1940b) investigated the attribution of consciousness by 335 schoolchildren 6:0-13:11. Overall Russell found a mean square contingency correlation of .75 between the animism stage and the consciousness stage of his subjects.

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[43]Piaget proposed that attributions of consciousness developed through four stages that were parallel to the four stages through which animism developed. In the first stage, any entity might be regarded as conscious at a given moment, if the object was involved in some activity or in some sense imposed upon, as a boat might be imposed upon to carry a cargo across the sea. In stage II, consciousness was restricted to entities which were ordinarily in motion, or whose special function was to be in motion. In stage III, only entites which moved autonomously were regarded as conscious. In stage IV, consciousness was restricted to animals.

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Huang and Lee's (1945) 40 Chinese subjects 3:5-8:7 also showed a readiness to attribute sentiency to entities which they regarded as living. The children were asked whether nine different entities (eight inanimates and one tree) could feel pain when pricked, could want or not want something, could be good or not good, and also whether each entity had anything it must do, and whether it performed such functions purposely. When the percentage of subjects who correctly determined the life status of each entity is correlated with the percentage of subjects who correctly determined the sentiency status of each entity, the correlation coefficient is .68. If the results regarding the problematic tree are excluded (subjects were twice as likely to correctly assess the sentiency of the tree as they were to correctly assess its aliveness), then the correlation coefficient rises to .82.

Berzonsky et al. (1988) worked with 32 4- and 5-year-olds. They found a general pattern of correlation between children's ability to judge sentence anomalies which focussed animacy and sentence anomalies which focussed sentiency.

However, having now argued the case which favors the classical view that animistic attributions of life keep close company with attributions of sentiency and other biological traits, it should now be noted that numerous researchers have developed quite contrary findings. Many investigators have found that the relationship between attributions of life and attributions of affiliated biological traits is one of mysterious independence.

While Berzonsky et al. (1988) endorsed a general relationship between animistic attributions of consciousness and life, their article was dedicated to the thesis that the sentiency distinction is developmentally perfected earlier than the animacy distinction. The research team based this conclusion on observations of cases in which aliveness was attributed animistically while consciousness was not. Numerically, 58% of the subjects who failed to meet criterion for detecting sentence anomalies focussing animacy did still

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manage to meet criterion for detecting sentence anomalies focussing sentiency. When directly asked whether various entities were alive or could know something, this effect was even more marked: only 23% failed to meet criterion on the sentiency test, while 94% of the subjects failed to meet criterion on the animacy test. When other relevant studies are reviewed, the weight of evidence supports the position that aliveness is apt to be attributed more animistically than sentiency or other traits biologically affiliated with life.

Granich (1940) querried 18 children 7:1-8:3 and 12 children 13:2-14:4 about the aliveness of various entities, and also about their ability to see, talk, and feel a blow. From 33% to 56% of the younger subjects, and from 0% to 25% of the older subjects asserted that the various inanimates were alive. In contrast, almost no subjects affirmed that the inanimates could see, talk, or feel a blow (except that 44% of the younger subjects regarded the moon as able to see).

Klingensmith (1953) solicited 142 elementary schoolchildren's views on the aliveness of various entities and their capacity to feel pain, grow, hear people talking, breath, think, see, be aware of their own movement, and make a wish. His stimuli represented a range of apparent animation and functional value: burnt kitchen match, broken dish, opened pocket knife, comb, loudly ticking alarm clock, lighted candle, goldfish in bowl, petunia in pot. Klingensmith found that the attribution of ancillary biological traits to inanimates occurred much less frequently than attributions of life, and at a very low level overall. In all groups except the group of kindergarteners, the attribution of ancillary traits was nearly nil. For example, over one-half of the third graders attributed life to the clock and candle, and over two-thirds of the fifth graders did the same. However, these children showed almost no inclination to attribute ancillary traits to these entities. In this study, variations in the attribution of aliveness across the test stimuli were not in any impressive fashion predictive of variations in the attribution of ancillary traits, though

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some positive correlation (no figures given) was said to be in evidence.

Klingberg (1957) found that his 67 7- to 8-year-old Swedish subjects were, when regarding certain entities, much more restrictive in their attribution of feeling than in their attribution of living. One quarter or more of the children were willing to say that the tree and the moon both live and feel. However, while about one-quarter of the children maintained that the river and the watch were living, very few thought that the river and the watch could also feel.

DelVal (1975:226ff) examined 104 Spanish schoolchildren 4:0-12:0. He found that 52 (50%) attributed life to nonliving objects, but only 12 (11.5%) attributed consciousness to these same entities.

Holland and Rohrman (1979) found, in a picture sorting task administered to 40 3- to 8-year-olds, that children judged the aliveness of a large and diverse set of entities in an animistic fashion 59.2% of the time. In contrast, their judgments were far less animistic when assessing the ability of these entities to sleep (17.1%), grow (10.5%), die (6.6%), breathe (6.6%), and eat (0%).

Carey (1985a:77-82) asked small samples (N=9) of 4-, 5-, and 7-year-olds whether people and various unfamiliar or remote entities (aardvarks, dodos, hammerheads, stinkbugs, worms, orchids, baobabs, harvesters, garlic presses, volcanoes, and clouds) were alive, and whether they breathed, slept, could get hurt, had a heart, thought, grew, died, etc. The young children were often willing to regard inanimates as alive, but seldom accorded them the animal traits biologically affiliated with life. Among the 4-year-olds, one attributed the ability to get hurt to the cloud, and one attributed this ability to the harvester. Among the 5-year-olds, one attributed the ability to sleep to the cloud, and one attributed this ability to the volcano. Otherwise, no subjects attributed animal properties to inanimates. In a subsequent experiment involving 20 4-year-olds, 10 7-year-olds, and 20 10-year-olds, Carey again found that children

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attributed animal properties to inanimate objects, including the sun, much less than they attributed being alive. For example, while four of the ten 7-year-olds affirmed that the sun was alive, only one affirmed that the sun slept, only one affirmed that the sun had a heart, and no one affirmed that the sun had babies (1985a:87-93).

As exemplified above, it is generally the case that an animist is more likely to say that an entity is alive than to say that an entity possesses traits biologically associated with life. However, this generalization is not ironclad. Since the association of ancillary traits with life status is loose for the animist, it is possible that he will affirm that an entity has some traits considered indicative of life and yet is not alive.

Smeets (1974:21) reported on a sample of 20 youngsters 5:10-7:2 who were apparently baffled about the biological properties of plants. 17 thought that a tree could grow, and all 20 agreed that a flower could grow. 13 believed that a tree could die; 19 believed that a flower could die. However, only 5 said that a tree was alive, and only 11 said that a flower was alive. Obviously, in the minds of these children, the ability to grow or to die was not sufficient to ensure the presence of life.

Piaget found that one-fifth of his subjects attributed consciousness to entities which were denied life (1926b:204-206). An analogous finding was reported by Tunmer (1985), who found that his 4- and 5-year-old subjects were much more accurate at detecting sentences which violated animacy restrictions than sentences which violated sentiency restrictions.[44] Outside of these two studies, however, it is only incidentally reported that subjects attribute consciousness to entities which are not thought to be alive. Klingberg (1957) observed a couple of children who maintained that the

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[44]As noted above, Berzonsky et al. (1988) obtained contrary findings in a similar study. An important section of Berzonsky et al. is devoted to a compelling, though not quite exhaustive, criticism of Tunmer.

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moon was able to feel and yet did not live. DelVal (1975:234) encountered a couple of children who denied that they themselves were alive, though they naturally enough affirmed that they could feel a pinch. The really important thing to note here is that, even in these cases, the larger pattern of loose association between attributions of aliveness and attribution of biologically affiliated traits — in this case, consciousness — is preserved. It is the looseness of this association which must be highlighted if the proper relationship, or nonrelationship, between animism and biology is to be understood.

A certain amount of the nonsynchronization between attributions of aliveness and attributions of mental or physical traits associated with life arises because individuals may employ disjunct cognitive strategies for deciding whether a given entity is alive or has a given trait. Where extensive knowledge of biology is wanting, the question of whether a particular trait should be attributed to an entity may be decided by one of two methods. An individual uses the first method when he applies a class inclusion formula which defines the trait as present or absent for a whole class of entities. As in the case of attributing life, the use of class inclusion formulae may produce correct answers at an early age whether or not the relevant biology has been mastered.

Gelman, Spelke and Meck (1983) asked 3-, 4-, and 5-year-olds about the ability of a person, a doll, and a rock to perform actions (walk, eat, cry, listen, ...) and to possess mental states (feel happy, remember, think, ...). Intermittently, the children were asked to explain or justify their answers. When speaking of dolls, the children most often relied on class inclusion (or exclusion) rationales, such as that dolls are not real, not alive, not human, etc. References to the superordinate classification of dolls became more prominent as the children grew older.

Smith (reported by Carey, 1985a:102-105) designed a free production task in which 4-, 5-, and 7-year-olds were asked to name a few things that possessed some 18 thought provoking properties,

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including 'goes quack quack,' 'bounces,' and 'melts in the sun.' When asked for entities which ate, slept, had bones, had a heart, or thought, the children were most likely to mention people, with other mammals being the next most common examples chosen. The finding of particular interest is that the children were next most likely to respond with the superordinate category label *animal,* which was produced more frequently than were particular examples of birds or fish or reptiles or bugs. This fact suggests that the childrens' associations between the category label *animal* and the traits presented were more robust than the associations between these traits and actual but nonprototypical exemplars of the class of animals. Resonant findings were reported by Carey (1985a:25), who observed that 4-, 7-, and 10-year-olds who were asked to give examples of living things were as likely to respond with the category label *animal* as they were to produce specific examples of animals. Further, subjects were more likely to respond with the category label *plants* than they were to produce more specific references to plants (e.g., *trees*).

In general, these studies showcase the ability of young children to address a trait attribution task at the level of large inclusive classes. The implication here is that even young children are quick to stabilize their knowledge of the prototypic tendencies of real world entities in categorical form, and quick to invoke those categories in mental tasks drawing upon that knowledge.

The demonstrated prototypicality of human beings and common mammals in Smith (*Op cit.*) also highlights the second biologically naive method for attributing biological traits. An individual uses the second method when he attributes biological traits to entities in accordance with their similarity to prototypic exemplars of the traits in question. If the trait under consideration were the ability to fly, for example, then the prototypic exemplar would likely be a bird, and whether an entity were judged to be able to fly would depend on its perceived similarity to birds. For general biological traits, and especially for traits involving mental states, the prototypic exemplar

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is a human being since, for the young child, biology is conceptualized in substantially anthropocentric terms.

Developmentally, it appears that similarity to humans at first governs attributions of both mental and physical traits, but that eventually only mental traits are attributed on the basis of similarity — and then, with much diminished frequency. The reason for this shift must have to do with the way that biological knowledge accrues. Basic biological knowledge brings an appreciation of living things as systems of physical parts with part-related capacities such as seeing or hearing. More advanced knowledge fosters an appreciation of the systemic capacities of living things, such as growth and reproduction. This culminates in an understanding that mental states must be supported by specially structured biological systems. Thus, stable categorical knowledge first emerges in connection with the more concrete matters of biological fact, and only later in connection with the more intangible biological realities.

Crucially, as biological knowledge becomes more elaborated, there can only be an increase in the reliance on class inclusion formulae, a diminution of reliance on similarity gradients, and an obviation of opportunity for animistic projection. The direction of this cognitive shift from similarity-based attributions to class-based attributions is determined, not so much by the nature of biological *reality*, or by the nature of cognitive development, but by how biological *knowledge* is socially regarded and conceptualized. It appears to be part of a pandemic intellectual ethos that biology be regarded as a thought system which *ought* to be organized in terms of criterially defined classes and postulates that make plain the inclusion relations between classes. In short, in societies of disparate cultural and technological complexions, there appears to be agreement that biology ought to be organized as a science. Foregoing here any discussion of why this should be the case, let it just be reaffirmed that this scientific bent can only mean that attributions of life and of traits biologically affiliated with life must, in development, increasingly come under the control of class inclusion postulates. And

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knowledge which is made rigid in this form must, more effectively than knowledge organized in the more fluid terms of similarity gradients, close off opportunities for animistic projection. When children are asked about the life status, the physical status, and the mental status of entities in the world, the animistic content of their responses may vary depending on the degree to which these different issues are understood in terms of class inclusion precepts.

The researcher who has done the most to detail the correlation between advancing biological knowledge and declining animism is Carey, who sees in this interplay an argument that animism should be characterized as a naive theory of biology, cast in the form of a naive theory of human behavior. Carey (1985a:87-102) found, in testing 4-, 7-, and 10-year-olds, that there was a tendency to underattribute animal properties (has bones, has a heart, eats, sleeps, has babies, thinks) to animals. This tendency decreased with similarity to humans, and decreased with advancing age. There was a big jump in accuracy between the 4-year-olds and the 7-year-olds. In assessing the status of a mixed set of both familiar and unfamiliar animals, 4-year-olds denied 20% of the time that nonhuman animals ate, and denied 40% of the time that they had babies of their own kind. By age seven, all animals were virtually always credited with eating and having babies (1985a:89-94). We see here a clear progression from reliance on similarity-based attributions to attributions based on class inclusion principles. In an affiliated set of experiments, Carey established quite convincingly that this decline in animism coincides with the child's growth of biological understanding between 4 and 10 years of age. By late childhood, the child has acquired enough biological knowledge to correctly assess the life and biological trait status of nonprototypical animals and plants, despite their overt dissimilarity to humans and mammals (cf. Lucas, Linke and Sedgwick, 1979).

Other researchers have confirmed this tendency to underattribute biological traits to nonprototypic animals, relative to their dissimilarity to humans, and to experience confusion about the sta-

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tus of plants. Looft (1974) found that, even when his second graders were able to correctly identify living and nonliving entities, they were not yet likely to correctly attribute the need for nutrition, the need to respire, and the ability to reproduce. While attributions were most accurate in connection with the stimulus 'woman,' none of Looft's 39 subjects attributed these three traits to every living entity among the test stimuli (though 14 of the subjects correctly withheld attribution of these traits from every nonliving entity). The underattributions of biological traits to plants were particularly marked.

Dolgin and Behrend (1984) undertook a very impressive experiment designed to test across a wide range of subjects, attributes, and stimuli.[45] In agreement with Carey, this team found a significant jump in accuracy between the performance of subjects younger than five years old and the performance of subjects older than seven. The younger subjects, for example, were willing to attribute biological traits to dolls 33-46% of the time, but this figure dropped to a mere 6% for 7-year-olds. For all age groups, the appraisal of fish and insects proved more difficult than the appraisal of other animals. Fish and insect errors were still substantial among the 7- and 9-year-olds, even though these groups performed at adult levels with mammals and birds. In contrast, subjects erred relatively rarely when responding to prototypical animates and inanimates.

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[45]Subjects were 12 each of 3-, 4-, 5-, 7-, and 9-year-olds, and adults. 32 color photo stimuli produced 16 pairs representing 16 categories: (man, woman), (boy, girl), (boy baby, girl baby)(dog, squirrel), (robin, turkey), (tropical fish, carp), (fly, buttefly), (roast turkey, steamed bass), (jade plant, oak tree), (broken bare tree limb, uprooted dessicated houseplant), (promontory, rock), (crayon, chair), (cloud, moon), (car, airplane), (kid-made scribbled drawing, kid-made clay cup), (girl doll, stuffed puppy). Subjects were asked which of these could grow; die; have a brain; eat; be thirsty; be happy sometimes; get hurt/feel pain; think; have dreams; sleep; see; like you; have mommies & daddies; do things on purpose/make plans; want to do/have something; be naughty sometimes; move by itself; understand you if you talked to it; be a boy or a girl; be alive (always asked last). Errors were defined as responses which differed from adult concensus.

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Even the adults in Dolgin and Behrend's study were in error on insects 10% of the time, and in error on fish 7% of the time, while erring on mammals only 4% of the time. The obvious interpretation is that some adults, like many children, attributed biological traits on the basis of similarity to humans rather than on the basis of formal biological knowledge. Some adults, to be sure, never formalize much biological knowledge, and are easily led to make attribution errors. However, it is worth noting that biological science may not always provide the kind of guidance that educated adults might like to have when asked to decide on the trait status of different entities. Biology has its limitations and its foibles.

Looft (1974:236n) reports coming across an educational film entitled "Living and Non-living Things" which explicated four "life-indicating" attributes: the need for nutrition, the need to respire, the ability to reproduce, and the ability to move.[46] Here is something of a Mt. Rushmore of biological attributes: just as one can only wonder how Theodore Roosevelt joined company with Washington, Jefferson and Lincoln, one can only wonder how the ability to move could be ranked alongside metabolism, respiration and reproduction. Every animism researcher, at least, is aware of the drawbacks of accepting the ability to move as a sign of life. On the other hand, to ignore the remarkable capacity of some living things to move autonomously would be a striking omission of important biological data.[47]

Huang and Lee (1945) asked their subjects whether various entities could feel pain when pricked, could want or not want something, could be good or not good, had anything they must do, and could perform this task purposely. The investigators allowed that a dog could feel pain and could want or not want something, but at the

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[46]The film was distributed by Coronet instructional Films of Chicago, Illinois.

[47]In TR's defense, it is said that Washington and Jefferson founded the Republic, that Lincoln preserved it, and that Roosevelt revitalized it.

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last three questions, they balked. "[W]e psychologists don't seem to be too sure of the correct answers ourselves" (71)!

An equally poignant case arose in a study by Inagaki and Sugiyama (1988). These investigators asked children and adults whether various entities had various anatomical or mental traits. In order to eliminate any possibility of controversy, they appealed to a professor of biology at their national university for the correct answers. The professor proclaimed that fish and grasshoppers don't think or feel pain. Adult subjects who attributed sentiency to these animals were judged to be in error. Needless to say, the resulting error rates were high, since most adults feel that any animal large enough to be prodded can feel the pain of the prod.

For the biologist, the question of whether an animal can feel, or to what degree an animal can feel, involves a consideration of neuronal systems which is far beyond the ken of the layman. The biologist wonders whether the wriggling of the fish or grasshopper is autonomic and insensate. He examines the neuronal architecture for an answer to these questions. He may conclude that the lower animal's capacity to feel is diminished or insignificant relative to that of higher animals. But his conclusions must always remain tentative, because he has no direct access to the mental states actually experienced by different animals. What is desired finally is not an understanding of neurons, but an understanding of internal states of mind. The connection between neuronal status and mental status is not fully determinate (neither is it clear that it ever could become fully determinate, even in principle), and so it is easy for the biologist to overstep the bounds of his actual knowledge when he speculates about the mental state of an animal which he has investigated only neuronally. Ultimately, there is no good evidence that the biologists' methods for estimating sentiency are superior to the methods and evidence employed by laymen.

Biologists come up against a different kind of limitation when they speculate about an entity's capacity 'to think.' There is no con-

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sensus in the scientific community — much less, among language users generally — on what the limits of 'thinking' should be. The word *think* may refer to thought activities ranging from 'being aware of the cold' to 'remembering a tune' to 'planning a wedding' to 'contemplating the concept of concepts.' And again, it is not clear what kinds of evidence ought to be preferred for determining whether 'thinking' is in progress.

There is some evidence that adults, though in possession of sophisticated biological knowledge, continue to employ gross similarity to humans as a factor in deciding whether to attribute mental states to entities, though they rely on more categorical knowledge when deciding whether to attribute various physical characteristics to entities. The different attribution patterns of mental and physical traits was first brought out by Inagaki & Sugiyama (1988). This Japanese team reported that 4- and 5-year-olds made similarity-based attributions of anatomical and physiological traits (having a heart, having bones, breathing, and growing), as well as mental traits (the ability to think, feel happy, feel pain). While adults made category-based attributions of both anatomical and physiological traits, they also relied in part on a similarity scale in the attribution of mental states.

Inagaki (1989) followed up with a report on an experiment by Inagaki and Hatano (in preparation)[48] which was designed to tease out differences in attribution styles for physiological and mental traits. Subjects were asked specific questions about the properties of five different pairs of animals representing different superordinate categories. For example, mammals were represented by an elephant and a mouse; birds were represented by a swallow and a penguin; and so forth. While the pairmembers were of the same superordinate category, they differed with respect to their judged similarity to people. Inagaki and Hatano reasoned that, if attributions

[48]Subjects were Japanese 7-, 9-, and 11-year-olds, and college students.

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were category-based, both pairmembers would be attributed the same properties, while if attributions were similarity-based, the pairmember judged to be more similar to humans would be attributed the properties in question more frequently. Each pairmember was presented individually, in a random order. It turned out that 90% of all attributions made by all age groups were identical for both pairmembers, indicating a strong bias toward category-based attributions, even at age seven. However, for physiological properties, in those cases where responses were inconsistent, the two younger age groups favored the more similar pairmember, while no such pattern was observed with adults. For mental properties, subjects of all ages favored the more similar pairmember, though the difference was statistically significant only within the youngest group.

Inagaki (1989) also reports on Hatano et al. (in preparation), which employed a similar research paradigm, augmented by attention to reaction time. This study found that college students relied on similarity-based attribution to some extent, not only for mental properties, but also for physiological properties in a situation which demanded quick response. Under these conditions, subjects attributed human-held properties more frequently to the pairmember which was more similar to human beings. When positive attributions were made to both pairmembers, RT with the more similar pairmember was quicker. Likewise, when attribution of a human-held property was withheld from both pairmembers, response was slower with the pairmember that was more similar to humans. This result was interpreted to mean that subjects first attributed traits on the basis of similarity to humans, and then checked the plausibility of their judgment by applying additional knowledge, including formal categorical knowledge.

One of the commendable features of these studies is their concern for how formalized knowledge of classes and informal estimations of similarity to exemplars might interact in the formation of biological views. Naturally, the organization of knowledge and belief

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in terms of both class inclusion relations and similarity gradients is not unique to animism. It is rather the case that the advantages of employing both organizational strategies are entirely general. What we witness here is really an exemplification of the general drive toward cognitive economy which has been explicated by Rosch (*op. cit.*) and discussed above.

To review, Rosch has argued that category formation proceeds as a mediation process between the tendency to form a large number of fine-grained categories which maximize the attention paid to individuals, and the tendency to form a small number of broad-grained categories which smooth the diversity of the presentational world. Likewise, the determination of entities' biological attributes on the basis of their similarity to prototypic exemplars offers a means of attending closely to the individual differences between entities, while the determination of attributes via reference to class inclusion formulae offers a means of rising above individual differences, and of introducing previously concretized knowledge of categories into the biological overview. In short, the cognitive principles which underly the formation of categories in general apply to the determination of attributes of entities in a completely natural and predictable way. After all, to speak of attributes at all is simultaneously to speak of categories. It is not the case, as is sometimes assumed, that attributes (or features) are some kind of infracategorical or atomic quanta which are independently constituted outside of normal concept formation processes. Rather, the entities which possess a given biological attribute always themselves constitute a category — a subcategory of the entities which are deemed to be alive. And our concept of the attribute itself can only emerge in tandem with the formation of the subcategory of entities serving to instantiate it. Knowing what it is to have a nose involves knowing entities which have noses.

To summarize, there is considerable variation in the degree to which children's biological or quasi-biological views are implicated in their use of the word *alive*. Even in their earliest years, children

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conceptualize life as a cluster of affiliated traits. However, this cluster may for some time be very loosely bound, and the constitution of the cluster may vary between individuals, between entities being considered, and between occasions of inquiry. It may even be the case that none of the individual traits appearing in the cluster will necessarily lever an attribution of aliveness, or that no combination of the traits will be sufficient to do so. Thus, the attribution of traits biologically affiliated with life may ensue in some mysterious independence from the attribution of life itself. To put it another way, the word *alive* is employed with much greater independence from the child's developing scientific theories than other biological predicates. In this early period, it is difficult to predict what biological commitments a child has in mind when he deploys the word *alive.*

To the degree that this situation persists, it is inappropriate to regard the concept represented by the word *alive* as a component in a theory, or prototheory, of biology or physical causation. The volatility of the concept disqualifies it for inclusion in any thought system that we would like to regard as a theory. Its inclusion would simply violate the coherency requirements of theories.

As the child matures, the associations binding the cluster of traits affiliated with life become strengthened, and fall increasingly under the control of biological knowledge which has been structured in the form of postulates about determinate classes of entities in the world. Abetted by social pressures to conceptualize biology as a science, the formalism of this knowledge supplants the asystematicity which characterized the child's earlier contemplations of the biological realm. However, the fact that animistic expression is finally suppressed by the force of science is not a reason to regard animism as an early version of the adult's overpowering biological and causal theories, any more than the suppression of Gallic peoples qualified them to be regarded as early versions of Romans.

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In this scenario, the relationship between biology and animism is complex. For the most part, it can be expected that practical experience with entities and knowledge of their biology and of their causal mechanisms will diminish animistic projections. It is plainly the more enigmatic entities of the world which are most likely to be credited both with life and with other traits associated with life — particularly, traits of sentiency, which are themselves of an enigmatic character. However, there are ways in which an individual's incomplete biological knowledge may encourage as well as inhibit animistic attributions. A preschooler with an early understanding of nutritive needs may affirm that animals and plants must be living because they drink water (and that trees must have mouths in their roots to do it!). A preschooler who has discovered that trees can regenerate leaves may then affirm that trees are 'more alive' than animals. Plants may be accorded animal traits on the rationale that living things (zoocentrically conceived) ought to be able to know, feel, breathe, etc. Strange to say, then, the freewheeling asystematicity of outlook which makes animistic projections possible may become directed in its content by the systematic expectations of incipient biological knowledge.

If animistic trait attributions are advanced, the attributions are more likely to concern mental states than physical capacities. In part, this may result from the use of different cognitive strategies to determine the mental trait status and the physical trait status of entities in the world. Quite often, the question of whether an entity possesses humanesque mental traits is decided by assessing the similarity of the entity to humans. For this reason, mental traits are more likely to be extended to exemplars of the category {animal} than to peripheral members or nonmembers of the category. The question of whether an entity possesses given physical traits is more likely to be decided by referring to more formal categorical knowledge. However, in connection with any trait (though perhaps more with physical traits), and in connection with any entity (though perhaps more with nonanimals), an individual may decide the matter of trait attribution by invoking simple class inclusion formulae. The

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age at which such formulae are invoked is quite variable, as is the degree of biological knowledge supporting these formulae.

More often than not, when determining the biological trait status of various entities, the child will make fewer mistakes with nonliving entities than with living ones. This suggests that the living-nonliving distinction is intertwined with an appreciation of the presence and absence of biological traits. However, it is also generally the case that traits biologically affiliated with life are less frequently attributed to entities than aliveness per se. This suggests that attributions of aliveness are not deductively based on the presence of biological traits, since attributions of aliveness may ensue in cases where key biological traits are judged to be absent. Thus, in its affiliations with biological traits, the word *alive* occupies a kind of semantic netherworld: it is neither completely independent of such affiliations, nor completely amalgamated with them. Variability, rather than strict systematicity, is the relationship most often observed.

The asystematicity of animistic attributions and the resilience of animistic tendencies when they are exposed to causal and biological knowledge suggests that animism cannot be adequately explained as the expression of early, somewhat erroneous, causal and biological theories. One must assume that the animistic mentality is in some way self-sufficient, with its own appeal and its own legitimacy. In exploring what kind of a mentality it might be, one can speak all one likes about biology and causality, and yet fail to say nearly enough about animism.

2.235

The following pages will argue against the validity of the classical system of animistic stages, and so constitute a final attack on the relativistic claim that animism is restricted in its very nature to the minds of children. It will be argued that the classical stage system is not internally coherent, that the stages are not

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properly isolable, and that the stages cannot be associated with age in any way that supports relativistic claims.

2.2351

Animistic stage systems are incoherent whenever they allow subjects to be classified via methods producing different results. For example, investigators typically do not distinguish between children's responses to the question *Is it alive?* and questions such as *Can it grow?*. Yet, as explicated above, animists may not respond to both of these kinds of questions with the consistency that one finds with biologically sophisticated adults. Since attributions of aliveness and attributions of traits biologically affiliated with life do not always square, a subject might be classified in one way if he is responding to an aliveness question and might be classified in another way if he is responding to a trait question.

What we see in this particular example is an inconsistency in how the semantics of the word *alive* is approached. When unadorned judgments of aliveness are elicited, there is implicitly a commitment to an extensional semantics: what counts is whether the entity at issue is or is not a member of the set of living things. When subjects are asked questions about the traits of the entities under consideration, or are asked to explain their judgments of aliveness, there is implicitly a commitment to an intensional semantics. The incoherency of classical stage systems arises because these systems are inconsistent in how they address both the conceptualization of life and the semantics of the word *alive*.

We find that even the stages themselves are not defined in consistent terms: here too, there is an ambivalence between intensional and extensional treatments. Some stages are characterized in terms of the rationales offered for attributions of life; other stages are characterized in terms of the entities to which life is attributed. In Laurendeau and Pinard's system, Stages 1 and 2 are characterized by the use of animistic rationales relating to usefulness,

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anthropomorphism, activity, or autonomous movement. In contrast, Stage 3 is characterized by the restriction of life to animals (and possibly plants), regardless of the rationales which are offered or the depth of biological understanding which is demonstrated.

Whether stage assignments should be made on the basis of subjects' judgments of life status or on the basis of the explanations offered for their judgments has been an ongoing dilemma. Brainerd (1973a, 1974, 1977) has argued that the assignment of subjects to stages on the basis of explanations introduces two sources of Type II error. First of all, subjects who can expound on the character of the conceptual models they possess are a proper subset of subjects who nevertheless possess the same conceptual models; hence, stage assignments based on explanations are overly conservative. Secondly, explanations can only tap conceptual competence through verbal responses, while judgments can be made by additional modes of response (e.g., nonverbal sorting), so that here again stage assignments based on explanations may be overly restrictive.

The incoherent tendencies of stage systems reach a combustion point in the characterization of Stage 3 behavior. This stage is classically defined in terms of judgments rather than explanations. It is the stage at which overattribution of aliveness ceases, so that only animals, or animals and plants, are said to be alive. Hence, it is classically referred to as the stage at which an adult concept of life is attained. However, when one looks beneath the surface of these judgments, the internal disorder of the stage is alarming. An individual may perform at a Stage 3 level because he possesses sophisticated biological knowledge, like an adult. Or an individual may perform at a Stage 3 level simply because he has invoked a class inclusion formula restricting the use of the word *alive* to animals and plants, or to animals alone. Or an individual may perform at a Stage 3 level because he has judged only animals to be sufficiently similar to human beings to be called alive.

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Since there is no necessary continuity between the ability to judge aliveness correctly and the ability to invoke biological justifications for these judgments, it is hardly the case that Stage 3 behavior can be taken as evidence that an adult concept of life has been acquired. In particular, in those cases of Stage 3 behavior where it is denied that plants are alive, there is almost always positive evidence of animistic tendencies at work. Generally, the criteria according to which plants are denied life are animistic in character. Thus, when 5-year-olds and 20-year-olds are both classified in Stage 3, despite the disparity in their biological knowledge, despite their disagreement on the life status of plants, and despite the difference in their willingness to employ animistic modes of appraisal, it is preposterous to regard Stage 3 as an internally coherent level of conceptual attainment, much less an essentially adult level of understanding.

2.2352

Let us now address the putative isolability of stages. It will be argued here, as even Laurendeau and Pinard have themselves conceded (1962:153ff), that these stages cannot be viewed as radically isolable plateaus of cognitive semantic attainment. In fact, it is the testimony of virtually every investigator (including Piaget) that, when judging aliveness, a child typically offers a variety of rationales such as might represent separate stages of understanding.[49] This fact would in itself seem to explode the notion of isolable stages, but it seems to have not detered the employment of stages to gauge children's conceptual development.

Generally, investigators have decided on the stage of a child on the basis of his most sophisticated response. If a child made mention of autonomous movement, then he would be assigned to Stage 2,

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[49]See Piaget, 1926b:188-196, 204f; Keen, 1934; Bruce, 1941; King, 1961; Laurendeau and Pinard, 1962:45-53, 138, 153ff; DelVal, 1975:168-172, 204-209; Carey, 1985a:31.

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even if most of his responses were based on anthropomorphic or functional or ad hoc considerations. In the Canadian study, there were actually no subjects who relied exclusively on autonomous movement rationales (1962:138). Why then should the invocation of an autonomous movement rationale be taken as evidence of a quantally advanced level of understanding? Laurendeau and Pinard's quantalization of the ascension from Stage 1 to Stage 2 rested solely upon evidence that the autonomous movement rationale was never found in the youngest group of subjects, and never appeared sooner than rationales typifying Stage 1. This strict progression was also later observed in Nurcombe (1970:75) in a sample of Aboriginal children, and in Sharp et al. (1985:55,60) in two samples of American children.[50]

Even accepting that autonomous movement rationales for attributing life never do appear before simple movement rationales, the question remains whether the child's advancement to the sometimes use of an autonomous movement rationale ought to be commemorated as a quantal transformation of the meaning of the word *alive.* Alternately, one might argue that the adoption of an autonomous movement criterion is but one of many conceptual refinements by which children constrict and stabilize their concept of living things around the model of animals or people. It has always been tacitly agreed, and it has now been decisively confirmed by Carey (1985a) and others, that the child's early category of living things centers around human beings and other common mammals, even at the height of animism. In free production tasks, it is animals rather than rivers and lightning which are most likely to be named as examples of living things, or as examples of entities which have biological traits such as eating or thinking.[51] In clinical interviews,

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[50]However, the data in Sharp et al. is not quite reported completely.

[51]Regarding the free production of examples of livings things, see Carey (1985a:25 - child Ss); Smith (cited in Carey, 1985a:102-105 - child Ss); Holland and Rohrman (1979 - child Ss); Siegler and Richards (1983:105f - child and adult Ss); and Brown and Thouless (1965 - adult Ss). Regarding the free production of examples of attributes

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even a Stage 1 thinker is likely to perform at an adult level when assessing the life status of people and familiar animals. In this setting, too, a child's propensity to attribute biological traits such as sleeping or feeling to unfamiliar animals varies in accordance with how similar to a human being those animals are judged to be. If then, *for whatever reasons*, the child is generally predisposed to constrict the category of things said to be alive around the exemplary model of animal life, then the sometimes adoption of an autonomous movement criterion would seem to be in service to this enduring predisposition. Since the Stage 2 child does not possess a penetrating understanding of the biological foundations of autonomous movement, his use of this criterion seems more indicative of an incremental conceptual advance than a radical conceptual change.

The tenuous status of Stage 2 is brought home when data concerning the timely transition of stages is examined. When we look at the distribution of children among developmental stages, we should expect to find a normal curve of distribution which moves through the stage sequence as the age of children increases. Successive graphs of this progress should remind us of an animated film sequence of an anaconda eating a pig. Crucially here, there should be one bulge rather than two. However, when the developmental data of Russell (1940a:356ff, 1940b:87ff, 1942:332f) and Laurendeau and Pinard (1962:154) are reviewed, it turns out that the mode of distribution is *never* centered at Stage 2. That is, there is no report of an age group which has more children at Stage 2 than at any other stage. Instead we find age groups in which most children are in Stage 1 or Stage 3, or bimodally distributed between Stages 1 and 3. This previously unnoticed finding holds up whether the sample is determined by chronological age or by mental age. Some of the more illustrative data is presented below. The tables show, for various age groups, the percentage of subjects classified in each developmental stage.

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of life, see Lucas et al. (1979 - child Ss); Siegler and Richards (1983:108f - child and adult Ss); Voeks (1954 - adult Ss); and Brown and Thouless (1965 - adult Ss).

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Laurendeau and Pinard (L&P) (1962):

	L&P Stage 1	L&P Stage 2	L&P Stage 3
6:0 CA	42%	12%	23%
7:0 CA	43	10	39
8:0 CA	37	15	42

Russell (1940b):

	L&P Stage 1	L&P Stage 2	L&P Stage 3
6:0-7:11 CA	41%	6%	22%
8:0-9:11 CA	43	16	29
10:0-11:11 CA	33	19	45

Russell (1942):

	L&P Stage 1	L&P Stage 2	L&P Stage 3
8:0-9:11 CA	20%	10%	40%
8:0-9:11 MA	33	0	33

The interpretation of this phenomenon is straightforward. This sort of bimodal distribution can only occur if a) Stage 2 is traversed relatively rapidly, or b) Stage 2 is sometimes skipped altogether. Neither alternative supports the isolability of Stage 2 as a distinct level of conceptual attainment. These data, and Laurendeau and Pinard's observation that an autonomous movement criterion for attributing life was never used in isolation, suggest that Stage 2 has more the character of an indistinct and relatively brief phase of conceptual transition. The use of an autonomous movement criterion is an obvious extension of the regard which the child has for movement in general in Stage 1, and a clear notice that the child is thinking along increasingly criterial and restrictive lines which will have the effect in Stage 3 of restricting life to animals (and possibly plants).

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Regarding the possibility that Stage 2 is sometimes skipped altogether, it is interesting to note that Dennis (1942:314,317) failed to find any evidence of Stage 2 in a longitudinal study of his own daughter. When she was tested at 2:9, 2:10, 4:7 and 4:11, she was classified as Stage 1; when next tested at 6:2, she was classified as Stage 3. It is certainly possible that she transited Stage 2 between 4:11 and 6:2. But if this had happened, then Dennis — one of the preeminent researchers of animism in America — would certainly have noticed her regard for autonomous movement. And if he had noticed evidence of Stage 2 behavior, then he certainly would have reported it, instead of just tersely remarking that "Stage [2] was not in evidence at any examination." My reading of Dennis' report is that his daughter never demonstrated any Stage 2 behavior, either in the context of an examination or in the context of everyday life. Dennis (1942) appears to be a defeat for the cognitive inevitability of Stage 2 (in a battle pitched on a single data point).

Note further that there are just two cognitive procedures by which a child can ascend to Stage 3, and that both of these suggest ways in which Stage 2 might be skipped altogether. A child may make accurate attributions of life on the basis of biological knowledge, or by invoking a simple class inclusion formula: viz., If it is an animal (or plant), then it is alive. Since even rather young children may acquire class inclusion formulae, it is quite possible for a Stage 1 child to suddenly ascend to Stage 3. As regards the acquisition of biological knowledge, it need only be noted that, if a child possesses even a meager understanding of what is required for an entity to move by itself, the claim that only autonomously moving entities are alive is essentially *identical* to the claim that only animals are alive. In this case, there must be a real tendency for an autonomous movement criterion to just coalesce with a Stage 3 class inclusion formula.

This last point is of particular interest as a demonstration of how class inclusion formulae may develop in close interaction with less formal categorization strategies. A general appreciation for

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movement, in concert with even a slight understanding of what is required for an entity to move by itself, may yield a proclamation with the character of a class inclusion formula: Only animals move by themselves and can be said to be alive. Similar semantic progressions can be envisioned with other biological predicates. A general appreciation for growth, once allied with biological knowledge sufficient to distinguish growth from mere enlargement, may yield a proclamation with the character of a class inclusion formula: Only animals and plants grow and can be said to be alive.

Scenarios such as these considerably moderate the view that an ascension to Stage 3 must require a quantal shift in conception of life, via the quantal acquisition of wholly new principles for the attribution of life. The gradualism of the acquisition of biological knowledge is well documented by Carey (1985a), and here it is submitted that the concretization of this knowledge in the form of biological principles, and the emergence of class inclusion formulae, are typified by a process of gradual stabilization. As a result, the child's gravitation toward increasingly analytic and criterial strategies for attributing life need not have a quantal character at all.

This takes us quite a distance from the Piagetian point of view that stage ascension is a process of quantal leaps in understanding and, in panorama, a saltatory escape from childhood realism. As Laurendeau and Pinard have remarked, the general picture which emerges from investigation of childhood animism is one of "stage transitivity," in which "accession to the higher level presupposes at least a partial withdrawal from the preceding level" (1962:261). It is certainly possible to monitor children's developmental advance by noting the kinds of rationales they offer for attributing life and by noting the classes of entities to which attributions of life are restricted. But the psychical ontology of isolable stages of understanding appears to be a fiction.

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2.2353

Let us finally examine the issue of whether, or to what degree, animistic stages are bound with age. Is the shift away from animism properly regarded as a consequence of maturation; particularly, a consequence of a maturational reformulation of world view?

Even in studies which have been touted as important replications of Piaget's work, the relationship between age and stage has only been moderately predictable. Russell (1940a, 1942) found the correlation between stage assignment and mental age to be .49—.59, and between stage assignment and chronological age .44—.62. There is no reason to think that this correlation is higher than it would be for any given domain of acquired knowledge, so there is no reason to think that there is a special developmental relationship between cognitive maturation and the acquisition of an adult conception of life. At best, it appears from studies in which retardates are compared with normals of like mental age and also with normals of like chronological age that performance on animism tasks is best predicted by an interaction of mental age and chronological age; i.e., by an interaction between cognitive development, and real world experience and received knowledge (Granich, 1940:25,45; Russell, Dennis and Ash, 1940; Smeets, 1974). This finding is quite different from the original Piagetian position which laid so much emphasis on the clocklike internality of the child's acquisition of ideas. There is now clear evidence that children progress in their conception of life at significantly different rates: an abundance of investigators report that it is typical to find three or four stages represented at a given age level.[52] Further, there is intriguing evidence that the acquisition

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[52]See Keen, 1934; Bruce, 1941; Russell, 1940a, 1942; King, 1961; Laurendeau and Pinard, 1962:153ff; Tomlinson-Keasey and Keasey, 1972; Berzonsky et al., 1977; Carey, 1985a:25; Cherry, this volume.

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of the alive-inanimate distinction begins in the first few years of life[53], and that animistic behavior perseveres into adulthood.[54]

Piaget's maturational interpretation of animistic behavior was once appealing because animism seemed to continue until pre-adolescence, and so fit nicely with a whole constellation of other developmental changes which have an approximate terminus in late childhood. However, studies contemporary with that of Piaget have suggested that Piaget's subjects were unusually slow to cast off animistic modes of thinking, or that Piaget was an exceptionally evocative investigator of animistic tendencies (Isaacs, 1929; Johnson and Josey, 1931-32). Three decades later, Laurendeau and Pinard demurred on the age range at which stages of animism might appear, acknowledging that their subjects advanced more rapidly than those of Piaget (1962:153ff,260f). In fact, only a few investigators in the last three decades have reported that as many as 10% of their subjects over ten years old will evince an animistic attitude (King, 1961; Smeets, 1973, 1974; Manaster, 1980). Most contemporary investigators give evidence that the sophistication of young subjects has increased, and that the age of animistic displays has very dramatically receded, with animism nearly extinguished past age seven.[55] By age seven or eight, 90% or better will not only use the word *alive* in an adult fashion, but will also demonstrate a good grasp of key traits associated with animals, plants, and inanimates. They will correctly identify and repair sentences with animistic anomalies (James and Miller, 1973; Tunmer, 1985); they will cor-

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[53]See Keil, 1979; Carlson, 1980; Golinkoff and Harding, 1980; Gelman and Spelke, 1981; Wellman, 1982; Gelman et al., 1983; Sexton, 1983; Golinkoff et al., 1984; Carey, 1985a.

[54]See Russell, 1942; Dennis and Mallinger, 1949; Dennis, 1953; Crannell, 1954; Bell, 1954; Lowrie, 1954; Voeks, 1954; Dennis, 1957; Crowell and Dole, 1957; Simmons and Goss, 1957; Mikulak, 1970; Papalia and Del Ventro Bielby, 1974; DelVal, 1975:253-257; Margand, 1977; Papalia-Finlay, 1978; Siegler and Richards, 1983.

[55]See Safier, 1964; Whiteman, 1967; James and Miller, 1973; Looft, 1973; Berzonsky, 1974; Looft, 1974; Berzonsky et al., 1977; Margand, 1977; Dolgin and Behrend, 1984; Tunmer, 1985; Berzonsky, 1988.

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rectly complete sentences requiring animate or inanimate arguments (Howe and Hillman, 1973; Margand, 1977) and, in response to direct inquiry, they will correctly determine whether a given entity can have a heart, have bones, grow up, have babies, get thirsty, eat, sleep, have dreams, breathe, see, listen to someone, like someone, be happy, be naughty, get hurt, want to do something, move autonomously, do things on purpose, have mommies and daddies, be a boy or a girl, die, etc. (Safier, 1964; Dolgin and Behrend, 1984; Carey, 1985a:77-102). In several studies, even 5-year-olds have operated at a Stage 3 level of competence,[56] though the rationales they offer for restricting life to animals (and possibly plants) seldom show much biological sophistication. Cherry (this volume) found, in a sample of preschoolers in an enriched environment, that the transit from No Concept to Laurendeau and Pinard Stage 3 was unlikely to take longer than about a year.

2.236

The studies briefly cited above are sufficient to discredit the classical notion of animistic stages. However, it is worthwhile to elaborate on those studies which demonstrate that the alive-inanimate distinction begins to be formed in infancy, while animistic behavior continues into adulthood, not only because of their relevance to the classical stage sytem, but also because they bring into higher resolution the intractibility of the incongruities between animistic thinking and causal and biological knowledge. How can it be that animism appears in children whose understanding of physical causation is already well along, and perseveres in adults who have acquired biological knowledge?

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[56]See Holland & Rohrman, 1979; Siegler and Richards, 1983; Bullock, 1985; Sharp et al., 1985; Berzonsky et al., 1988; Cherry, this volume.

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As mentioned, recent research indicates that preschoolers and even infants are already hard at work puzzling out the distinction between inanimate objects and living beings. Wellman (1982) found that 4-year-olds restricted their assignment of brains to animals. Carey (1985a:78ff) reported that 4-year-olds were willing to say that animals, but not inanimates, had a heart and could eat, breathe, sleep, and get hurt. Keil (1979) reported that 3-year-olds granted feelings to people and to animals, though not to plants or inanimate objects.[57] Gelman et al. (1983) found that at least 70% of a sample of 3-year-olds could correctly judge whether dolls and puppets really had external body parts (head, feet, mouth, eyes, ears, hands), and whether they could perform simple actions (see, run, walk, sit, talk, hear, throw, eat, cry, laugh, breathe), perform reciprocal actions (talk to, play with, run with, kiss, hug), and experience mental states (feel sad, feel happy, remember, think, make a wish).

Gelman and Spelke (1981) have addressed the acquisition of the animate v. inanimate distinction within the pleasantly expanded context of the development of social v. nonsocial cognition. Inclusive in an understanding of the animate-inanimate distinction is a whole set of causal expectations and behavioral norms. To take up the most marked contrast, we do not expect the same things from people and manipulable objects, nor do we behave toward them in the same way. In addition to biological expectations, we expect people to be capable of willful action and to possess interior psychological states: we expect the behavior of people to be predictable by psychological principles and social conventions rather than by physical laws. We

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[57]However, plants are commonly accorded the capacity to feel — even, sometimes, when they are not regarded as living! Carey (1985a:80) reported that, in a group of nine 4-year-olds, no children attributed breathing, sleeping, eating, or having a heart to orchids, but two children did attribute the ability to get hurt. Granich (1940:25f) noted that 2 of 12 13-year-olds claimed that a tree could feel a blow, though they refused to grant trees powers of vision or conversation. Smeets (1974) reported that only 25% of his youngest subjects, 5:10-7:2, regarded trees as living, though 55% granted them powers of feeling.

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expect people to be responsive, to communicate, and to act reciprocally. In our projects, we expect people to act the role of agents rather than instruments. In our perception of people we are attuned to their actions, intentions, motives, and feelings. In the perception of inanimates, we focus on physical properties.

Golinkoff and Harding (1980) used the affective and motor responses of infants to assess their reactions when a chair appeared to move on its own. Subjects were 54 16- and 24-month-olds. At 16 months, 38.9% of the infants reacted in a way which suggested that they found the sudden movement of the chair to be anomalous. By 24 months, this proportion increased to 77.7%. These findings suggested that by the end of the second year infants have formed some expectations of what an inanimate object can and cannot do. They may believe that causal events involving inanimate objects should occur only with the aid of an external force.[58]

Sexton (1983) tested the reactions of 11-, 17- and 23-month-olds to the activation of (for the most part) battery operated playthings. The activation was either caused by the mother, caused by the experimenter, or made to appear sui generis. The person(s) to whom the infant directed showing, offering, pointing, and requesting, etc. were coded as dependent variables. At 11 months, the infants did not direct appeals to either person, but just attempted to recreate the event by manipulating the toys. By 17 months, the infants distinguished between caused and apparently sui generis events, directing significantly more communicative overtures to their mother or the experimenter in the trials where the event had been evidently initiated by a person. However, at this age, most

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[58]Golinkoff and Harding are unaware that their experiment was previously contemplated by R. R. Marett: "Does not even the baby soon learn to distinguish its nurse by her relatively arbitrary proceedings from the chair with its thoroughly wooden way of reacting to the baby's way of thumping it? On the other hand, if the chair creaked in a peculiar manner it might frighten the baby, and might thereupon pass over into the class of objects that act arbitrarily ..." (Animatism. *Encyclopædia Britannica*, 1957 edition, volume 1:973).

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overtures were directed toward the mother, whether or not she had been the one to cause the event. By 23 months, the infants appealed significantly more to the actual agent of the event. Apparently, by the latter half of the second year, infants know that at least some events are caused by persons and even that certain events are caused by particular persons.

Golinkoff et al. (1984:148) provides a nice overview of additional studies in this line.

> Some researchers in the Piagetian tradition have related fear of strangers, which appears at approximately 9 months of age, to the infant's recognition that animate objects, as opposed to inanimate objects, act unpredictably and are beyond their control (Goulet, 1974; Zaslow, 1978). The infant's recognition of the power of animates may also underlie the contemporaneous appearance of communicative appeals directed to adults for instrumental assistance (Harding & Golinkoff, 1979). On the other hand, some researchers (e.g., Trevarthen, 1977) infer from the infant's communication behaviors that infants can distinguish between people and objects from the first weeks of life (see Golinkoff, 1983, for a critique of this research).
>
> Findings from language comprehension tasks suggest that children use this distinction by their second year (Chapman & Miller, 1975; Golinkoff & Markessini, 1980). In the later study, children were shown a picture book in which a pair of objects (animate and inanimate) were presented on facing pages. Children were trained to point in response to questions such as, "Where's the boy's flower?". When asked questions such as "Where's the flower's boy?" in which an inanimate object "possessed" an animate one, children often refused to respond. In language production, children's early sentences almost invariably have animate agents as the subject (Brown, 1973), and children discuss causal events involving animate objects before they discuss mechanical causal events involving inanimate objects (Hood & Bloom, 1979).

In summary, it has to be said that the relationship between age and stage has always been tenuous and, in the last three decades of research, has been decisively disconfirmed by evidence that children begin to make appropriate distinctions between animates and inanimates in infancy, may use the word *alive* with an adult extension by the age of five, and may correctly identify ancillary traits of entities said to be alive by age seven or eight. Had data of this sort been available to Piaget, animism would not have been promoted as a phenomenon reflecting classical Piagetian maturational themes.

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In some ways, these studies have the effect of simplifying accounts of childhood animism by dissociating these accounts from the Piagetian postulation of a relativistic maturational shift from childhood realism to adult rationality. In other ways, however, these studies introduce new topics of mystery. For example, if infants already regard objects such as chairs to be nonsocial entities, then why do some older children apply the word *alive* to these entities? If we believe that the animate-inanimate distinction is essentially constituted by a distinction between social and nonsocial causal expectations, then we have to believe that young animists who say that chairs are alive are using the word *alive* to refer to some *other* distinction. But what other distinction could it be? It has already been demonstrated that the animistic use of the word *alive* need not entail extensive biological commitments. Here, it appears that the kind of causal commitments bound up with 'social cognition' may also be absent in specific animistic acts. One has to infer that the animistic meaning of the word *alive* cannot be *exhausted* by a discussion of its biological and causal associations.

2.2362

In the history of research on this subject, the studies which have most served to complicate the relationship between age, biological knowledge, causal knowledge and animism have been those which have uncovered perseverant animistic tendencies in adults.

So strong was the Piagetian presupposition that animism was extinguished in late childhood that, throughout the 1930's, no one actually tested for the presence of animism in adults. However, Russell (1940a) found that only 18% of subjects 12:0-13:11 could be classified in the highest developmental stage. Seeking to complete the developmental picture of animism, Russell (1942) tested rural and suburban high school students up to 20 years of age. He found that 93% of subjects 18:0-19:11 could be regarded as having an adult concept. In a rural and suburban population, at least, it appeared that animism might just barely extend through the teenage years.

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The first indication that animistic thinking might be found in fully mature adults was offered by Dennis and Mallinger (1949; cf. Sheehan and Papalia, 1974). In a study of 36 senescents aged 70 or older, this team found that 75% of their sample gave animistic answers, and that fully one-third were in the lowest Piagetian developmental stage. The answers given by these seniors were frequently identical to those given by children.

Among the answers obtained from Piagetian Stage I thinkers: The chair is living because it is of use. The mirror is living because you can see yourself in it. The knife is living because it cuts and performs work. The broken dish is dead because it is of no use, or it is living because it can be mended and can be fixed up. A stone is living because it is in its natural state, having never been crushed or broken. (1949:219).

Among the answers obtained from Piagetian Stage II thinkers: The clouds are living because they travel; the wind moves them. The river is living because it has motion; the motion is created by the elements. In another instance, the river is living and is moved by gravity. The wind is alive if it is blowing (1949:219).

Among the answers obtained from Piagetian Stage III thinkers: The river is living because it moves by itself. Lightning is alive because it does devilment. Clouds are living because they produce water and absorb water (1949:219).

Dennis and Mallinger were aware that no norms were available for adults, and the team was inclined to think that many adults of normal intelligence were not in the highest developmental stage. However, the team was struck by the fact that the conceptual performance of their senescent subjects was inferior to that of even 12-year-old children. It was not felt that generational differences in education (many of the subjects were educated before 1885) was the cause. Animistic differences between subjects who were younger than 80 and those who were older than 80 approached

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significance at the .05 level. Since the two senescent groups had been exposed to the same historical, cultural, and educational influences, the difference between the two groups — like the conceptual 'immaturity' of the senescent subjects in general — was judged to be due to "a return in senescence to childhood concepts ... due to the decline in mental ability which accompanies senility" (1949:220).

In the context of the present discussion, one might look at this 'return to childhood' as a reversion to a more relaxed conceptual style, rather than as a breakdown of rationality. Russell (1942) and Dennis and Mallinger (1949) offer us views of young adults and senior citizens which suggest incompatibilities in their mental life. Here it is suggested that the crucial mental differences between these populations are related to style more than acuity.

The young adult is not only a positive thinker, but also a positivist thinker. He is not only an idealist in the social sense; he is an idealist in the philosophical sense. He brings into the intellectual flowering of his late childhood and young adulthood an immoderate belief in essences and clarity, a commitment to criterial definitions, an insensitivity to grey areas, and a disdain for equivocation. As the proud possessor of only moderate knowledge, he is able to stake out uncompromised positions in every field. In 1942, the rural/suburban 18- to 20-year-old American with a high school education was at the peak of his analytical game. It is unlikely that things would ever again seem so rationally ordered and straightforward to him, or that he would ever again be so habituated to the rationalistic activities of the classroom. It is completely unsurprising that, in a simple 'biology test' administered at school, 93% should achieve a perfect score. In contrast, it is hard to imagine a circumstance more likely than old age to diminish the inclination for analytic thought.

Dennis (1953) provided the first portrayal of animism in a college sample. Here of course there was no question of organic

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deficits (as supposed by Dennis and Mallinger, 1949), or of lingering mental immaturity (as supposed by Russell, 1942). Dennis' instructions:

> I am going to ask you some questions about some common objects. You may think some of the questions very easy; some may be rather hard. I am asking these questions of many kinds of people. Both the easy and the hard questions are asked of you because I want to know how persons of all sorts answer the very same questions. Please answer each question seriously, though some questions may seem very simple. (1953:248)

Four groups of undergraduate and graduate students were tested. The subjects were asked to write down whether each of several inanimates was living or not living, and to state the reason for each answer. The entities tested over the four groups included an unlighted match held before them, the same match lighted, an electric clock on the classroom wall, the sun, the wind, stars, lightning, clouds, the earth, the ocean, the sea, a pearl, gasoline, and a five-cent piece.

To be sure, some of the test entities were problematic or inappropriately suggestive: unlighted match v. lighted match, pearl, ocean, sea, earth. In addition, the test may not have been clearly recognized as a test of biological concepts: the instructions affirm that some of the judgments are difficult, which may have suggested to students that they were to take a philosophical view rather than a biological one, since there was really nothing biologically challenging about any of the judgments requested. The absence of any genuinely animate entities may have suggested that the biological animate-inanimate contrast was irrelevant to the task at hand. These factors may have accounted for the high percentage of subjects in the four groups who gave at least one animistic response: 48%, 45%, 37%, 12%. The three more animistic groups were made up of undergraduate and graduate students in psychology classes. In the least animistic group, sophomores were just completing the third semester of an integrated science course. Most of the work of the current semester had been biological, with a strong emphasis upon the properties of protoplasm and the

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distinctive characteristics of living things. It appears then that the students who were more oriented by their coursework to a biological perspective performed less animistically than those who were not.

As in the study of senescents, the animistic responses received were much like the productions of children. Consider these typical remarks:

> *The lighted match:* "Living because it has flames which indicate life." "Living because it is burning brightly, giving forth something." "Dying - I saw it being burned."
>
> *The sun:* "Living because it gives forth energy. Gives us power, warmth, light, and energy. Makes things — living things — thrive and exist." "Living because it gives off heat." "Yes! Living! Without breath, but living, scientifically living, changing."
>
> *The ocean:* "Living because it is constantly maintaining life. Movement is characteristic of it, and life is brought forth by it." "Living. It has moods and is temperamental just like many human beings." "Living — it moves and makes noise and is powerful and changing. Sometimes calm, sometimes stormy. We cannot control it." "Living, continually in motion, changing, etc." (1953:248f)

Were subjects simply using the word *alive* to mean 'moving; activated,' or did subjects also attribute sentiency to these entities? Immediately after they had rendered their aliveness judgments, the subjects in one group were asked two additional questions:

> Many ships are lost at the bottom of the sea. We cannot find them. Do you think the sea itself knows where they are?
>
> This pearl was once in a shell in the sea. When the water moved, could the pearl feel the movement of the water?

Of those who had previously answered animistically, one-third attributed consciousness to the sea or to the pearl, or to both. Some characteristic responses regarding the sea:

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> "Yes, the chemicals in the sea come in contact with sunken vessels and are aware." "Yes, the sea does know the location of lost ships because they are in the bottom of the sea." "Yes, if it [the sea] is living, it ought to." "Yes, the sea rubs over the lost ships and knows them to be there." "No, the sea doesn't care to know. There are too many of them. The sea *could* know if it wanted to."

and the pearl:

> "Probably as much as a very young fetus might feel the effect of water in the mother's womb." "Yes, the pearl was part of a living thing." "Yes, through the living oyster." "Yes, because it is changed by friction." (1953:249)

Again, despite whatever semantic difficulties might attend the interpretation of the verbs of mentation, *know* and *feel*, one has to be struck by the parallel in tone between these responses and the animistic responses of children. Dennis' overall judgment was that education had failed with these subjects, and that their responses reflected an immature conception of life. He did not believe that, in general, they were acting whimsically, philosophically, poetically, or mischieviously.

> It should be borne in mind that sophomores often have had no more specific instruction than primitive peoples concerning the distinction between the animate and the inanimate and concerning the dependence of consciousness upon a nervous system. Apparently, in the absence of specific instruction, "educated" persons in modern societies possess many conceptions of the world that are identical with those of the child and of the uneducated. (1953:249)

Replications using Dennis' format followed in the United States (Crannell, 1954; Bell, 1954; Lowrie, 1954; Voeks, 1954; Crowell and Dole, 1957; Mikulak, 1970; DelVal, 1975:248-279) and internationally (Dennis, 1957). Positive animistic results were also obtained using somewhat different formats in the United States (Simmons and Goss, 1957; Sheehan and Papalia, 1974; Papalia-Finlay, 1978) and internationally (Tanguay, 1960; Brown and Thouless,

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1965).[59] All of these studies assessed the views of college students enrolled in social science and natural science classes — a population which, on the face of it, should be intolerant of animistic thought forms.[60] These studies unfortunately continued to employ problematic stimuli (atoms, pearl, blood, etc.), and stimuli which drew attention to biologically irrelevant factors ("electric clock plugged in," "radio turned on," "bicycle being ridden," "lighted match," "unlighted match," "parked truck," etc.). To their credit, however, some investigators made an effort to ensure that the experimental task would be interpreted along nonfigurative lines.

> We ask that you answer the questions seriously ... although some may seem very trivial. Bear in mind that they are destined for very different types of persons. ... The word alive should be understood in a scientific sense, as a biologist would understand it. ... Answer from a strictly scientific point of view, without literary interpretations. (DelVal, 1975:318f, my translation)
>
> [Respond] as if you were a scientist, e.g., Newton, Madame Curie, or Darwin ... (Simmons and Goss, 1957:184)
>
> Please answer the questions in the way that you think they would be answered by a biologist. For each object, the question is, is the object living in the same way that animals and plants are living? (Dennis, 1957:193)

One investigator sought to assess the sincerity of subjects by asking them to self report on their seriousness and on any difficulties they had in performing the experimental task.

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[59]Not too surprisingly, negative results were reported by Margand (1977), who found that college students did not make the animistic errors made by 4- and 5-year-olds when asked to complete multiple choice sentences such as 'The (horse, wagon, drum) ate the food.' or when asked to perform an oddity task with picture triads of animates and inanimates. One is reminded of the argument in Berzonsky et al. (1988:237) to the effect that, to a large extent, subjects' linguistic judgments and subjects' responses to direct inquiries about life/sentiency status are not consistent and are not measures of the same mental constructs.

[60]In two studies, the views of non-college adults were also tested: one of the five samples assessed in Dennis (1957) comprised adult night high school students; and two of the five samples assessed in Sheehan and Papalia (1974) comprised 30- to 64-year-olds, and subjects over 65 years old, respectively. The level of animistic response found in these groups was comparable to the levels found in the college and high school samples of these studies.

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List any difficulties you experienced in answering these questions.
Did you answer the questions seriously and to the best of your knowledge?
Define what you mean by *living*. (Voeks, 1954:406)

In the study by Bell (1954), sincerity and biological thinking were promoted by incorporating the animism test on the final examination of a general biology course.

The long and short of it is, however, that nothing would prevent a shocking number of the experimental subjects from answering in the animistic fashion associated with children. The same entities animistically favored by children were, in the same relative proportions, animistically favored by adults. Further, the same sort of rationales were offered for these animistic judgments. Consider the following data in relation to the data already presented in connection with children.

BELL (1954)

Percentage of all responses which judged the aliveness of the test entity animistically:[61]

Entity	All Subjects
the sun	42.1
the ocean	38.7
lighted match	30.6
clouds	26.7
wind	23.0
a pearl	21.0
gasoline	16.7
electric clock	13.6
unlighted match	6.3
a 5-cent piece	3.8

[61]Ss: 519 college students in biology and botany classes at the University of Illinois.

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VOEKS (1954)

Percentage of all responses which judged the aliveness of the test entity animistically:[62]

Entity	All Subjects
the sun	25.2
the ocean	16.1
lighted match	14.8
clouds	12.3
the wind	11.6
electric clock	7.7
gasoline	7.7
unlighted match	5.2

SIMMONS & GOSS (1957)

Percentage of all responses which judged the aliveness of the test entity animistically:[63]

Entity	All Subjects
sea	49
earth	44
sun	39
stars	31
pearl	31
wind	28
lightning	27
clouds	25
match	21
gasoline	15

---

[62]Ss: 155 college students from different classes at San Diego State College [now California State University at San Diego]. The distribution of subjects by classes: Introductory Philosophy (26), History of Philosophy (24), General Biology (41), Social Psychology (34), and Developmental Psychology (30).

[63]Ss: 255 college students in an introductory psychology course at the University of Massachusetts.

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DENNIS (1957)

Percentage of all responses which judged the aliveness of the test entity animistically:[64]

Test Entity	High School Subjects - Baghdad	High School Subjects - Mosul	Night School Subjects - Mosul
pearl	78	75	42
sun	66	36	35
wind	56	24	35
river	54	28	42
lighted match	50	27	42
petroleum	49	23	40
lightning	32	23	25

Percentage of all responses which judged the aliveness of the test entity animistically:[65]

Entity	College Women	College Men
atoms	55	31
lighted match	47	21
sea	41	24
sun	38	26
wind	34	21
lightning	30	16
pearl	26	24

---

[64] Ss:
115 first-, second- and third-year students at a high school in Baghdad, Iraq;
286 first-, second- and third-year students at two high schools in Mosul, Iraq;
141 adult high school students in Mosul, Iraq.

[65] Ss:
77 college women in Beirut, Lebanon (student body from many Near Eastern countries);
53 college men in Beirut, Lebanon (student body from many Near Eastern countries).

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Experiments Ia and Ib

Percentage of all judgments of aliveness which were animistic:[66]

	Subjects That Were Given No Special Instructions (Ia)	Subjects That Were Told to "Respond as a Biologist" (Ib)
sun	82.89	66.03
earth	79.22	52.83
lit match	70.12	47.05
ocean	69.73	49.05
wind	65.78	43.39
stars	58.66	47.16
lightning	57.89	41.50
clouds	53.94	32.07
clock	46.05	22.64
pearl	36.36	25.00
gasoline	33.76	21.15
5-pesetas piece	18.42	5.66
unlit match	3.89	1.83

Percentage of all judgments of sentiency which were animistic:

	Subjects That Were Given No Special Instructions (Ia)	Subjects That Were Told to "Respond as a Biologist" (Ib)
ocean feels pull of moon	28.94	15.09
pearl feels movement of water	24.67	9.61
sea knows of sunken ships	14.86	7.54

[66]Ss: second-year psychology students at the Universidad Autónoma de Madrid. N=77 for Experiment Ia; N= 53 for Experiment Ib.

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Experiment II

Percentage of all judgments of aliveness which were affirmative:[67]

	All Subjects
ocean	30.00
mountain	15.25
pearl	15.00
wind	13.75
bread	10.06
clock	8.07
stone	7.36
doll	4.90
dog	100.00
tree	97.54
blood	69.81
cork	11.72

Percentage of all judgments of sentiency which were affirmative:

	All Subjects
worm knows when it rains	71.87
tree feels severed root	64.55
fly knows when flyswatter lifted	28.48
ocean feels pull of moon	28.47
motor feels heavily loaded car	24.52
river feels dike in its way	16.35
volcano's mouth feels eruption	14.99
compass knows where north is	8.33
sea knows of sunken ships	8.12
moon knows of astronauts	5.79
house suffers when demolished	3.18
shotgun knows when discharged	1.25

[67]Ss: 163 first-year Philosophy and Letters students at the Universidad Autónoma de Madrid.

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PAPALIA-FINLAY (1978)

Percentage of all responses which judged the aliveness of the test entity animistically:[68]

Entity	All Subjects
earth	64
ocean	55.5
sun	38
stars	35
wind	35
lightning	33
lighted match	20
radio turned on	16
electric clock plugged in	16
bicycle being ridden	16
parked truck	1.5
comb	1.5
unlighted match	1.5

DENNIS (1957)

Percentage of subjects who offered various animistic rationales:

Rationale	College Women	Baghdad High Schoolers
Moves, changes, does something	39	38
Supports or produces life	21	7
Has a beginning and an end	14	4
Grows	16	23
Uses oxygen, produces energy	6	16
Miscellaneous	4	12

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[68]Ss: 200 female undergraduate sophomores through seniors enrolled in an introductory course in child development at the University of Wisconsin - Madison.

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SIMMONS AND GOSS (1957)

Number of times various animistic rationales were cited by all subjects:

Rationale	No. of Times Invoked
contains and/or supports life	151
movement	150
changes and/or grows	110
produces effects	78
force and/or power	74
heat and/or light	71
beauty	35
product of living things	29

Clearly, adults judged the same entities to be alive as children did, in the same relative proportions as children, and offering the same sorts of rationales. What was even worse, from the pedagogical point of view, was that they did so in classrooms and on final exams and with such obvious commitment that no one could doubt the sincerity of their foolishness. 97% of Voeks' (1954) subjects claimed to have answered seriously and to the best of their knowledge. Further, her students engaged in animated discussions for the remainder of the class period, and for part of the next meeting of the class, indicating that they did not take a dismissive attitude to the task, or find the issues involved to be silly.

Investigators gave various interpretations to these findings. Each, perhaps, had some degree of truth. Certainly, no single interpretation was sufficient to account for all of the behavior observed. Initially, many felt that the subjects had simply responded out of biological ignorance, or had simply reasoned ineptly, and their reaction was one of mock pedagogical despair and genuine disdain for students.

> The present writer fears that here is added one more howl to the hullabaloo about our educational system, which, so we are told again and again, fails to teach our young folk to spell, to cipher, to comprehend the American Way, or to keep house (the relative exacerbation of the deficiency depending upon the specialty of the complainant). Yet here we have evidence that a significant minority of our college students has not even

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> learned "what life is all about." ... Like the educational deficiencies which have a longer reputation, this one probably has no ready solution, but the investigations pioneered by Dennis show us where another educational battle-line must be drawn. (Crannell, 1954:55f)
>
> Rather than stemming from animism, the label of "living" seems to arise mainly from other mistakes in reasoning and from semantic difficulties.
> ...
> Active animism probably could be engendered in them, however, for they are rather inept thinkers ...
> ...
> Their most common error in logic involved the assumption that if some attribute is often found in living organisms, possession of that attribute is sufficient for classifying the possessor as living. They seem to confuse *if* and *only if* . The reasons they gave most frequently for calling things alive were that it has some use, shows movement ..., is affected by the environment, sustains life, undergoes chemical changes. Although common characteristics of plants and animals, these are not their distinguishing marks. (Voeks, 1954: 406f)

There is something unconvincing about Voeks' haughty claim that adult animists are inept thinkers. When the classification of a flame and a flash of lightning as living is justified by saying that, like life, they have a beginning and an end (Dennis, 1957:197; Brown and Thouless, 1965:39; DelVal, 1975:267), this does not appear as a reasoning error so much as a gem of desperate genius in reasoning. If anything, it is a great reasoning success. Following the initial shock of such reports, most investigators could not accept as credible the notion that college students, many with substantial backgrounds in science, just did not know that entities such as the wind were not animate, or that 'having a beginning and an end,' etc. were not legitimate criteria for establishing life. After all, even if these students *said* that petroleum was 'alive,' no one thought that you could make a pet out of petroleum, and no one thought that atoms went hungry. So it was just obvious that these inanimate objects were not in most ways being conceptually classified along with things that were genuinely alive. But if the students didn't really believe that these inanimate things were alive, why did they say that they were? It was supposed that subjects had interpreted their tasks along nonbiological lines. Influenced by folk anthropomorphism in everyday speech, they had applied the word *alive* in figurative ways (Lowrie, 1954; Mikulak, 1970).

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It was suspected that this had occurred even when subjects had been carefully instructed to respond scientifically. DelVal (1975:271) noted that the term *alive* is used in many ways, and affirmed that, in spite of his instruction to answer from a strictly scientific point of view, subjects had passed uncritically from one kind of regard for the word to another. Voeks (1954:407) concurred: "The students shifted their implied definitions from one item to the next, sometimes using a word one way and sometimes another."

Brown and Thouless (1965) suggested charitably that such shifts exemplified a cognitive flexibility that was an advantage rather than a deficiency. This team found that, when asked directly, their college subjects were quite capable of determining the life status of a set of inanimates, and of giving scientifically reputable rationales for their judgments. However, when asked to list things that might *equally* be classed as living or not living, their subjects produced a list which included such entities as are classically treated animistically in childhood: e.g., "ships," "wind, rain, sun, heat, fire," "trees," "vegetables," and "plant life." Other responses included: "supernatural things, including God, spirits," "virus," "cells, fungus, coral, mold, bacteria," "plankton," "hair and skin," "atoms and electrons" (1965:39).

Here, the special terms of Brown and Thouless's thought experiment had the effect of freeing subjects to consider criteria for assigning life other than those which were strictly biological. By asking subjects to set aside the binary biological opposition between the living and the nonliving, Brown and Thouless opened the way for their subjects to set aside the rest of biology as well, or to consider points of biology which did not support a living-nonliving dipolarization.[69] In the creative conceptualization which ensued, the

[69]Incidentally, four of Brown and Thouless' twelve subjects refused to allow that any entity could be equally said to be alive and not alive. Some individuals are steadfast in their rationalistic commitment to criterial definitions. In my own work, where large samples have been asked to judge which of two entities is, in a manner of speaking, 'more alive,' I have found that roughly one out of three or four will decline to make a

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animistic predilections associated with childhood were quick to come to the fore. Today, one way of interpreting Brown and Thouless' thought experiment is that it presented a *more sensitive* test for the presence of animistic categorical norms than more conventional experimental formats. Brown and Thouless defended the rationality and utility of animistic categorization in general.

> It remains true that there is nothing necessarily primitive in the classing together of tree, snake, and fire among the animate. In many respects, the behavior appropriate to a fire and to a snake has more in common than has the behavior appropriate to a tree and to a snake. Both the fire and the snake are free-moving and unpredictable in their movements; both can be deprived of activity (made "dead") by appropriate activity on our part. There is nothing absurd in putting a fire in the class of the living. There is no one right system of categorisation. (1965:36)

> There does not ... seem to be in the use of the concept of the "living" merely a single direction of development from children to adults in which the categorisation becomes increasingly "correct": i.e., in conformity with biological use. Such correctness may also be attained by children if they are suitably taught, and there is no reason for supposing that it has not been attained by adults who use animistic categories. Rather it appears that there is an additional direction of development in which the use of the category becomes increasingly flexible in the adult. ... It is clear from the two studies here reported that the use of animistic categories by adults may be a result of choice and not of an inability to make the conventional discrimination between the living and the nonliving. (1965:40f)

Papalia-Finlay (1978) concurred that animistic behavior in adults arose as a matter of style and choice. In her study, she administered a two-part questionnaire to a child development class composed primarily of nursing and physical therapy students. These students had, on average, taken 4.59 science courses. The subjects were first asked to judge the life status of various entities, and then asked to indicate the nature of their personal concept of life by choosing one of the following:

> 1) Everything is living which has activity, or a function or a use of any sort.

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judgment of relative aliveness unless the choice is forced. And when the choice is forced, something like one percent of subjects will, with agitation, refuse to perform the task.

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2) Everything is living which has movement whether it occurs spontaneously or is imposed by an outside agent.
3) Everything is living which moves spontaneously.
4) Only plants and animals are living.
5) Other (please specify).[70]

In the first part of the questionnaire, 134 of the 200 (67%) subjects appeared to demonstrate animistic thinking. However, in response to the explicit question about personal concept of life, 132 of 200 (66%) subjects chose the scientific position embodied in the fourth option.[71] Papalia-Finlay took this as definite proof that

> most subjects *do* possess a mature definition of living; in other words, they are able to use biological classification criteria when called upon to do so. Their scientific background should also ensure this. The attribution of life to inanimate objects, as found in responses to Part I, may simply reflect that the subject's *primary* orientation to the term 'living' is not a biological one. Rather, when subjects were not specifically instructed to reply 'as a biologist,' they chose to define living in a broader sense. ... In choosing alternate categorization systems, young adults may be reflecting characteristics of thought which enable them to deal with concepts flexibly rather than in [a] very rigid, restricted manner ... (138)

Brown and Thouless and Papalia-Finlay are not explicit about the cognitive advantages afforded by the "flexibility" of an animistic conception of life. Flexibility always strikes one as a virtue, but it is not obvious how adults could specifically benefit from having *this kind* of flexibility. Brown and Thouless' remarks on the subject are exceedingly vague.

> There may be occasions when adult thought is facilitated by the use of animistic categories, particularly when (for example) unpredictability

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[70]The first four choices are explicit representations of the developmental stages posited by Piaget (1926b).

[71]It is possible that more subjects would have selected the fourth option if Papalia-Finlay had not asked them to specify their "personal concept" of life. This language is very misleading, since it really acts pragmatically as a directive to the subject to take license to respond idiosyncratically, or even to emphasize the points on which the subject's definition of life differs from that of the general speech community. The information actually desired, of course, was how well the subjects could *align* themselves with the semantic values of the general community when producing a terse, precise, and hence quasi-technical definition of life.

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> and apparently autonomous movement are involved. The use of animistic categories may facilitate the handling of some problems by overcoming the limitations that language imposes, as do the use of myth and of symbolism. (Brown and Thouless, 1965:41)

It would appear that the functionality of animistic conceptions weighs heavily for these investigators because of their claim that adults are animists by choice. Presumably, one would need to find a functional reason why adults would choose to employ animistic conceptions over biological ones. On this point, Papalia-Finlay shows some interesting equivocation. She affirms that animists "choose to define living in a broader sense," while at the same time she postulates that this broader, nonbiological orientation to life is primary. If it is primary, then it does not have to be chosen — and possibly it *cannot* be chosen or not chosen. In fact, the best argument for the primary status of the animistic orientation is its persistence in the face of intellectual pressure to choose a biological orientation instead. In ratiocination, animistic conceptions can never match the functionality of biological conceptions. But, insofar as the animistic orientation to the question of what is alive is indeed primary, the functionality of the animistic orientation is to be found in a view of the whole person in a relationship with his world rather than in an examination of specific intellectual problems.

It is appealing and sensible to think that many subjects chose to interpret the experimental questions in a figurative manner. The apparent application of animistic norms to figurative expression here suggests that animism is not extinguished by biological knowledge, but rather that animism persists in subjects' minds with the acquired stipulation that what is true animistically but not biologically must be said to be true figuratively but not literally.

However, it is evident that many subjects did not answer animistically out of choice in the way proposed by Brown and Thouless and by Papalia-Finlay. One cannot believe that the 40-77% of subjects answering animistically in experiments where they were instructed to answer scientifically were simply choosing to disregard

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instructions.[72] If subjects were that uncooperative, it is hard to imagine that any research would ever be possible. Neither is it credible to believe that 55.4% of Bell's (1954) biology students chose the occasion of their final examination to reflect animistically instead of biologically. Finally, the supposition of choice is not supported by the high level of subject anxiety reported in Voeks (1954) and Papalia-Finlay (1978). In Voeks' study, 92% listed, in depth, difficulties in answering the questions.

> "You have raised questions in my mind that I have never thought of before. How do you define living?" ... "I need to have time to think about these in order to be able to give an intelligent reason for my answers. ... I've never been asked questions of this sort before, so they came as rather a surprise." Of the "animistic" labelers, all but two wrote some such reply. (1954:406)

> Several subjects noted the difficulty inherent in defining living (e.g., "I don't agree with any of the above definitions but I'm at a total loss in defining living"). (1978:137)

This self report information indicates that most subjects most of the time were doing their best to respond according to instructions, but that they regarded the experimental task as some form of dilemma bringing into issue the dissonance between their biological and animistic views. But why should such a dilemma affect college students and fail to affect the high school students who performed so admirably back in Russell (1942)? One would think that the college students would be much superior in understanding and acumen than the high schoolers. In particular, virtually all the college students tested had completed course work in fields where measurement and the establishment of criterial definitions are emphasized; i.e., the social and natural sciences. And, in at least one

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[72]Following, the percentages answering animistically in these studies.

In Dennis (1957): 53% of college men (the group with the most extensive science background), 77% of college women, 74% of adults in night high school.

In Simmons and Goss (1957): at least 40% of all subjects — who, incidentally, had on average taken 5.76 courses in natural science.

In DelVal (1975): in Experiment Ib, 64.16% of all subjects gave at least one erroneous response, and the average number of erroneous responses was 4.85.

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study — the final examination study conducted by Bell (1954) — students must have been highly motivated to follow instructions exactly and to get the correct answer.

In an ironic fashion, however, it may be that the scientific orientation of these subjects and the science oriented context of these examinations actually drew subjects right into animistic thinking. When asked on a biology test whether some entity is alive or not, one can solve the problem in a scientific or rationalistic fashion by using one of two strategies. One way is to solve the problem logically, by determining class inclusion. If one defines the class of living things as the class of all animals and plants, then one can decide whether something is living simply by deciding whether it is an animal or a plant. For entities such as the sun or the sea, this is not a difficult question. The students who determined life status in this way probably did not make any animistic mistakes. Notice that this method does not require that one think deeply about the nature of animals or plants, much less about the nature of life.

But there is a second method for scientifically determining whether a thing is alive, and it is this method that gets people into trouble. The second method is to specify the features of a living thing, and then see whether the thing in question has those features. Now here one does have to think deeply about the nature of life. One must ask what it is, exactly, that qualifies a thing to be called "alive." After all, we have been trained to expect scientific definitions to be very exact. Also, we have a folk expectation that scientific definitions will characterize entities at their most basic level of integration: in short, we expect scientific definitions to speak to the essences of things. One way of scientifically defining gold, for example, is to specify the atomic structure of gold, and that seems to specify the essence of gold, and that seems to be a good scientific definition.[73]

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[73]Other equally scientific definitions of gold are possible. Science actually answers to a broad range of human needs. One could argue that the definition of gold should depend

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The problem is that {life} is a concept which eludes this kind of specification. There is no essence of life which can be scientifically specified. And this is a fact that was much better known to college students in the 50's and 60's and 70's than to high school students in 1942. That the confusion of college students arose from efforts to define the essence of life is evident from the self-report data of Voeks and Papalia-Finlay (*op. cit.*). Recall that these subjects objected that they were unprepared to answer the questions about life status, and were at a loss as to the definition of life. Given the substantial biology background of most of these students, this strongly suggests that the students were distinguishing between their substantial knowledge of the processes of life and the behavioral attributes of living things on the one hand, and the 'defining essence' of a living thing on the other.

In 1942, what high school students knew of living things was that they had certain gross characteristics:

they begin life and they die;
they are composed of cells, or are unicellular;
they internalize and metabolize nutrients (e.g., sunlight);
they metabolically maintain homeostasis;
they undergo growth and development;
they reproduce;
they are highly ordered systems;
they can be excited by external stimuli;
they evolve in interaction with their environment.

In slightly later times, high school students might have known a little more about the biogenetic characteristics of living things:

their biogenetics are governed by processes involving DNA and/or RNA;
they are potentially descended from a single species.

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on the context — that is, the use to which the definition will be put. A definition in terms of atomic structure would be of little use to a chemist who is interested in analyzing samples to determine their gold content. He might prefer a definition consisting of analytical procedures one could use to determine gold content. He would then say that gold is the substance that, when present in a sample subjected to these procedures, causes a positive answer to be produced or, perhaps, which survives this process of chemical treatment (Dr. Russell Mills, personal communication).

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College students in the 1950's knew that these characteristics are in many ways problematic and so fail to specify a precise set of living things. The more one knows about biology, the more aware of this one must be. It can further be said that, in every era, the study of biology must finally lose its way when attempting to specify the essential nature of life. This is because the properties of living things are for the most part emergent properties and typical properties rather than statements of essence, and because the study of biology has to address three phenomena in which the state of being alive merges in inexplicable ways with a nonliving state. These three phenomena are:

> the presence of life in bodies which, in final reduction, are nonliving compounds, molecules, and atoms;
>
> the first emergence of life from nonliving material in geologic antiquity;
>
> the passage from life into death.

In regard to the first alive-inanimate contrast above, an interview with Linus Pauling produced the following exchange:

> To what extent can we understand life by breaking it down, in contrast to trying to study processes in whole cells or organisms?
>
> ... I, myself, have confidence that all of the properties of living organisms could ultimately be discovered by this process of attempting to reduce the organism in our minds to a combination of the different parts: essentially, the molecules that make up the organism.
>
> Your last point raises another question: If living organisms are made of lifeless molecules, then where is the dividing line between a molecular aggregate and life?
>
> Perhaps I shouldn't let your question go by without challenging the expression "lifeless molecules." This is just a matter of words. I can ask, if I crystallize a virus to obtain a crystal consisting of the molecules that make up the virus, are those molecules lifeless or not?
>
> Put in those terms, it's a rather arbitrary line, isn't it?
>
> That's right! It's quite arbitrary. The properties of living organisms are those of aggregates of molecules. There may well be some point at which one tries to draw a dividing line. But it's very difficult to draw such a line between molecules that are lifeless and molecular aggregates that are not lifeless. (Campbell, 1987:18f)

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What Pauling argues is that, even when you have a good example of a living organism (rather than a virus), it is problematic to determine the level of organization at which you want to say there is life. We normally resist the notion of life at an atomic level but, even at the molecular level, the issue becomes clouded. Pauling is a reductionist but not an eliminative materialist: for him, life is real rather than epiphenomenal, and it is real down to at least the level of aggregates of molecules.

When one encounters a poor example of a living organism — a virus, for example — the issue becomes cloudier still. Campbell (1987:357) remarks:

> Viruses are in the semantic fog between life and nonlife. Do we think of them as nature's most complex molecules or as the simplest forms of life? Either way, we must bend our usual definitions. An isolated virus is as static as a rock. Yet, it has a genetic program — a program written in the universal language of life. The program is mutable, and viruses evolve. Although viruses cannot reproduce independently, it is hard to deny their connection to the living world.[74]

When Campbell says that viruses have "a program written in the universal language of life," he is referring to the fact that the biogenetics of viruses are controlled, or coded, by DNA and/or RNA, and that the *same* code is used by all living things. (It is this fact which suggests that all living things are the descendants of a single species.) But aside from this, there is little to recommend viruses as examples of living things. A virus does not respire or conduct any metabolic activities or do anything to maintain homeostasis. Neither do the stages in its replicative cycle involve growth or development in the usual sense: e.g., there is no enlargement of the virus, or differentiation of parts, or process of maturation.

Further, there are striking differences between the birth and reproduction and death of clearly living entities and the replication

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[74]Campbell's (1987) discussion of viruses, viroids, and protobionts was an important source in the presentation below.

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cycles of viruses. Viruses are obligate intracellular parasites: they are only capable of expressing their genes within a living host cell. For example, a typical lytic replicative cycle ensues when phage T4, a virulent virus, attaches to its host bacterium, *E. coli*, and injects its genetic material into the host cell. The protein shell (capsid) which had enclosed the genetic material is left inert and abandoned on the host cell's exterior surface. Within the host cell, the viral genetic material disrupts the host's normal metabolic processes and dismantles the host's DNA. After the host DNA is dismantled, the viral genome takes full control of the cell and induces its metabolic machinery to produce the components of new viruses, in part utilizing the DNA remnants of the host. These components self assemble by the hundreds. Then, after enzymatically disintegrating the cell wall of the host, these newly formed viruses are released into the surrounding medium. Since the new viruses are 'mature' as soon as they are assembled, they may begin to infect new hosts immediately.

Clearly, viruses do not operate in the normal mode of living things. It cannot even be said that a virus leads its life within its own cellular confines — a seemingly basic property of living things — since a major component of the viral 'cell,' the capsid, is abandoned at the beginning of the replicative cycle. So in some sense it is false to say that viruses have cellular organization, *even* if the free virus is accepted as a bona fide cell.

Further, while it is true that viruses are able to replicate, they do not do so with the kind of species autonomy that is expected of living things. A virus can only replicate by activating the metabolic machinery of its host: one cannot say that a virus reproduces without also saying that a host copies the virus. In a very real sense, the ability to reproduce cannot be wholly ascribed to the virus. So it is false to say without careful qualification that viruses reproduce.[75]

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[75]It is true that sometimes a species needs a little help from outside. In order for some seeds to grow they may first need to be chemically treated in the digestive tract of

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The replication of viruses in lysogenic cycles is in some ways even less compatible with a normal understanding of reproduction. A typical lysogenic cycle may ensue when phage lambda, a temperate virus, attaches to its host bacterium, *E. coli*, and injects its genetic material into the host cell. Following injection, the viral DNA may insert itself at a specific site in the bacterial chromosome. Once inserted, the phage genome is referred to as a prophage. Subsequently, during cell division, the bacterium will copy the prophage genes along with its native genes, passing on both to its two daughter cells. Commonly, the lysogenic process continues across several generations, creating more and more prophages in more and more daughter cells (though conversion to a lytic cycle is always possible should the prophage separate from the bacterial chromosome). Since the prophages are not free viruses, but merely the genetic material constituting an unrealized instruction for the manufacture of free viruses, it is hard to say whether the lysogenic replication of prophages represents virus reproduction or virus limbo. As the lysogenic cycle grinds on, the viral genome neither affects its host nor generates new viral components: it is just a dormant string of molecular material that has hitched a ride on a bacterial chromosome. Is it alive?

Tumor viruses present a related case. All tumor viruses transform cells by inserting viral DNA into the host cell's DNA. Insertion is permanent: the viral DNA remains fixed in the cellular chromosome as the chromosome replicates in each cell generation. The presence of the viral material triggers cancerous characteristics. Here again, there are no free viruses. There are only hitchhiking strings of molecular material, this time with dramatic effect as the host reacts to the presence of the viral genome. When the viral ma-

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animals, or exposed to extended cold, etc. But the digesting animal does not participate in the growth itself, nor does the extended winter; the seed grows by virtue of its own metabolic capacities when conditions of abrasion and temperature trigger the onset of growth. A virus does not have this sort of autonomous metabolic capacity, but must rely on the assistance of a host from a specific range of hosts.

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terial is virulent, aren't we more inclined to say that it is alive? Should we be?

To say that a virus is alive asserts very little really except that certain molecules, including DNA and/or RNA, are assembled in such a fashion that they *may* interact in important ways with host organisms. Ironically, the virus is most active when it is in a state of partial disassembly; i.e., when the capsid has been sloughed and the genome injected into the host cell.

The things that viruses do are very strange when they are examined as the actions of individual organisms, since viruses are not physically modularized in the way that we expect individuals to be. Viruses, in their parasitism, vacillate between conducting themselves like independent organisms, and conducting themselves like parts. If viruses were part of a larger living system, then no one would have a problem with saying that they were alive in just the way that parts of living systems are alive at that level of molecular organization. But the activities we expect from parts are different from the activities we expect of whole organisms. As whole organisms, we find viruses disappointing.[76]

There are other molecular structures which are simpler, more partlike, and even less appealing than viruses as candidates for living things. Viroids are tiny molecules of naked RNA. The chain of nucleotides in a viroid may be a couple of hundred times smaller than a chain of viral nucleic acid. It is not known where viroids come from, or how they work, or replicate. A viroid is probably too small to program the host cell to make even a single protein. Still, it is known

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[76]There is evidence that viruses in fact evolved from parts of cells; i.e., from fragments of cellular nucleic acid. The genetic material of viruses is much more similar to the genetic material of their hosts than to that of other families of viruses. Furthermore, viral genomes have marked similarities to certain genetic elements of cells, including plasmids, which are self-replicating circles of DNA that can transfer themselves from cell to cell, and transposons, which are DNA segments that can move from one spot to another on a chromosome.

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that they cause abnormal and stunted growth in plants. One viroid disease has killed over ten million coconut palms in the Philippines, and another nearly destroyed the chysanthemum industry in the United States.

Finally, there are agents which seem to act in the fashion of viruses but which may not even contain DNA and/or RNA. These include the mysterious pathogens for scrapie, a disease of sheep, and kuru, a disease of cannibals.[77]

Knowledge of entities such as viruses and viroids tends to undermine the alive-inanimate distinction, not only because these entities lack some of the classic features of living things, but because they exemplify the general difficulty of determining whether or not life is present in relatively simple physical structures. The point of general interest, and consternation, is of course that all organisms are reducible to relatively simple physical structures, so that one is always faced with the conundrum that life appears to be absent at certain fine levels of physical description, and present at more inclusive levels. Not only is it the case that life is principally characterized by high level emergent properties, life is itself an

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[77]Much of this information on viruses may have been known to the animistic college student research subjects spoken of above. Recall that the bulk of these animism studies spanned the years 1953-1957, with some subsequent studies in the 1960's and 1970's. The 1940's saw prominent research with bacteriophages, focussed on the T phages which include T4. The details of the lysogenic cycle were learned largely through research on phage lambda, which was discovered in 1951. By 1945, electron microscopes were broadly used in research and could resolve objects 10 nm in diameter, about half the size of a virus. Pictures of viruses and articles on viruses appear in popular encyclopedias in the 1950's. Also, 1942-53 saw the greatest sustained incidence of poliomyelitis in the United States. In 1950, there were 33,344 cases. The Salk vaccine, a dead suspension of the three strains of polio virus, was first tested on a large scale in 1954, and released for general use in April of 1955. It is fair to say that viruses would have been a topic of interest in a college biology curriculum. College students generally may well have had some general notion of the problems of determining the life status of viruses.

The role of DNA and RNA was also likely to have been a subject within a general curriculum in the 1950's. James D. Watson and Francis Crick published their famous paper on the helical structure of the DNA molecule in 1953. The pathogens for scrapie and kuru became objects of interest in the 1960's, among more elite circles. Discussions of viroids may not have appeared until the 1980's.

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emergent property of biological systems. Just where it emerges cannot be determined.

The alive-inanimate distinction is further undermined by knowledge of the circumstances of the emergence of life in geologic antiquity. In the 1920's, A. I. Oparin of Russia and J. B. S. Haldane of England independently postulated that conditions on the primitive earth favored chemical reactions that synthesized organic compounds from inorganic precursors present in the early atmosphere and seas. In 1953, Stanley Miller and Harold Urey tested the Oparin-Haldane hypothesis in the laboratory in what has come to be a popular classic among experiments. When water vapor containing H_20, H_2, CH_4 (methane), and NH_3 (ammonia) was exposed to electrical sparks (simulating primeval lightning), there spontaneously developed a variety of organic compounds, including some of the amino acids that make up the proteins of organisms. The abiotic synthesis of organic molecules in the Miller-Urey experiment caused great excitement at the time as a demonstration in microcosm of how life might have begun to emerge from nonliving components. Subsequently, laboratory models of the primeval earth have been used to make all 20 amino acids commonly found in organisms, several sugars, lipids, and various bases present in the nucleotides of DNA and RNA. Polymerization of organic monomers has been experimentally induced by setting up interactions between dilute solutions of amino acids and hot clay, especially if iron or zinc are present.[78]

Currently, research has advanced to the level where abiotically produced molecular aggregates called protobionts are capable of some of the kinds of behavior which are classically regarded as properties of living things. Specific protobionts may exhibit metabolism, excitability, growth and self-replication. Protobionts called coacervates form as colloidal droplets when a solution of polypeptides, nucleic acids, and polysaccharides are shaken. If enzymes are

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[78]E.g., research along these lines has been conducted by Sidney Fox of the University of Miami, and by NASA's Ames Research Center at Moffett Field, California.

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present in the solution, they will be incorporated into the coacervates, and the protobionts may thereby be enabled to absorb substrates from their surroundings, internally transform them through reactions making use of these enzymes, and release the products of the reactions back into the external medium.[79]

Abiotically produced polypeptides mixed with cold water will self-assemble into tiny droplets called microspheres. Some microspheres store energy in the form of a membrane potential. When perturbed, this voltage is discharged, in a putative display of primitive excitability. Microspheres grow by absorbing free polypeptides until they reach an unstable size, when they split to form daughter microspheres.

Two groups in the mid-1980's described laboratory created replicating systems based on small nucleic acid molecules. Most recently, Tjivikua et al. (1990) at MIT described a replicative process involving pentafluorophenyl ester and amino adenosine, molecules with properties of both nucleic acids and proteins.

> In summary, we have observed autocatalysis in a self-replicating system. At best this can be regarded as a primitive sign of life; at the very least, the system offers a bridge between the information of nucleic acids and the synthesis of amide bonds. It should be possible to design systems capable of peptide synthesis on a nucleic acid backbone and thereby provide models for events that occurred some time ago. (1990:1250)

Research into the abiotic origins of living systems clouds the distinction between the living and the nonliving, and also our notions of what constitutes metabolism, excitability, growth, and reproduction. Work at the level of molecular aggregates has so far only proceeded in connection with carbon-based life. However, as savvy science fiction writers have long observed, it is conceivable that

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[79]The primordial environment would have lacked enzymes; however, other molecules produced abiotically do have weak catalytic capabilities: it is possible to envision how abiotically produced structures with 'metabolic' capacities like coacervates could have arisen.

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the complex molecular structures required for life could alternately be rendered in a silicon idiom. Future researchers may well design and investigate the protobionts of a silicon-based life. By reconstructing the transition from inanimate compounds to living systems, we gain an appreciation of how things might have been primordially, and also an appreciation of how they might have been otherwise. These contemplations may unsettle even our most basic convictions about the nature of life. If lifelike systems might precede the synthesis of RNA and DNA, or be assembled in silicon instead, then should a general definition of life assert that genetic control is imposed by nucleic acids? Here, the most secure and essence-like characteristic of life may suddenly appear adventitious.[80]

Matching the mystery of the evolution of living kingdoms from nonliving components is the return of individual entities to a nonliving state when they die. The transition from living to dead obfuscates the nature of life because it lacks true punctuality, and hence fails to preserve the binary distinction between life and death. An organism becomes dead as a sequence of progressive organic failures. Typically, these occur in a flurry, so that the transition to death appears sudden. However, if the time frame of the event is expanded, it may be difficult to establish a binary value for the life status of an organism whose death is in progress. Simply, complex systems do not radically change state all at once. This fact may be understood at various levels of sophistication. In this country at least, it appears to be popular knowledge and a source of

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[80]One may further note that life can be (and is being) redesigned in sophisticated ways by experimenting with DNA with unusual bases; DNA with a larger number of bases, able to code for a larger number of amino acids; proteins with unusual amino acids; and redesigned enzymes. One could imagine starting evolution with these different structures, with unimaginable consequences. Silicon based life forms are probably not as attainable as science fiction buffs would like to imagine; however, carbon based life forms may have a greater potential range of diversity than biologists can presently envision (Dr. Russell Mills, personal communication). The point remains approximately the same: the range of life forms might be quite substantially different than what we currently recognize, and this may bring into question many essentialistic characterizations of what life is.

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wonder among children that hair and nails continue to grow even after an individual has died.

While one might think that a biological investigation of death would explain its necessity, there is some evidence that the contrary is the case. In 1911, A. Carrel developed a procedure whereby the death of a tissue culture could be indefinitely postponed. Subsequently, Carrel and Ebeling kept alive a culture of tissue from the heart of a chick embryo for more than 25 years — much longer than the normal life span of a chicken. Apparently, it is complex living systems, rather than living tissues, which must die.

Even at the level of whole organisms, most talk of death as a necessity is imprecise. Death is commonly conceptualized as a necessity of individuals, since it is clear that no individual can last forever. However, the concept of the biological 'individual' is in every case bound up with the concept of generations. One can only speak of biological individuals if one demarcates a sequence of generations in the biological continuum which connects life today with the life of billions of years ago. The problem arises in that the way that we speak of generations and individuals differs from one kind of life form to another. In the case of bacteria and protozoa, which replicate by binary fission and by mitosis, the generational distinction between parent cells and daughter cells is clear enough — but in some way it seems misleading to say that the parent has 'died' at the moment of division. Really, when we speak of death, we like to envision a corpse. Perhaps, speaking carefully, we might say of the nineteenth century forebears of today's bacteria, that they did not 'die' but rather 'ceased to exist.' But in this case, we should disdain the edict that all living organisms die.[81]

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[81]Since cell division is a complex process which takes some time, it is not really accurate to speak of a 'moment' of cell division. If death is regarded as occurring at all in these cases, it has to be spread out in time. In the case of cells, why not consider it to be spread out over a very long period? To the extent that the daughter cells retain the same structure (the same DNA information, say) as the parent, then the parent remains living in its descendants. But DNA information gets altered with every cell division — replica-

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It is also easy to unsettle the seemingly common sense position that the reproductive capacity underlying the advance of generations must be a necessary characteristic of living things. At the level of individuals, this is certainly false, since individuals may be sterile for a number of reasons, including simple immaturity or old age. In addition, in some cases, reproduction may require a second individual — a sexual partner — so that the entity alleged to be alive by virtue of its reproductive power would here have to be the reproductive couple rather than any individual. At the level of species, there is the problem that hybrid forms are often completely sterile or too feeble to produce viable offspring. Examples include hybrid frogs of the genus *Rana*; and mules. In the case of plants, two individuals can be crossed when they do not even have the same number of chromosomes, and the offspring in such crosses are inevitably sterile. Neither do all cells reproduce (e.g., cells of the CNS). Apparently, the only necessity involving the ability to reproduce is that all living things exist as the *result* of a process of reproduction. But if all we can say is that living things are things which are the reproductive product of living things, we have not said much of value. One problem here is that whether something counts as a reproductive process may require that a determination of life status be already made. In order to affirm that the splitting of boulders is not an example of reproduction, one must determine in advance that boulders are not alive. Once again, what begins as an attempt to firm up a common sense attribute of living systems may easily degenerate into the contemplation of profound inanities.

We have reviewed some puzzling aspects of the relationship between life and its nonliving components, the evolutionary emergence of life from nonliving materials, and the conversion of the living into the nonliving at death. These three biological mysteries all address the problematic relationship between life and the physical structures that support it. They underline the fact that life is it-

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tion is never perfect. So the parent dies a little with each generation. Looked at this way, dying is the same process as evolution (Dr. Russell Mills, personal communication).

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self an emergent property of physical systems, and hence cannot be defined in the essentialist terms that one might classically or ideally expect of a science. In fact, professional biologists just do not bother to fret about framing a scientific definition of life, even though their entire careers are devoted to investigating its nature.

Now in contrast to the professional, the college student taking an exam or attempting to make a sophisticated task out of the life status assessment of clouds has a real need to define life in determinate terms. There are true-false questions at stake for him here. Are clouds alive? The question ought to be easy, but the search for essences makes it complex — in fact, impossible — because no essences determine the matter one way or the other. The student exposed to college biology knows that the characteristics of life committed to memory in high school are problematic and indeterminate. But how then is life to be understood? In this situation, the holistic qualities of life are as likely candidates for essences as any other qualities, and the agonizing student may fumble forth with animistic appraisals of the life status of clouds, and the sun, and lightning, and rain. He says: they move, they change, they give off energy. His animistic judgments may express a considered intellectual belief that the difficulties in defining life set biological and animistic rationales on an equal footing, or his judgments may just represent an intuitive reversion to animistic norms in moments of intellectual desperation.

In either case, one must be struck anew by the ironic quality of the interaction between biological and animistic thinking. Animism takes special note of the dramatic and interactive entities in the world, and biology follows up on this interest using rigorous techniques of investigation. One might expect biology to replace animism, both historically and developmentally. However, as we have demonstrated, it is part of the nature of biological theory to direct itself toward mysteries which are beyond the range of its own explanatory capacities. Biology must always demur when it comes to giving a final answer on the nature of life, and so biology must al-

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ways return its followers back to their own intuitions. In this intuitive reappraisal of life, animistic sentiments may well reemerge. Contrary to the classical view that animism must necessarily cease in late childhood, one has the impression here that animism can hardly fail to persevere, since even biological science (the nemesis of animism in the Piagetian account) has the effect of delivering thinkers over to the kinds of holistic orientations in which animism thrives. Actually, it may be that we see animism in its most purified form in adults; i.e., animism without the decoration of false causal and biological beliefs.

We have taken some pains to amplify on the ways in which the biological characterization of life fails to attain the ideals of scientific concepts, and of classically defined categories. The purpose has been to further elaborate on the relationship between scientific and animistic thinking, and to sketch a scenario in which college students might be more likely to respond in an animistic fashion than high school students, as has been experimentally observed. It has been suggested that college students are more aware of the imperfections of biological theory than high school students are, and that they are consequently more likely to reflect upon animistic alternatives when asked to assess the life status of provocative inanimates.

We have indicated that there are a number of reasons why adults might respond in an animistic fashion in the course of an experimental investigation. These include the possibility that adults might respond metaphorically. On account of this possibility, the interpretation of the literature on perseverant animism in adulthood has often been led astray. The principal danger appears to be that expressions of animistic sentiment by adults will be discounted as *merely* metaphor, or as not being *the same* as animism in children. That is, the animistic proclamations of adults may not be considered a 'genuine' expression of animism. From the sight line along Occam's razor, it is hard to imagine how the displays in question could be anything else but genuine expressions of animism. When adults judge

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the same entities to be alive and not alive as do animistic children, and do so in the same relative proportions as do animistic children, and offer the same kinds of rationales for their judgments as do animistic children, and hierarchically rank the aliveness of entities in the same fashion as do animistic children, then who is to say that this behavior of adults is not legitimately animism, and that it is not in good measure the same animism that makes its debut in childhood?

To object that the animism of adults is not the same animism as that found in children is a little like saying that playing with electric trains as an adult does not bring one the same happiness that it brings to a child. It does and it doesn't. Both may experience happiness when operating electric trains. But the role of electric trains is not the same in the life of an adult as it is in the life of a child. The imagined reality of the railroad yard is more compelling for the child. On the other hand, there is much knowledge of railroading that an adult can bring to the hobby that is beyond the ken of the child.

To be sure, the animistic sentiment of adults is not likely to be identical to that of children, given adults' causal and biological sophistication. Adults' animistic proclamations cannot help but be tempered by their sophisticated knowledge. Metaphor is one way in which the tension between animistic sentiments and sophisticated biological and causal knowledge is resolved: statements such as 'the wind is alive' are regarded as sincere but not literal. Instead of regarding metaphor as faux animism, students of development might alternately regard metaphor as the dominant form that animism takes in adults. *Regardless* of whether the adults exhibiting such behavior are acting metaphorically, they are expressing the norms which are constitutive of animism in children. There can be no doubt

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that the animistic sensibilities and the animistic norms of childhood have been preserved into their adult years.[82]

2.2363

Additional indications that animistic inclinations and animistic norms may persevere into adulthood may be found in studies in the neuropsychological literature regarding brain injured adults whose ability to name living things has come to significantly differ from their ability to name inanimate things. In some cases, it is the ability to name living things which is relatively preserved, while the ability to name inanimate objects is seriously impaired (Nielsen, 1948:176-183; Hécaen and de Ajuriaguerra, 1956; Warrington and McCarthy, 1983). Conversely, it sometimes occurs that the patient has much greater difficulty naming or otherwise identifying living things than objects (Nielsen, 1948:183-186; Warrington, 1981; Warrington and Shallice, 1984; Silveri and Gainotti, 1988). Below, some verbatim responses from two patients which demonstrate differential impairment.

INANIMATE OBJECTS

J.B.R. Tent—temporary outhouse, living home.
Briefcase—small case used by students to carry papers.
Compass—tools for telling direction you are going.
Torch—hand-held light.
Dustbin—bin for putting rubbish in.

S.B.Y. Wheelbarrow—object used by people to take material about.
Towel—material used to dry people.
Pram—used to carry people, with wheels and thing to sit on.
Submarine—ship that goes underneath the sea.
Umbrella—object used to protect you from water that comes.

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[82]DelVal (1975:275ff,289ff) argues carefully that, in a small fraction of cases, adults may actually possess animistic conceptions which *are* isomorphic with those of young children. First, there are some adults who may not possess a normal comprehension of causal and biological mechanisms. Secondly, there are some adults who at least intermittently fail to conceptually dissociate their own subjectivity from the object being considered. This indissociation of subject and object, or Piagetian egocentrism, may be displayed in projective assertions that a compass knows where north is, or that an automobile must feel it when it lumbers from being loaded up, etc.

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LIVING THINGS

J.B.R. Parrot—don't know.
Daffodil—plant.
Snail—an insect animal.
Eel—not well.
Ostrich—unusual.

S.B.Y. Duck—an animal.
Wasp—bird that flies.
Crocus—rubbish material.
Holly—what you drink.
Spider—person looking for things, he was a spider for a nation or country. (Warrington and Shallice, 1984:838)

Arguably, these patients' impairments indicated how they structured the categories of {animates} and {inanimates}. There is some evidence that this structure was not always determined by strict biological criteria. Nielsen (1962:176-186) reported on two patients who grouped body parts along with living things. However, Warrington and Shallice (1984) and Silveri and Gainotti (1988) each reported a patient who apparently grouped body parts with inanimates. The direction of grouping, by the way, was not predicted by the direction of impairment. Plants appeared to be generally grouped along with typical mammals and birds (Nielsen, 1948; Warrington, 1981; Warrington and McCarthy, 1983), as were insects (Warrington and McCarthy, 1983). However, Silveri and Gainotti (1988) reported on a patient whose biocentric naming disability seemed to show graded structure such that impairment was maximal in connection with wild animals; moderate in connection with plants and insects; and minimal in connection with inanimate objects:

more impaired

wild animals

domestic animals

insects, flowers

body parts

vehicles

tools, clothes, furniture

less impaired

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The interpretation given here to this data is that the graded nature of this patient's naming disability corresponded to the gradient structure according to which the patient conceptualized living things. What cannot be missed here is that the category appears to have been internally graded in just the way that the crosscultural animism hierarchy appears to be graded; i.e., with prototypic animals being considered better examples of living things than flowers and insects, and body parts being regarded as objects — all in contradistinction to what biology has to say on the subject. These findings suggest that, in one possible pattern of mental organization in adults, the category {living things} may be more sensitively characterized by an anthropocentric, mammalocentric or animistically flavored semantics than by strict biological criteria. In short, these findings represent a neuropsychological argument that animistic norms may be preserved in the adult. At present, the argument is admittedly skeletal, since most extant research on this subject simply does not provide the kind of subcategorization data such as can be gleaned from Silveri and Gainotti.

2.2364

Additional support for the preservation of animistic norms in adults comes from a literary study conducted by Kelly and Keil (1985). A key feature of the crosscultural animism hierarchy is its anthropocentricity, and its depreciation of plants. Kelly and Keil present data which demonstrate these features of thought in literary art forms. Kelly and Keil were interested to obtain, through literature, a gauge of how ontologically similar we intuitively judge different kinds of entities to be. They reasoned that, in a body of tales where some entities were magically transformed into other entities, the likelihood of transformations occurring (and hence the frequency of transformations occurring) would depend on the degree of perceived ontological similarity between the kinds of entities involved.

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> In fantasy, any transformation of one kind into another can be imagined. Still, some transformations may be favored over others as they adapt to, and hence reflect, properties of conceptual structure. (1985:404)

The team found in an examination of Ovid's *Metamorphoses* and the Grimms' *Fairy Tales* that anthropocentricity played a role in determining the type of changes which occurred when humans were transformed into animals (1985:415):

Human is transformed into:	No. of tranformations in Ovid's *Metamorphoses*	No. of transformations in Grimms' *Fairy Tales*
bird	40	20
mammal	37	19
reptile, amphibian, fish	15	6
insect	1	2

One is reminded here of the hierarchy of incarnations set forth in certain formulations of the transmigration of souls: human > beast > tree/worm > inert thing (Tylor, 1871: II:9ff). Tylor also notes that, historically, when the belief in souls wanes, the possession of a soul may be first denied to entities which are lower on this hierarchy (1871: I:500f). At any rate, just as humans were equally likely to be transformed into birds and mammals, and much less likely to be transformed into lower life forms, so we note that birds and mammals are equally likely to be regarded as alive by animistic children, while lower life forms are much more likely to be animistically denied this status.

The animate-inanimate distinction played a role in determining the direction of transformations: in general, the distinction was observed, so that animates were not likely to be transformed into inanimates, nor vice versa. But here, plants grouped with the inanimates rather than with the animates: 73% of human transformations produced humans or animals; 67% of animal transformations produced humans or animals; however, 78% of plant transformations produced plants or inanimates (1985:414).

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In the anthropocentricity of transformations, and in the grouping of plants with inanimates, we see evidence of conceptual structure that is common to the animistic outlook. The naturalness of this conceptual structure is in part argued by the success of the tales themselves, since this success is in part owed to the ease with which the tales integrate that which is fantastic with that which is already familiar. DelVal (1975:295) suggests that stories in which objects are animated achieve their popularity with children in part because they fit well with the children's preexisting animistic tendencies. But these stories, and stories like them, are also popular with adults.

2.2365

Every scholar who has written comprehensively on animism has noted the prima facie relationship between animistic thinking and certain animistically colored, culturally sanctioned forms of behavior toward inanimates and plants. These include such practices as the naming of vehicles or weapons, the esteem or worship of natural objects, the ostracism of objects used in crimes or associated with unpleasant events, and the belief in the vitalism or personlike power of trees. It is certainly true that the perpetuation of these practices does not require, for example, that their practitioners ardently believe in the personhood of boats with human names, or that the sun is a god, or that a murder weapon shares culpability with a murderer. However, the social perpetuation of these practices hich is of less interest to the scholar of animism than their inception; it is their inception. How could such practices be conceived except as an expression of a preexisting tendency to regard the natural world along animistic lines?

When the world's cultures are examined, it is quite clear that not all inanimates are equally probable to be accorded exalted status in a mythology or magicoreligious system. The sun and the moon are the universal favorites. A second eschelon comprises entities such as stars, lightning, thunder, wind, waterspouts, waterfalls, rain, and

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rainbows (Tylor, 1871: I:273-368; II:207-214,259-303). Trees, groves and forests are less likely to become objects of mythic esteem, though it is certainly more common for them to be accorded special status than ordinary logs and stones (Tylor, 1871: II:214-229). What we see here is a hierarchy of mythic regard which exactly matches the crosscultural animism hierarchy. The highly exalted status of the sun and moon, the dubious status of plants, the elevation of noble inanimates over common inanimates, the esteem of objects of nature over artifacts — all of these structural features of fetishistic sentiment in religion are parallel to structural features of animism in children.

Frequently it has been suggested that children's animistic beliefs have been fomented by cultural practices such as religion and mythology. These suggestions are not completely without merit, since a horse and cart must run together. The problem is that this account has the cart ahead of the horse. The crosscultural literature indicates that it is childhood animism rather than fetishistic religion or mythology which is universal. Animism arises whether or not it has the support of myth or religious doctrine, and arises in young folk whose exposure to such forms may be minimal. It is more credible to believe that animistic sentiment in youth results in the consolidation of a set of category norms and projective tendencies which may in later life find expression in the idiom of religion. The widespread formation of fetischistic religious conventions ought to be taken as a testament to the perseverance of animistic tendencies among adults, as well as a readiness on the part of adults to institutionalize these inclinations.

We close this section with a pot pourri of reports of animistically colored adult behavior which is directed toward objects used in crimes, or objects which otherwise give us trouble. These kinds of behavior are only sporadically reported, and lack the breadth of conventionality observed in religious systems, but are nevertheless suggestive of the perseverance of animistic tendencies in adults. The examples collected by Tylor (1871) are annotated in his text.

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> Even among full-grown civilized Europeans, as Mr. Grote appositely remarks, 'The force of momentary passion will often suffice to supersede the acquired habit, and even an intelligent man may be impelled in a moment of agonizing pain to kick or beat the lifeless object from which he has suffered.' In such matters the savage mind well represents the childish stage. The wild native of Brazil would bite the stone he stumbles over, or the arrow that had wounded him. Such a mental condition may be traced along the course of history, not merely in impulsive habit, but in formally enacted law. The rude Kukis of Southern Asia were very scrupulous in carrying out their simple law of vengeance, life for life; if a tiger killed a Kuki, his family were in disgrace till they had retaliated by killing and eating this tiger, or another; but further, if a man was killed by a fall from a tree, his relatives would take their revenge by cutting the tree down, and scattering it in chips. A modern king of Cochin-China, when one of his ships sailed badly, used to put it in the pillory as he would any other criminal. In classical times, the stories of Xerxes flogging the Hellespont and Cyrus draining the Gyndes occur as cases in point, but one of the regular Athenian legal proceedings is a yet more striking relic. A court of justice was held at Prytaneum, to try any inanimate object, such as an axe or a piece of wood or stone, which had caused the death of anyone without proved human agency, and this wood or stone, if condemned, was in solemn form cast beyond the border. The spirit of this remarkable procedure reappears in the old English law (repealed within the last reign), whereby not only a beast that kills a man, but a cart-wheel that runs over him, or a tree that falls on him and kills him, is deodand, or given to God, i.e. forfeited and sold for the poor ... (1871: I:286f)

Prof. Hans von Hentig (1954-55), a criminologist at the University of Bonn, recorded several cases of objects being treated as criminals. Not uncommonly, a murderer's axe would be burned along with the murderer. Sometimes the criminal's house would also be destroyed. In other cases, culpable objects were exiled or their names were stripped from them. In Russia, in 1591, a bell that had given the signal for a rebellion was condemned to perpetual exile in Siberia along with many of the perpetrators. In 1935, the King of Belgium was involved in an accident when his automobile ran into a lake in Switzerland. The auto was diligently removed from the lake for the King, but the King later had it returned to the scene of the accident and, after a brief but solemn ceremony conducted by functionaries of the Swiss government and attended by the Belgian ambassador, the offending auto was given a shove into the lake where it was to remain for all time. Hentig also suspected the presence of animistic sentiment in the destruction of the guillotine by Parisian revolutionaries, the dynamiting of a balcony from which Hitler made

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many addresses, and the changing of the name of tainted places or institutions.

Societies achieve closure on criminal events by ritualistically dealing with the criminal, the agent of the crime. However, blame is a contagion which often spreads from the criminal to other individuals perceived as affiliated agents of the event (including perhaps the parents of the criminal or even, unfortunately, the criminal's victim). The appeal of blaming the inanimate implements of a crime derives from the fact that these, as instruments, stand out as being more like agents than other entities in the general background. In fact, the presence of a general social condition such as 'poverty' may be a more important proximate cause of an act of burglary than the presence of a crowbar, but since it is only satisfying to blame an agent, we are more likely to blame the crowbar than the poverty, because the crowbar comes much closer than poverty to meeting the prototypic specifications of an agent. As any craftsman knows, a good tool is an extension of the body. In a manner of speaking, the crowbar has performed an act, and done so by virtue of having parts intended to undertake such acts. Also, the crowbar can be abusively treated in retribution for the act: one can interact with a crowbar, but not with poverty, in the way that one interacts with a person. To the degree that the crowbar is conceptualized as an accomplice, it is just and proper that it should be punished. Thus, it would not be fully explanatory to say that the crowbar is *merely* associated with the crime, and that we would therefore like to exile the crowbar and see it no more. One needs to say further that the way that implements of crime achieve their strong association with the crime itself is by phenomenologically coming forth from the background as instruments, or as quasi-agents. The little leap from regarding an object as an instrument to regarding it as an agent may be fueled by a little surge of animism.

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2.24

The classical Piagetian account of animism affirmed that, universally, animistic tendencies appeared in the postinfantile period of development, only to finally subside with the cognitive integration of late childhood and the acquisition of adultlike knowledge of biology and physical causation. Here, we have disavowed the characterization of animism as a systematic set of beliefs; the characterization of animism as a prototheory of biology or causation which must therefore be extinguished by mature biological and causal theories; the characterization of animism as a thought syndrome confined by its cognitive nature to childhood, and the associated characterization of the developmental course of animism as a quantal ascension through a series of cognitive stages.

The reasons why it is inappropriate to characterize animism as a naive theory of biology are summarized below:

1) Many animists regard life as a gradient attribute, but it is hard to imagine what it means to have a *biological* theory which regards life in this way. The beginning point for biology is the division of entities into living and nonliving classes.

2) Animists may not be able to specify a determinate set of things which can be said to be alive. Even the best examples of living things are not guaranteed to be regarded as living by animists. But a *theory* must be able to specify the entities that the theory is about, at least in terms of some secure exemplars.

3) Animists may regard life as an intermittent status, and may be inconsistent over time in their attributions of life. Of course, an assertion that life was intermittent could be considered a mistaken biological view. But how mistaken can views get before they cease to be biological at all? And how can the evanescence of animistic attributions be interpreted as a theoretical belief?

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4) For animists, there is only a tenuous relationship between attributions of life and attributions of traits biologically affiliated with life. The concept represented for the animist by the word *alive* does not appear to be the central or coordinating concept in a set of biological beliefs. It is rather the *last* concept which is understood as basic biological knowledge develops.

5) The rationales offered for animistic attributions of life address many issues which are not at all of a biological nature.

6) Neither do the social and personality factors which abet or inhibit animism have any clear relationship to a child's biological views, or to any other set of theoretically coordinated beliefs.

As an alternative to the representation of animism as a naive biological theory, we have portrayed animism as an intuitive, relatively nonanalytic, phenomenologically situated style of engagement with the natural world. Animism abides in the immediate dynamics of appraising or engaging with entities in the world. It is far less dependent than biology on the specification of determinate categories of entities on the basis of constant, intellectualized criteria. It is precisely this inconstant quality of animism that most distinguishes it from science — even naive science.

To the degree that animism is free from biology, there is no reason to suppose that animism would be confined to the biologically naive period of childhood, and in fact the psychological, neuropsychological, literary and anthropological studies adduced above present compelling evidence that normal intelligent adults have, as one of their mental assets, an animistic conception of life which is not determined by biological criteria. The continuity between the animism of children and the animism of adults is best attested by the fact that, in comparable experimental settings, adults judge the same entities to be alive and not alive and more alive and less alive as do animistic children, and do so in the same relative proportions as do animistic children, and offer the same kinds of rationales for

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their judgments as do animistic children. By Occam's razor, one can only infer that the animistic sensibilities and norms of childhood are preserved in later years.

In the developmental course of animism, animistic views and biological and causal knowledge interact in very complex ways. The acquisition of biological and mechanical perspectives on the natural order, and the development of the analytical styles of assessment which support these perspectives, cannot fail to have the general effect of suppressing animistic sentiment. At the same time, however, the acquisition of knowledge about biological systems may in specific cases provide content to animistic projections. As the child learns more about the makeup of living organisms, he learns more about what to associate with attributions of aliveness. Still, to a large degree, the attribution of traits affiliated with life proceeds with a baffling kind of quasi-independence from attributions of life itself. The lack of correlation between attributions of life and attributions of ancillary traits is consistent with the view that animism is not entirely about biology, and that attributions of life are not entirely attributions of a biological status, *even though* an appreciation of biological facts is central to the general regard which an animist has for the entities he judges to be alive or not alive. It can earnestly be said that one can say all one likes about the animist's biological and causal views, and yet fail to say enough about his animism.

In a similar fashion, the developmental relationship between animism and metaphoric understanding is complex. In the earlier stages of animism, it is not credible to say that the animist is speaking metaphorically. There is no indication that the youngest animists are in possession of literal concepts which they contrast with their animistic and putatively metaphorical ones. Animistic uses of the word *alive* are the first uses ever observed: a fact which argues for their literality, since the first concepts to emerge must be literal. In addition, when young animists are asked whether they *really* believe that, for example, rivers are alive, they answer in the

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affirmative (and may even attribute ancillary biological traits to the river). Further, there is experimental evidence that young children treat life-related metaphors as literal until such time as they develop a veridical biological conception of life and concurrently cease to exhibit overt animism (Schecter, 1980; Keil, 1986; Engel, 1988). Finally, when the whole course of animistic development is reviewed, it is not credible to regard the developmental modification of the animistic conception of life as an evolution of metaphoric style. There is no reason, for example, why the acquisition of biological and causal knowledge should suppress animistic expression, if such expression was all along intended metaphorically.

At the same time, it must be recognized that the child is surrounded by adults' metaphorical treatments of the life and death concepts and that these form an important input to his understanding of how the words *alive* and *dead* ought to be used. As the accumulation of biological knowledge begins to give shape to a distinct biological conception of life, the tension between animistic and biological attributions of life comes increasingly to the fore, and the content of animistic proclamations comes increasingly to be regarded as nonliteral. Finally, for the adult, metaphor offers the only socially sanctioned opportunity for the overt expression of animistic sentiment.

Developmentally, animism is suppressed as the child increasingly relies on analytic rather than intuitive cognizing strategies for the appraisal of the natural order, and for the definition of word meaning (cf. Vygotsky, 1934; Werner, 1948; Keil and Batterman, 1984; Keil,1987,1989,1991). Keil characterizes this development as a shift "from representations based on holistic tabulations of all symptomatic or characteristic features to those where a few defining features predominate" (1991:241). This shift in cognitive style, or cognitive emphasis, affects not only attributions of life, but also the attribution of ancillary biological traits, first in connection with physical traits, and later in connection with mental

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traits (Inagaki and Sugiyama, 1988; Inagaki and Hatano, in prep.; Hatano et al., in prep.).

The developmental ascendancy of a more analytical thought style is directly responsible for the waning of overt animism, not only because the individual becomes cognitively less inclined to animistic appraisal, but because the community which envelops him dictates that the more analytic style of cognition is to be regarded as primary, and preferred. In the sequestering of animistic sentiment in the realm of metaphor, we can perceive a universal tendency to favor concepts structured analytically over concepts which are produced by less determinate styles of mentation. In every culture, animism and biology must come into direct conflict over which orientation to the natural order will command first rights to the use of the word *alive*. Universally, it is the scientific orientation which prevails. The facts referred to by biological postulates are said to be the 'literal' facts, while the facts referred to by animistic or animistically colored proclamations are said to be 'nonliteral' or 'metaphorical.'

The distinction between the literal and the nonliteral is not unproblematic (Searle, 1979:117-136), but a disquisition on the literal-nonliteral distinction is not called for here. Here, the essential thing is just to point out that the biological sense of *alive* is not accorded its literal status because the biological sense is historically or developmentally antecedent, or cognitively more primary, or factually more true. In connection with the word *alive*, it is clear that the nonliteral meaning has deeper roots than the literal meaning, since the nonliteral meaning is in important ways continuous with animism, and since animistic word use predates biological word use in the utterances of the child. Further, there can be no doubt that speakers really mean what they express in figurative speech; that is, figurative expressions are just as sincere as literal ones. And as far as truth goes, nonliteral ascriptions of life are just as true as literal ones: they merely present facts of a different nature. Nevertheless, there is a common sentiment that the literal

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sense of a word is ultimately 'right,' and that the nonliteral sense is ultimately 'wrong.' In reality, right and wrong have nothing to do with the matter. Appeals to right and wrong are merely reformulations of the sentiment that one sense *ought* to dominate over the other, and be accorded first semantic rights to the word at issue. In connection with the word *alive*, the literal-nonliteral distinction — a distinction on which all common sense seems to ride — is very nearly a distinction without any content at all, *except* for the prestige which is accorded to the biological meaning which is stipulated to be literal.

Two reasons might be offered to explain why speech communities universally prize criterially defined concepts over concepts lacking determinate specifications. First, concepts like biological concepts (which at least put up a good show of being defined by specific criteria) are more suited to communication because their meaning can be more readily agreed upon. Too, criterially defined categories strike all thinkers as the models of the way that categories ought ideally to be, since they maximize the power of the category name to predict attributes of the category members, while at the same time rendering maximally sharp the distinctions between categories. This is just to say that the same principles which govern category formation in general arise to determine what kinds of categories people will most esteem. Thus, in the event of polysemy, it is always the case that the more precisely and classically defined concept is selected as the default, or literal, meaning of the word, since this is the *kind of* meaning which is universally held in higher regard, the meaning which is taken to better support the *kind of* mentation that 'makes the most sense' out of the world. The great irony here is that the implicit objectivist ethos of the speech community should be supported by a device that is patently nominalistic. What counts as literal is a matter of decree.

Once a speech community has made its pronouncement on what is literal and what is not, it enforces its decision with every sanction at hand. All conversation presupposes an understanding of the

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distinction, and any individual who fails to lock step is regarded as a linguistic troublemaker or imbecile. Since the literal-nonliteral distinction is an issue which pervades the issue of presupposition in discourse, we have in view here a universal in pragmatics as well as a universal in cognitive semantics.

This description of how overt animism is universally suppressed completes the ontogenetic account of how animistic conceptions arise, interact with emergent biological and causal knowledge, and finally are displaced to the outskirts of mental life. However, while we have devoted quite a lot of attention to talking about the traits which an animist might or might not attribute to an entity which he regards as alive, we have yet to say enough about the core semantics of an animistic attribution. Putting aside all talk about feeling pin pricks or being able to grow, what is the central focus for the animist mean when he says that a thing is alive? How is it that the animist seizes the word *alive* to express his meaning when, evidently, the biological content of the meaning being expressed is so variable?

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2.3 Phenomenological Aspects of Animism

2.31

An inquiry into the semantics of a word is always an inquiry into how the word is used. It is through its use that a word achieves its meaning (Wittgenstein, 1953; Austin, 1965). Since there is no universal format for how a word is taken up and used, there is no universal format for semantic specification. Semantic structure varies from word to word.

Is it necessarily the case that a single sense of a single word has a single, immutable semantic structure? Don't we require this much for there to be stable meaning in a language? We have an opportunity to study this question by examining how young animists use the word *alive*, since we have reason to believe that, at a tender age, the word *alive* is only understood in one sense. When we examine the animistic use of the word *alive*, we find that $alive_{animistic}$ may be used in different ways, and that these different uses support different semantic analyses. It appears that the semantic structure of $alive_{animistic}$ is adapted to the structural format of the different language games in which it is used.

When we ask the animist whether such and such an entity is alive, we have conveyed to him that he is to play an extensional language game in which entities are either labeled by the word *alive* or not labeled by it. If our questions take a form such as

Is a rock (ever) alive?

rather than a form such as

Is the rock alive (now)?

then we have also conveyed to our listener that the status of entities is to be regarded as general and fixed. Our questions in games like this always provide guidance on how the semantics of the word

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alive is to be modeled. In the extensional language game described here, aliveness must be modeled as an attribute that is binary and fixed. Thus, in a subtle way, the superficially neutral questions of the extensional language game are predisposed to inhibit animistic expression, since they encourage that life be conceptualized in structural terms that are more suited to a biology. It is the biological concept of life, rather than the animistic one, which is necessarily binary and fixed.

It is interesting that such a structure can be imposed on semantic domains which would not by nature seem amenable to binary specification. Imagine a collection of buttons whose reflected light ranged from 440nm to 520nm. For each button a subject is asked, "Is it blue or is it green?" There is nothing to prevent one from playing this game. But there is a difference between the structure which is imposed by the requirements of the game and the structure which is latent in the nature of the domain being addressed. Our subject's two piles of buttons reveals nothing about the gradient internal structure of color categories as they are naturally conceived.

While the extensional language game is more amenable to biological conceptions, the language game which might be called the relative aliveness game is more amenable to animistic points of view. An individual is introduced to this game by asking him to judge which of two entities is *more* alive. The game requires that the word *alive* be used to refer to a gradient attribute, and encourages the view that the attribute is present to some degree in all of the entities presented for comparison. This naturally favors animistic views. In fact, those with a strong biological orientation may have difficulty playing this game, or may refuse to play it altogether. A biologist may object that the question cannot be answered in the case where the two entities to be compared are both living or both nonliving, and that the form of the question is ill-suited for the case where one entity is living while the other is not, since this is not a

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case in which one entity is strictly speaking 'more alive' than another.[83]

The structural inhospitability of the language game to biological views results because the binary semantic structure of *alive*$_{biological}$ cannot be adapted to the gradient structural requirements of the relative aliveness game. For the animist, on the other hand, it appears that the form of the question is ideally suited for inquiries into the relative life status of entities. The structural amenability of the language game to animistic views is attested by the fact that animistic behavior may be elicited by this game when other methods have failed (Laurendeau and Pinard, 1962:152f; Cherry, this volume).

When a subject is asked *why* such and such an entity is alive or not alive, he is being guided into an intensional language game. Here, the object is to note the attributes of the entity which seem relevant to its being labeled alive. This need not be a ponderous cognitive task. Minimally, a subject might just cite an attribute that comes to mind by virtue of some salient but unanalyzed association with the word *alive* and the entity at hand. Such and such is alive 'Because it makes a noise.' But why does making a noise qualify it to be called alive? 'It just does,' or 'Because you can hear it.' If the game is played in this way, then it is only necessary that the word *alive* be semantically structured as a cluster of associated attributes. It is not necessary that the cluster be particularly stable or coherent, or that the constitution of the cluster be cogently justified.

However, in a more elaborated version of the game, the why-question may be interpreted as an instruction to semantically structure the word *alive* in terms of those features which would qualify

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[83]The problem of the biologist is familiar to readers of Alice in Wonderland: it recapitulates the problem Alice faced when asked whether she would like some more tea when she had not yet had any at all. Under one analysis, the March Hare's offer of 'more' tea was completely senseless. But as the Hatter obliquely pointed out, it seemed to make more sense than offering less.

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any entity to labelled as alive within a general theory of biology. Since why-questions ask for reasons, and since theories are the mental frameworks that best coordinate reasoned relations, the question of why something is said to be alive may issue more or less directly into the question of how life is biologically defined. The answer to the why-question may then take the form of a litany of the approximately determinate set of features of living things which, within biological theory, are viewed as being necessary, sufficient, coherent, justified, etc.

The kind of exchange which might occur in this elaboration of the intensional language game is idealized below. Note how the use of *we* encourages the respondent to conceptualize life in normative terms.[84]

> Why do we say that a cloud is not alive?
> It does not conduct metabolism, it has no DNA or RNA, it lacks cellular structure, it is not born and it does not die, etc.

In short, a why-question may function as a low level demand that 'reasons' be given for an attribution of life, where 'reasons' are expected to rationally and consistently articulate with an encompassing biological theory. If responses fail to take the form of 'proper reasons,' then we may not feel that the why-question has really been answered at all. In this way, the intensional language game obviously promotes systematicity on the part of the respondent, who is encouraged to give 'proper reasons,' and on the part of the questioner, who interprets as responsive only those replies which show the requisite systematicity. Naturally, the intensional language game tends to favor biological perspectives, since these are evidently more reasoned out and systematic than animistic views.

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[84]Of course, other theoretical perspectives on life may contend for attention in the intensional language game. For example, magicoreligious theories may vie with biology.

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In addition, the intensional language game introduced by why-questions tends to favor analytic biological perspectives because why-questions presuppose that attributions of aliveness can be analytically teased apart. It would not be cooperative of the questioner to ask a why-question were this not the case. By way of demonstration, note that all of the following are anomalous as straightforward questions.

! Why do you say it is orange?
! Why do you say it is big?
! Why do you say it is far away?
! Why do you say you are hungry?
! Why do you say you are bisexual?
! Why do you say you are alive?

There is a kind of self-evidence that something is orange or big or far away, or that one is hungry or bisexual or alive. These things present themselves to us whole, as it were. The anomaly of the why-question arises in part because it asks for an analysis of matters which are not properly analyzed at all. An entity is not orange by virtue of having the subsidiary properties of orangeness. Rather, we believe that it is possible to have a direct percept of the color or size or distance of an object, or to know directly one's own hunger or sexuality or life status. We do not need to infer our own aliveness by, for example, observing our own capacity to reproduce or by microscopically confirming our own cellular structure. Neither do we have any sense of inferring the life status of other beings. Hence, it is sufficient to say

I *just know* that I'm alive.
I *just know* that Bob's alive.
It just *is* orange.
I *can tell* that it's far away.

In contrast, it is felicitous to ask why one says that classes of entities are alive (e.g., 'trees,' 'a rock'), and it is considered unresponsive to reply, 'I just know.' What this demonstrates is that the intensional language game introduced by why-questions is a game

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which requires the semantics of the word *alive* to be modeled in terms of the objective attributes of entities labeled as alive. Even the question 'Why do you say that *people* are alive?' cannot be felicitously answered by reference to direct intuition. The game requires instead that one make reference to objective attributes of people. The overall effect then is to disallow any holistic structuring of the concept ('They just are') or any appeals to direct intuition ('I can just tell'). Since the animistic attitude is characterized by holism and subjectivity, it is unnaturally constrained in the course of this language game. Yet nothing prevents one from playing this language game, and from semantically structuring $alive_{animistic}$ to acknowledge only the objective attributes of entities animistically said to be alive.

We have seen that the semantic structure of $alive_{animistic}$ is to some degree mutable. While animistic judgments of aliveness may be thought to be normally subjectivized, holistic and gradable, the structure of $alive_{animistic}$ can be accomodated to language games in which life is represented as a binary status, and as an analytically decomposable array of objective attributes. The degree of structural plasticity is striking. There is no absolute way in which to specify the semantic structure of $alive_{animistic}$.

As we inquire into the phenomenology of animistic episodes, we need to be mindful of the fact that the language games in which animistic sentiments are elicited always have the effect of themselves imposing certain kinds of structure on the animistic behavior observed. It has been argued above that animism is a good deal less systematic than it has been classically portrayed as being. One of the reasons for this assertion is that the language games traditionally used to investigate animism tend to guide animists into making more systematic statements than they might if the expectations of the language game were more relaxed. The task is always to make the most sense out of the observations at hand while recognizing that the observations are to some degree the product of the method of observation itself.

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2.32

We have seen that the amenability or unamenability of different language games to biological or animistic conceptions of life is very largely determined by their amenability to subjective aspects of meaning. When we inquire into the semantics of $alive_{animistic}$, we must be directed to both objective and subjective aspects of its use. We are first of all directed to the fact that the word is used to designate a category of entities in the world. The entities said to be alive appear in some measure to share common features, and it is partly by virtue of their objective commonalities, as mediated by incipient cognitive biological theories, that they are grouped together. However, it has been argued above that animism subsists in a whole mode of engagement with the entities in the world, and that affective factors may determine the outcome of appraisals of aliveness as well as objective factors. When the word *alive* is used animistically, it announces something about the response of the animist to the entities being appraised, as well as something about the entities regarded in and of themselves. Thus, the semantics of $alive_{animistic}$ is problematic in a way that the semantics of $alive_{biological}$ is not. It is in the nature of a biological appraisal to have subjectivities stripped from it, while it is in the nature of an animistic appraisal to be imbued with subjectivity. To clarify the subjective aspects of the semantics of $alive_{animistic}$, we must finally clarify the whole phenomenology of the animistic episode.

Above, we have averred that it is the entities in the world which are more embodied and more purposive and more active which consistently show up animistically as more alive: we have averred that embodiment, purposiveness and activity (EP&A) are the principal lures for animistic feeling, the principal determinants of animistic salience, the causal ground and principal themes of animistic appraisal: the principal semantic dimensions of $alive_{animistic}$.

The primacy of EPA considerations is readily apparent from an examination of the relative placement of entities in the crosscul-

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tural animism hierarchy, and from a review of the rationales offered by animists for their judgments of aliveness and relative aliveness. In the hierarchical ranking of entities said to be alive, nothing is so striking as the advantage gained by such factors as anthropomorphic form (E), utility (P), and motility (A). In the rationales given for animistic attributions of life, nothing is so striking as the everpresence of EPA themes. Laurendeau and Pinard's (1962:144-147) observation that the committed animists of Stage 1 attributed life most often on the basis of anthropomorphism, usefulness, and activity/movement was one of the prime motivations for positing embodiment, purposiveness, and activity as the main themes of animistic appraisal. Piaget also speaks to the importance of perceived activity and purpose.

> Nature presents a *continuum* of life, such that every object possesses activity and awareness in some degree. This *continuum* is a network of purposive movements, more or less mutually dependent on one another and all tending towards the good of humanity. Gradually the child picks out certain centres of force within this *continuum* as being animated by a more spontaneous activity than the rest. But the choice of these centres does not become fixed for a long while. ... This is what explains the vague and unsystematic character of the answers obtained. But although the choice of centres may be undecided the reasons which determine it need not be. Activity in general, movement in general, spontaneous movement opposed to imparted movement: these were the three themes that we found continually recurring in the minds of the children tested, introducing a progressive differentiation within the primitive *continuum* of life and purpose. (1926b:233f)

As noted above (note 16), Piaget was less impressed than the Canadian team with his subjects' anthropomorphizing; however, the discretization of entities as "centres of force" is itself an oblique testimony to the primary importance of embodiment, broadly conceived. The first requirement for having a 'good body' is just to have a stable and discernible form; i.e., to be recognizable as an entity at all.

DelVal (1975:168-172) provided a content analysis of the justifications given by his subjects when attributing life. DelVal ob-

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served that 30 principal criteria were used. These were grouped in the following categories:

BIOLOGICAL

These were only found frequently and in combination among older children. E.g., reference to birth, growth, reproduction, death.

ANTHROPOMORPHIC / ZOOMORPHIC

These appeared at all ages and were almost always used. E.g., to have a mouth, hands, a nose, eyes, feet, a heart, a back; to breathe, eat, speak, hear, circulate blood, bleed, sleep, chew, scratch; to feel; to have a soul.

FABRICATION

These were used by all ages. E.g., made of wood.

ACTIVITY

E.g., to give light, heat; to be afire.

MOVEMENT

These appeared at all ages, whether specified as autonomous movement or not.

NONRESPONSE

Younger children sometimes failed to give a reason or gave an ad hoc reason such as, "Because I see it."

These responses were all clearly expressive of EPA sensibilities, broadly conceived. Note that some of what DelVal regarded as references to activity might as well have been regarded as references to purpose; e.g., 'to give light.' Some of the rationales which DelVal classified as nonresponsive may in fact have indicated that, for the young animist, the aliveness of a given entity was self-evident and directly perceived, so that it was sufficient to make reference to its being perceived. 'Because I see it' would be under these conditions a legitimate expression of animistic conviction.

Carey (1985a:29-33) provided a similar content analysis of the responses obtained from her subjects.

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GROWTH, DEATH, REPRODUCTION

E.g., a tree is alive because it grows.

ANTHROPOMORPHIC TRAIT

E.g., a watch isn't alive because it doesn't have eyes.

COMPARISON TO PEOPLE

E.g., a bird is alive because I am.

COMPOSITION

These rationales were only used to justify assertions that inanimates were *not* alive.
E.g., a cloud isn't alive because it's just made of water; rocks aren't alive because they're just made out of stone.

BUILT BY PEOPLE

E.g., a car is not alive because people made it.

USE

E.g., a table is alive because you can eat on it.

ACTIVITY

E.g., a clock is alive because it goes tick-tock.

MOVEMENT

E.g., a mountain is not alive because it just stays there.

AUTONOMOUS MOTION

E.g., a bicycle isn't alive because you have to pedal it.

EXISTENCE

E.g., trees are alive because I've seen them.

FACTS

E.g., a mountain is not alive because grass grows on it.

The responses of Carey's subjects were once more elaborations of EPA themes. Particularly emphasized was the importance of having specialized parts, while being at the same time an organismic whole composed of living tissue that cannot be built up from

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artifactual parts or simplex materials. As always, one suspects that certain references to activity (e.g., 'goes tick-tock') were simultaneously references to purpose. Like DelVal, Carey noted that attributions of aliveness were sometimes justified by simply affirming that the entities being assessed were present, or visible, or something to that effect. Again, these might be taken as an indication that the aliveness judgment was advanced holistically and intuitively. Carey noted that subjects sometimes recited a seemingly random fact about the entity being assessed (cf. DelVal, 1975:179; Berzonsky, 1970). This too might be taken to indicate how desperately difficult it can be for an animist to give analytic rationales for his holistic intuitions.

Siegler and Richards (1983:108-111) asked groups of children[85] and adults to think of attributes that distinguished living things. 'Moves' was the most frequently cited attribute of the children's groups, and the fifth most frequently cited attribute of adults. 'Talks' was the second or third most cited attribute among the three youngest groups. Most of the other popular responses had essentially biological themes: eating, dying, breathing, growing, feeling, reproducing. The five attributes of life mentioned most frequently by the two youngest groups are listed below.

4- and 5-year-olds		6- and 7-year-olds	
1.	Moves	1.	Moves
2.	Someone told me	2.	Talks
3, 4, 5.	Talks	3, 4.	Eats
	Walks		Makes a noise
	I just know		
	Dies	5.	Walks
			Dead things lie down
			Dead things are extinct

[85]Groups of child subjects: 4&5-year-olds, 6&7-year-olds, 8&9-year-olds, and 10&11-year-olds.

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Lucas et al. (1979) examined 944 Australian schoolchildren from grades 2-10. Subjects were shown a black-and-white photograph of a two-colored piece of damp smooth dough, placed on beach sand, and asked to write down ways of determining whether the object was alive. The investigators were struck by the prevlence of behavioral responses, especially movement, at all grade levels. In addition, at all grade levels, more than 40% of the subjects suggested a criterion based on external structure (e.g., reference to a breathing structure, mouth, eyes). An increasing proportion at higher grade levels referred to some aspect of internal structure (including reference to cells or blood). A majority of subjects at most grade levels made reference to observable physiological functions (including heartbeat, pulse, breathing). Many also referred to behavioral criteria other than movement, particularly eating and drinking. Between 7% and 15% of all subjects suggested vocalization or making noise as a criterion for recognizing life.[86]

2.33

Together with the hierarchical superiority of more embodied, purposive and active entities, the four studies cited establish broadly that EPA considerations are the causal ground of animistic attributions of life. However, it is necessary to give greater specificity to the notions of embodiment, purposiveness, and activity. It must be made clear that these are not intended as reductive semantic primitives in the style of Wierzbicka (1980), or as Aristotelian features in the style of Katz and Fodor (1963), or as the orthogonal poles of a semantic space in the style of Osgood, Suci and Tannenbaum (1957). The EPA complex is unlike any traditional matrix of semantic features in that it is not believed to exhaustively decompose

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[86]Admittedly, the object suggested a free-living sea creature. Also, the task of determining whether something on the sand is alive is more constrained than the task of reporting in general what the attributes of living things are. For example, one might cite the ability to grow as an attribute of living things, but it is not practical to wait around to see whether something found on the beach grows. Naturally, then, the test situation encouraged subjects to look for physical parts and physically observable activities.

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the animistic concept of life; neither are the individual natures of the EPA dimensions believed to be fully specifiable; nor is it believed that the individual dimensions are entirely independent or that they can be algorithmically summed. On the objective side, EP&A represent the three principal clusters of attributes which characterize entities judged by animists to be alive, and by virtue of which such entities are judged to be alive. On the subjective side, EP&A represent the principal phenomenological dimensions of one's own life, the three dimensions in terms of which one always understands one's own life.

We have averred that *the reason* why EP&A emerge as the dimensions of an animistic conception of life is that the animistic conception is constituted as a projection of the animist's own life. By 'projection' it is here intended, not that worldly entities are personified (though this may also occur), but that the structural terms of our own existence condition in a general way how entities show up for us, as well as the prominence of their showing up. We are necessarily oriented to other entities in the very terms implicit in our orientation to our own selves. Phenomenologically, the first figure against the background of the world is always oneself. Via projective processes, EPA subjectivity then issues into EPA 'objectivity,' and the EPA structure of other figures emerge. Let us then say a few words to clarify the principal terms in which one finds *oneself* embodied, purposive and active, since it is in these very terms that we are most sensitive to the being of other entities. Following, parameters of the EPA dimensions are presented as phenomenological axioms, along with some exemplification of how EPA considerations condition animistic attributions.

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We are physically real.

> Monsters are not alive (Carey, 1985a:31).
> Fairies are not alive; dinosaurs are not alive (Carey, 1985a:25).
> Trees are alive because I've seen them (Carey, 1985a:30).
> The moon is dead today, but at night it lives (Safier, 1964:291).

We have a three-dimensional rather than two-dimensional form.

> Pictures of people are not alive (Schecter, 1980:84).
> Pictures are not alive; people on TV are not alive (Carey, 1985a:25).

We are solid: our form is definite and stable rather than vague or protean; we occupy a location; we are here rather than there or all around.

> A river is not alive because it is just like air: you can go right through it (Schecter, 1980:86).
> A person is alive because a person wouldn't run through one's fingers (Schecter, 1980:86).
> Everything is alive except heat and light (Schecter, 1980:127).
> Thunder is probably not alive because it isn't like other things, people or trees or things like that (Piaget, 1926b:197).
> Wind is not alive because it is all around the world in every part of the world (Schecter, 1980:87).
> Wind is sort of [alive], but you can't see it. (Cherry, this volume, subject 3).
> A stone is more like a living thing than wind because it's hard (Cherry, this volume, subject 27).

We have an orientation to the world: we are upright.

> Dead things lie down (Siegler and Richards, 1983:109).
> Clouds are alive because they're standing up (Bruce, 1941:85).
> A mirror is dead because it's laying down and nobody's moving it (Werner and Carrison, 1944:47).
> A cloud is alive because it is moving and it can fall down (Smeets, 1974:25).

We have functional parts. In particular, we have parts which give us sensory knowledge of the world, and which provide for interaction with other human beings.

> A watch isn't alive because it does not have eyes (Carey, 1985a:30).
> A river is not alive because a hand can't come out of it. It doesn't have any eyes or nose or mouth (Schecter, 1980:124).
> The sun is alive because it has a mouth (DelVal, 1975:188).

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A tree is not alive because it only has branches. It got no mouth (Smeets, 1974:24).
Trees are not alive because they got a root; persons got a heart (Bruce, 1941:85).
A tree is alive because it drinks from the ground and has things that moves inside it (Schecter, 1980:123).
A tree is alive because it has bark (Schecter, 1980:81).
A tree is alive because it breathes (Schecter, 1980:122).
Grass is born but it is not alive. It does not have eyes; it does not have a mouth (DelVal, 1975:201).
A table is not alive because it does not have a heart (DelVal, 1975:193).

Our parts are constituted by natural living tissue and are intentionalistically connected; we are not assembled or made out of something else.

A bicycle is not alive because it is just a bunch of parts (Schecter, 1980:90).
Robots are dead because, if you chop it, it falls apart (Schecter, 1980:125).

A doll is not alive because it is made by man (DelVal, 1975:266).
A table is not alive because it has been fabricated (DelVal, 1975:206).
A car is not alive because people made it (Carey, 1985a:30).
A robot is built so it is not alive or dead (Schecter, 1980:124).
A snowman is not really alive because it is built by man (Schecter, 1980:89).
A train is not alive because it is manufactured (King, 1961:14).
Things which man cannot or did not make are alive (Papalia-Finlay, 1978:137 — adult subject).

A snowman is not really alive because he is made out of snow (Schecter, 1980:84).
A watch is not alive because it is made out of metal (Schecter, 1980:90).
A cloud isn't alive because it's just made out of water (Carey, 1985a:30).
Rocks are not alive because they are just made out of stone (Carey, 1985a:30).

We are whole; we have a form which is complete (i.e., not missing parts) and self-sufficient (i.e., not a part of something else).

A chair is living 'cause ain't nothing broke off (Werner and Carrison, 1944:47).
Clouds are dead 'cause they move apart. Like a big cloud breaks up ... goes apart (Werner and Carrison, 1944:51).
Rocks are not alive because they're all separated. They're not one thing (Schecter, 1980:89).
The moon dies when it's blown up, but it comes back to life the next day (Safier, 1964:291).

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A bicycle is dead when it's all crumbled and everything. You can't use it anymore (Schecter, 1980:124).
A tree is more alive than a lady because it grows leaves back after it loses them (Cherry, this volume, rejected subject, 5:2).

A stone is dead 'cause it's been broke off of another one (Werner and Carrison, 1944:47).
A living thing does everything by itself to keep itself alive (Schecter, 1980:125).
I can just be, more or less, without any help from anything else (Schecter, 1980:126).

We understand ourselves to have a beginning and an end.[87]

A flame and a flash of lightning are alive because they have a beginning and an end (Dennis, 1957:197).
A flame is alive because it grows and dies out (Voeks, 1954:406).
The wind is alive because it has a beginning, a duration, and then the calm or death (DelVal, 1975:267).
The pearl has a beginning and by virtue of this one can say that it is born, and everything that is born lives (DelVal, 1975:267).
A living thing will not last forever (Brown and Thouless, 1965:39).

PURPOSIVENESS

We are intentionalistically directed toward our own being as an issue, intrinsically involved with no means of disengagement; our life is a complex of projects; we are continuously concerned with matters of function and utility.

A car is alive because it takes people; a watch is alive because it tells time; rain is more alive than fire because it makes plants grow (Nurcombe, 1970:76).
The sun is alive because it gives light (DelVal, 1975:188).
The sun is alive because it gives heat to all people (DelVal, 1975:188).
The moon is alive because it guides us at night (Piaget, 1926b:200).
A stone is living 'cause you can use it to make a stone house (Werner and Carrison, 1944:47).
A tree has its own purpose ... a tree is doing it so that it can be a tree, be alive and keep growing (Schecter, 1980:127).
A tree is not alive because it cannot do nothing (Smeets, 1974:24).
The desk is not alive because it is broken down (Bruce, 1941:85).
Lightning is not alive because it isn't any use (Piaget, 1926b:197).

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[87]The understanding that our life extends since birth and until death is an intellectual acquisition. It is not surprising therefore that only adults have been observed to rationalize animistic attributions of aliveness by saying that entities 'have a beginning and an end.'

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ACTIVITY

Rather than static, we are active, interactive, in tension or in flux, and always in progress; we are never at a halt.

> I guess I'd call [a fetus] a living thing when the cells start reproducing (Schecter, 1980:125 — older child).
> Wind is alive because it moves (DelVal, 1975:182).
> A bike is living because it's moving (Safier, 1964:291).
> When a bicycle goes it is alive (Piaget, 1926b:196).
> The moon is not alive because it always remains in the same place (DelVal, 1975:206).
> A mountain is not alive because it just stays there (Carey, 1985a:30).

We are self-activated and self-locomoting.

> A stuffed bear is not alive because it does not move by itself (Sharp et al., 1985:54).
> The sun is alive because it rises and sets, but an auto is not alive because you make it move (Bruce, 1941:85).
> An auto is not alive because it can't walk (Bruce, 1941:85).
> A tree is not alive because it does not move by itself; when it moves, the wind makes it go up and down (Smeets, 1974:24).
> A bicycle isn't alive because you have to pedal it (Carey, 1985a:30).

As beings of nature, we are ultimately unconstrained, wild, and free.

> A clock is not alive because it is created by man and does not have its own life (DelVal, 1975:266).
> In a way, sun and rivers and wind are alive because they're not made by man (Schecter, 1980:124).
> Rivers are alive because they are a part of nature (King, 1961:14).
> Anything involving nature or purely natural phenomena is living. (Papalia-Finlay, 1978:137 — adult subject).

We vocalize.

> Fingernails are not alive because they can't say 'yes' or 'no' (Schecter, 1980:123).
> We are alive because we can yell (Sharp et al., 1985:55).
> A chair is dead because you sit on it and it don't tell you to get up (Werner and Carrison, 1944:47).
> The wind is alive because it talks to you. It says, "Whoo-oo-oo" (Werner and Carrison, 1944:47).
> A bird is living. If he were dead, we wouldn't hear him sing (Werner and Carrison, 1944:47).
> A clock is alive because it goes tick-tock (Carey, 1985a:30).
> A tree is not alive because it doesn't talk (Bruce, 1941:85).
> A tree is not alive: it doesn't talk (Schecter, 1980:123).
> A bicycle is not alive because it does not speak (DelVal, 1975:181).

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It is not the case that, phenomenologically, we entertain separate pure percepts of embodiment, purposiveness and activity, much less of being three-dimensional, etc. The many axioms and the three dimensions all work together. What we experience is unitary. This is not to say, though, that embodiment, purposiveness and activity are analytically equiprimordial. First, there is some sense in which activity is more primary than purposiveness. We can easy conceive of activities which are not purposive, but we cannot imagine looking for a purpose without looking for an activity. How would a purpose without an activity show up?[88] More fundamental still is embodiment. We can easily conceive of an inactive entity, but we cannot conceive of an activity without an entity.

In the animism research literature, activity has had a privileged reputation as the dominant rationale for attributing life to inanimates. It is true that activity may result in an attribution of aliveness even in cases where the entity being assessed does not have a 'good body' — e.g., rain, lightning, thunder. However, the prominence of activity has largely resulted from the fact that the stimuli employed have mostly been relatively embodied to begin with. If young children could be appropriately asked whether they thought that conceptually unembodied or unembodiable things (heat, gravity, equivalence) were alive, or were as alive as embodied things, then the primacy of embodiment would quickly become obvious.

The primacy of both embodiment and activity over purposiveness is further attested by the fact that we are endowed with specific sensory apparatuses for the detection of form and motion (as well as other varieties of change in the environment, including sonic perturbations of both vocal and nonvocal character), but we lack neurologically direct ways of detecting purpose. Our appreciation of purposiveness is nevertheless closely bound up with our apprecia-

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[88]A determined look, perhaps? A manifesto? But aren't these acts as well?

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tion of embodiment and activity. Note that the embodiment-purposiveness link has given rise to a few collocations: *to pull oneself together,* or *to get oneself together*, or *to have to do something*, where a verb denoting physical (i.e., bodily) possession has been grammaticalized as a marker of intention or obligation. Note also that *finish*, whose primary meaning relates to the completion of purposive activities, is used sometimes as a death-related word, as in *finish off* 'to kill,' or *to be finished* 'to be moribund.' Pretheoretically, to be alive is to possess a body, and to deploy this body toward purposive ends. Despite the possibility of analytically regarding embodiment as more primary than activity, and activity as more primary than purposiveness, these EPA dimensions are normally unified.

2.34

The fundamental phenomenological fact of our existence is that we are always directed toward our own being; that we always have our own life as an issue to be reckoned with; that we are always concerned, and cannot undo our concern for how our life is to be realized in the passing moment; and that in having our life as an issue, *we understand it* (Heidegger, 1927). EP&A constitute the specific dimensions in which we understand our life to be at issue, and the specific terms in which this issue is always resolved.[89]

The effect of the pervasiveness of EP&A concerns is this: the terms in which entities in the world show up for us are preconditioned by the terms of our EPA orientation to our own being in general. What this means is that we have a special capacity to assess the EPA character of entities in the world, and a special propensity to do so, because we are always directed toward the EPA dimensions of our own existence, and because the presentational world itself constitutes a physicalization of the issue of our own existence. To comport ourselves toward our own existence involves comporting

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[89]EP&A are without corollaries in the Heideggerian system. One might wish to regard EPA modeling as a component in an existentiell, or factical, analysis of being.

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ourselves toward the world. In this way our EPA orientation toward our own existence becomes extended as an EPA orientation toward the world as well. Ineluctably, we make the world intelligible by regarding it in terms of bodies and activities and purposes.

In this orientation to the world, certain entities show up more prominently than others. The entities which show up most prominently of all are other human beings, since these are the beings whose embodiment, purposiveness and activity resonate most perfectly with our own. In a whole way, we are constituted as detectors of other beings — and particularly, of other human beings. If we were constructed of pure light, and existentially oriented toward our own luminosity, then the entities that would stand out most prominently would be other light beings. But by virtue of our orientation toward the EPA structure of our own existence, the entities that we recognize as prominent others are those whose existence is also worked out along the axes of EPA dimensions.

We have said that every entity is appraised with an eye to its EPA features, and that some entities are thereby recognized as other beings. However, there is a continuity between the way that beings and nonbeings stand out for us, since the EPA terms of appraisal are the same for both types of entities, and also since the EPA dimensions provide for gradation in the degree to which both beings and nonbeings might demonstrate EPA attributes.

Generally, the EPA attributes of beings are much greater than those of nonbeings. Nevertheless, it is possible to be fooled on the issue of whether one is dealing with a being or a nonbeing. Often one is fooled by having fooled oneself, since it is usually our own projections which lead us astray. Purposive intentions may be imputed to entities which are merely useful; motility may be imputed to entities which merely move. But even in the cases where we are not fooled and do not project, the being of beings and nonbeings is made continuous by the consistent nature of the EPA terms of their appraisal. It is because they are fundamentally regarded in like terms

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that their being can be rated against each other. And since the character of their being is consistent with the character of our own being, the word that gets applied to the task of rating the intensity of their being is *alive*.

In this way, the animistic sense of the word *alive* precedes biology, and also succeeds it. In wielding $alive_{animistic}$, the animist announces himself as a detector of beings, where the means of detection are provided by EPA considerations rather than by biological criteria. As a result, both beings and nonbeings are disclosed. When the animist applies $alive_{animistic}$ to an entity, he does not necessarily commit himself to the position that the entity is another being, but he does affirm that the entity impresses him in terms which are phenomenologically continuous with the terms in which the company of bona fide beings is recognized.

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Chapter Three
Animistic Effects in Language

3.1 Introduction

This chapter will argue that perseverant animism in adults gives rise to two broad classes of linguistic effects. First of all, it can be crosslinguistically observed that adults tend to figuratively use words relating to life and to death in much the same way that young children animistically use these words; viz., to focus in on the embodiment, purposiveness, and activity of entities which stand out for them in the world. Secondly, it can be crosslinguistically observed that formal (and not so formal) ANIMACY distinctions in languages tend to distribute the entities of the world into just the same groups and hierarchies that children and adults form when they animistically assess the life status of the things around them. Section 3.2 examines alternate senses of life- and death-related expressions in English. Section 3.3 examines a crosslinguistic selection of ANIMACY governed phenomena. Section 3.4 presents a brief summary.

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3.2 Reflections of Animism in the Alternate Senses of Life- and Death-Related Words and Expressions

Crosslinguistically, the literal semantics of words referring to life and to death is always dominated by biology while the non-literal semantics of these words is substantially dominated by more animistic sensibilities. When used nonbiologically, these words express a more holistic appreciation for how life is phenomenologically constituted. Prominent among these holistic characterizations of life and death are allusions to the embodiment and the purposiveness and the activity of the entities that life- and death-related words are posed to describe. Put another way, embodiment, purposiveness, and activity can be said to be the principal semantic axes in terms of which words such as *alive* and *dead* are made meaningful outside of the biological sphere. Between languages, there is a good deal of variation in the extent to which life- and death-related words are used in a figurative fashion. English offers a very rich figurative lexicon, and will serve as a demonstration of semantic tendencies which are held to be general across languages. The English roots and derived forms referring to life and to death are presented below.

3.21 An English glossary

LIFE- AND DEATH-RELATED WORDS AND DERIVED FORMS

The senses of the words below are identified as biological, quasibiological and nonbiological. A biological sense is one which makes direct reference to biological life status. A quasibiological sense is one which cannot be understood apart from some reference to biological life status, but which does not refer directly to that status. For example, the quasibiological sense of the word *life* which means 'a specified portion of the time during which an entity is alive,' as in *Shakespeare's life in London*, is a reference to a period of time or a sequence of events rather than a reference to a biological life status, though to be sure one may only have a life in

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London if one is biologically alive. A nonbiological sense is one which is independent from biological facts altogether.

Life, n.

1. *(biological)* that property of plants and animals which makes it possible for them to take in food, get energy from it, grow, adapt themselves to their surroundings, and reproduce their own kind: it is the quality that distinguishes a living animal or plant from inorganic matter or a dead organism.

2. *(biological)* living things collectively: as, plant life; the life on earth.

3. *(biological)* a higher sentient living being: as, the plague did not spare a single life (cp. ! The weedkiller/fungicide did not spare a single life).

4. a. *(quasibiological)* a lifetime; the time during which an entity is alive (life in terms of its temporal duration): as, a dog's life passes quickly; the life of a maple tree; during one's life one faces many challenges; he was a joker all his life; he lived part of his life in Naples; with his generous trust, he was set for life; a life full of adversity.
b. *(quasibiological)* a specified portion of the time during which an entity is alive: as, Shakespeare's life in London; her life as a mother began at 32 years of age; he would never again know as much contentment as he had known in his early life.

5. *(nonbiological)* the time during which something exists, endures, lasts and, especially, flourishes or functions or is useful: as, fads have a short life; the life of a political alliance, like the life of a romance, can never be predicted; the life of a federal grant is often all too short; the life of a marriage can now be ended on short notice; the life of yesteryear's toasters exceeds the life of current models; the life of a storm system cannot be predicted algorithmically.

6. a. *(quasibiological)* the activities and interactions which occupy a living being (life in terms of its content): as, military life; political life; professional life; love life; life in Tsarist Russia; life in the company of adoring fans; life in the circus; life among the common folk; life with his uncle was never dull; life on the Western frontier; he led a wise life; she led a fast life; inspired by the lives of famous eccentrics.
b. *(quasibiological)* an account of these activities; a biography: as, his Life of Samuel Johnson is famous; a new life of Freud is available.

7. *(nonbiological)* vigor, liveliness, animation, vivacity, spontaneity, emotion; the source of vigor or liveliness: as, the party had plenty of life; there's not much life in a small town after dark; her jokes were the life of the party; freedom of speech is the life of democracy; *(in cricket)* that quality in a pitch which causes the ball to rise abruptly, unevenly, unpredictably.

lifeless, adj.
1. *(biological)* a. without life; specifically, inanimate or dead.
2. *(quasibiological; metonymic)* devoid of life or living beings or signs of life: as, lifeless mountaintop; lifeless streets; lifeless stretch of road.
3. *(quasibiological; hyperbolic)* unconscious or asleep: as, the lifeless form under the quilt.

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4. *(nonbiological)* dull; boring; listless; without emotion: as, lifeless decor of budget motels; lifeless prose; a lifeless conference; a lifeless gathering of condominium alcoholics; a lifeless smile.

lifelike, adj.

1. *(nonbiological)* closely resembling a real person, actual locale, etc.; accurately representing the conditions of life: as, a lifelike portrait; lifelike plastic fruit; lifelike doll; lifelike imitation leather; lifelike styrofoam rock; a superrealist painting in which everything is lifelike; lifelike stage set; a lifelike portrayal of early America.

lifer, n.

1. *(quasibiological; slang)* a person whose whole life has been or will be committed to a particular activity, job, etc.; especially, a person sentenced to imprisonment for life or a person committed to a lifetime in the military.

livelihood, n.[90]

1. *(quasibiological; only in connection with humans or, infrequently, human organizations)* means of living or of supporting life; subsistence: as, his livelihood as a lawyer is substantial; he gets his livelihood from crime; his livelihood depends on the strength of the stock market; the livelihood of the state is obtained by taxation; the club depends on dues for its livelihood.

Live, v.i.

1. *(biological)* to be alive; have life.

2. *(quasibiological; perhaps said only of sentient beings)* to dwell; to reside; to make a home; to habitually frequent; to habitually mingle with: as, they emigrated so that they might live in liberty; he lives alone; he lives with his uncle; he lives out of town; she lived a month in Rio; fish live in the sea; they live in bars and nightclubs; they live with riffraff; dogs will live with cats if they are raised together; *but,* % trees live in forests; % his comatose cousin lives in an institution.

3. *(quasibiological)* to subsist: as, he lives by his wits; he lives on only $800 a month; big fish live on little fish.

4. a. *(quasibiological)* to comport oneself in some fashion; to have a specified way of life or manner of living: as, to live wisely; they want to live fast and die young, like bacteria; to live like an animal; to live like a king; bears live like hermits during the winter; trees live like sentinels, immobile and staunch; live in poverty; living in this way, they are not happy but they survive; to live on the edge; to live for others; to live by one's principles.

b. *(quasibiological; quasitransitive, with life as an object)*: as, she lived a charitable life; she lived a life of ease; each of us lives a hundred lives at once; this is no life for an educated person to live; he desired only to live out his life in peace.

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[90]Etymological facts aside, it is very doubtful that *livelihood* is syncronically derived from *life* (or *lively*); however, it is equally doubtful that *livelihood* is regarded as unanalyzable. The modern speaker of English probably regards it as complex, but does not know *how* to analyze it. Given these qualifications, it is listed here as a form derived from *life*.

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5. *(nonbiological; emphatic; said only of sentient beings)* to revel in life; to experience life to the utmost; to enjoy a full and varied life; to have life that is worthy of the name: as, I want to really live; from the Disney film it is clear that otters truly know how to live; let's just live (for today) and forget about tomorrow; let's live a little; he had never lived until he went to Paris; he lived every day of his life; I don't call this living.

6. *(nonbiological)* to exist; to be in evidence: as, no charity lives in the heart of a despot; God's grace lives in the order of nature.

7. *(nonbiological)* to endure, last or escape obliteration: as, the shirt didn't live past the third washing; the powerless monarchy was not expected to live another five years; the image of it lives in my memory still; his memory lives in her heart.

8. *(nonbiological)* to continue to function or flourish, or exert influence or force: as, the ideas of Jefferson still live; evil deeds live after evildoers; it looks like my vintage Cadillac is going to live forever.

Live, v.t.

1. *(quasibiological)* to practice, express, instantiate, make actual or real or carry out in the course of one's life the principles of: as, the cleric lived Christianity six days a week, and lived a lie but one; to live poetry, indeed, is always better than to write it (Blackie).

liveable, adj.
1. *(quasibiological)* fit or pleasant to live in; habitable: said of a house, room, etc.
2. *(quasibiological)* that can be lived through; within the limits of what can be borne; endurable; tolerable: as, this is just not a liveable arrangement any longer; her homelife is barely liveable.

living, adj.
1. *(biological)* alive; having life.
2. *(quasibiological; metonymic)* having life in it: as living ocean; living desert; living mountaintop; living tidepool.
3. *(nonbiological)* extant, actualized, or actually ongoing: as, living proof; living legend; living hell.
4. *(nonbiological)* vigorous; flourishing; in use; influential: as, living faith.
5. *(nonbiological)* in its native condition and site: as, living stone.

living, n.
1. *(biological; quasibiological)* the fact or state of being alive; dwelling; subsisting, etc.
2. *(quasibiological)* the means of sustaining life; livelihood: as, he must work for a living.

liver, n.
1. *(quasibiological)* one who lives (in a specified way): as, a plain liver; a lover of fiction and a liver of lies.

relive, v.t.
1. *(quasibiological)* to live through again: as, the prospect of having to relive his crossexamination made him pray that there would not be a repetition of the trial.

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2. *(quasibiological)* to remember or re-experience a previous event: as, relive a childhood experience; (collectively) relive old times; relive the moment of the crash; in therapy, he believed that he had relived his birth.

Alive, adj.

1. *(biological)* having life; not dead; in the living state.

2. *(quasibiological; metonymic)* having life in it: as, it is now within the power of industrial nations to determine how long our oceans remain alive.

3. *(nonbiological)* in existence; in evidence: as, no one can say whether the UN will be alive in 100 years.

4. *(nonbiological)* operative, influential, flourishing or functioning well: as, the Puritan work ethic is still alive in America.

5. *(nonbiological)* lively; activated; vibrant; invigorated: as, he felt more alive after the tennis match; the antique dealers conference was more alive than he had expected it to be.

Live, adj.

1. *(biological)* having life; not dead; in the living state.

2. *(quasibiological; metonymic)* containing life: as, live stream.

3. *(nonbiological)* in the flesh; physically real rather than recorded; produced on the spot (and hence, potentially, unrehearsed and spontaneous): as, live models; live appearance; live music; live demonstration; live entertainment; live performance; live broadcast; (coming to you) live from New York; live account; *(in film or TV)* live action sequence; live footage.

4. a. *(nonbiological)* operational, activated; hooked up; hence, purposively engaged: as, live phone line; live microphone; live circuit; live wire (i.e., a wire connected to a source of electrical potential); live issue; live ball; live wire (i.e., a go-getter).
b. *(nonbiological)* energized, charged up or ready to be purposively deployed: as, live battery; live coals; live steam; live match; live ordinance; live ammo; live rounds; live bomb; live type (i.e., type set up and ready to be printed).

5. a. *(nonbiological)* vibrant, reverberant; zestful, lively: as, live party; live atmosphere; live colors; the live sound of an acoustically live room.
b. *(nonbiological; esp. in mechanics & engineering)* moving; imparting motion or power: as, live axle; live center; live pulley; live load.
c. *(nonbiological)* in its native state; unconstrained or uncontained; loose; spontaneously changing: as live stone (i.e., unquarried rock); live sparks; *(in engineering)* live load (i.e., the varying load imposed on a structure by its being put to use).

lively, adj.
1. *(nonbiological)* active, full of life, full of spirit, or vigorous: as, a lively eighty-year-old; exciting or animated: as, a lively session of the council; moving quickly and lightly: as, a lively dance; brisk: as, a lively breeze; vivid or intense: as, lively colors.

lively, adv.
1. *(nonbiological)* in a lively manner.

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livelily, adv.
1. *(nonbiological)* in a lively manner.

liveliness, n.
1. *(nonbiological)* the quality or condition of being lively.

liven, v.t. & v.i.
1. *(nonbiological; typically with up)* to make or become more animated or lively: as, he wondered whether this soiree of wax figures would ever liven; the conversation livened up when they began talking about soccer.

enliven, v.t.
1. *(nonbiological)* to make more animated or lively: as, Al liked to enliven picnics by pretending to have food poisoning.

Death, n.

1. *(biological)* the act or fact of dying (i.e., being at the point of death or being about to die); permanent cessation of life in an animal or plant: as, death is a certainty; her cousin's death continued to grieve her; his death came at 12:01; there was much death at Little Big Horn; before the execution, an atmosphere of death hung over the entire community; signs of death were found at the altar.

2. *(quasibiological; metonymic)* the death of living entities in a place: as, the death of a river or lake need not be permanent.

3. *(nonbiological)* any ending, cessation, or passage into nonexistence: as, the death of Imperial Japan; the near death of the American steel industry; the death of progress in civil rights.

4. *(biological)* the state of being dead: as, death follows life.

5. *(quasibiological; metonymic)* bloodshed; corpses: as, across the battlefield there was death as far as the eye could see; to look like death warmed over.

6. *(quasibiological)* the cause of death: as, the atom bomb was death to thousands; it would be death to be caught while escaping.

7. *(nonbiological)* the cause of any ending, cessation, passage into nonexistence, or failure: as, economic mismanagement was the death of Russian communism; pride will be the death of him yet.

8. *(nonbiological)* any condition or experience thought of as being like dying or death in that it can hardly be survived or endured: as, it was just death for her to revisit the scene of the tragedy.

deathless, adj.
1. a. *(nonbiological; very limited distribution)* everlasting: as, the deathless greed of capitalists.
b. *(nonbiological; very limited distribution)* ever relevant and admirable: as, the deathless words of Lincoln.

deathlike, adj.
1. *(nonbiological)* like, or as in, death: as, deathlike quiet; deathlike paleness; deathlike lethargy.

deathly, adj.

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1. *(quasibiological; very limited usage)* causing death; deadly; fatal: as, a deathly illness for which no remedy is known; the deathly gush of blood could not be stopped.
2. *(nonbiological)* like or characteristic of death: as, the deathly pallor of the bespectacled clerk; the deathly cold of January; the deathly stiff leather was beyond restoration; the deathly quiet of the nunnery.

deathly, adv.
1. *(quasibiological; very limited usage)* liable to cause death: as, deathly ill.
2. *(nonbiological)* like or characteristic of death: as, it was deathly cold in those stony lanes (C. F. Woolson).
3. *(nonbiological)* to an extreme degree: as, deathly serious; deathly afraid of heights.

Die, v.i.

1. *(biological)* to cease to be alive: as, to die from a heart attack.

2. *(biological)* to undergo the process by which life comes to an end: as, to die slowly.

3. *(quasibiological; metonymic)* for the life in a place to die: as, our oceans are dying; this trout stream died as a result of pollution.

4. *(nonbiological)* to cease to exist; to diminish or fade away; to pass out of memory: as, after his son's drowning, the gentleness inside him died; his knowledge of the conspiracy died with him; his affection for her died over the course of their vacation together; when she caught sight of the knife in his hand, her words died on her lips; his smile died as soon as she turned away; the sound of the church bells died in the distance; we will speak of it once, and then let the issue die; the motion died for lack of a second.

5. a. *(nonbiological)* to cease to function or to operate or be used: as, their marriage slowly died; his car died in the center lane; many languages which have died are preserved in written records.
b. *(nonbiological)* to cease to influence or exert force: as, one theory dies and is replaced by another.

6. *(nonbiological)* to diminish in activity; to come to a stop: as, the wind died as soon as we had unraveled our kite string; the baseball rolled up to him and died at his feet.

7. a. *(nonbiological)* to fail to overcome some challenge or obstacle; to come up against one's limits: as, he died on the final exam; the waves died against the breakwater.
b. *(nonbiological)* to be overwhelmed by some emotion, by some mental state, or by physical sensations: as he just died when he met the President; she was dying of remorse.

dying, adj.
1. *(biological)* at the point of death; about to die.
2. *(quasibiological; metonymic)* where the living entities in a place are dying: as, in spite of recent clean up efforts, it remains a dying river.
3. a. *(nonbiological)* drawing to a close; about to end: as, the dying days of the century.
b. *(nonbiological)* fading away; ceasing to exist: as, a dying social order; dying footsteps; a dying glacier.

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4. *(nonbiological)* ceasing to operate or function; ceasing to influence or exert force: as, a dying water heater; a dying bureaucracy which grows ever larger and less effective; a dying issue; a dying tradition.
5. *(nonbiological)* ceasing activity or motion: as, dying winds.

dying, n.
1. *(biological & nonbiological)* the act or process of dying.

undying, adj.
1. *(nonbiological; limited distribution)* unending; everlasting; eternal: as, the undying wheel of karma.
2. *(nonbiological; limited distribution, requiring reference to a mental state; hyperbolic)* steadfast or persistent: as, his undying patriotism; his undying love; undying devotion; his undying fascination with the Civil War.

Dead, adj. & adv.

1. *(biological)* no longer living.

2. *(quasibiological; metonymic)* devoid of living entities: as, while Death Valley is a living desert, the Dead Sea is a dead sea.

3. a. *(nonbiological; hyperbolic)* as if dead; numb or insensate: as, the dentist will not drill until your tooth is dead; he was passed out dead on the floor.

4. *(nonbiological)* no longer in existence: as, a dead civilization; a dead bank account; her love for him is dead.

5. a. *(nonbiological)* no longer used or usable; no longer operational, hooked up, or purposively engaged: as, dead language; dead laws; dead phone line; dead microphone; dead wire; dead circuit; dead issue; dead ball.
b. *(nonbiological)* discharged; expended; exhausted: as, dead steam; dead battery; dead coals; dead match; dead type (i.e., type already printed and ready to be disassembled and melted down for re-use).

6. a. *(nonbiological)* not vibrant, not reverberant; dulled, dull; lacking zest, not lively: as, dead colors; the dead sound of an acoustically dead room; dead clanking of muffled bells; dead tennis ball; dead atmosphere; dead party; business is dead this time of year.
b. *(nonbiological; hyperbolic)* disinvigorated; unresponsive; without spontaneity or emotion: as, feeling dead; dead smile; dead performance; advice consisting of dead words.
c. *(nonbiological; esp. in mechanics & engineering)* not moving or imparting motion or power: as, still dead waters of an inland sea; dead air space; dead load; a dead pulley; a dead axle.

7. a. *(nonbiological)* to an extreme degree; absolutely; complete: as, dead tired; dead broke; dead drunk; dead loss; dead wrong; dead right; dead level; dead even; dead calm; dead run; dead stop; dead silence; dead quiet; dead serious; dead set; dead sure.
b. *(nonbiological)* exact: as, dead center; dead level; dead even; dead heat; dead shot; iron bars cut to a dead length; dead ahead; dead astern; dead on course; dead on target; dead on; dead ringer.

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deaden, v.t. & v.i.

1. *(quasibiological)* v.t., to make as if dead; to make numb, less sensitive, or insensate: as, to deaden a tooth with novacaine; his ability to react had been deadened by alcohol.
2. *(nonbiological)* v.t., to lessen the vigor or intensity of; to diminish; to dull: as, the boss' presence had the effect of deadening discussion among the workers; to deaden vibrations; to deaden noise; to deaden the overbright colors of a painting.
3. *(nonbiological)* v.i., to lose vigor, intensity, vibrancy, responsiveness, etc.: as, his eyes deadened as he lost consciousness; the colors deadened as they dried; he felt the wheel deaden as the front tires began to drift.

deadening, n.

1. *(quasibiological; nonbiological)* the act of making less sensitive or intense.
2. *(nonbiological)* the material used to make rooms soundproof.
3. *(nonbiological)* material used to take off gloss.

deadly, adj. & adv.

1. *(quasibiological)* tending or liable to cause death; fatal: as, deadly poisonous; deadly disease.
2. *(quasibiological)* to the point of death: as, locked in deadly combat.
3. *(nonbiological)* seemingly or actually insurmountable; that cannot be gotten beyond: as, deadly interview; deadly college entrance exam.
4. *(nonbiological)* unbearable: as, deadly dinner party.
5. *(nonbiological)* to an extreme degree: as, deadly earnest.

With the exception of *live*, v.t., all of the life- and death-related roots have biological senses, and are conceived of as basically biological predicates, even though these roots also have very common nonbiological senses. Among the derived forms, several entries have only nonbiological or quasibiological senses: *(en)liven, lively, undying, deathless, deaden, lifelike, deathlike.*

It should already be evident from this unexplicated overview of the basic life- and death-related vocabulary of English that the nonbiological senses of these words tend for the most part to cohere around notions of embodiment, purposiveness, and activity, as these have been defined in the previous chapter. In order to make this more plain, the following sections will present the senses of these words — and also a number of collocations, idioms and compounds involving these words — which relate to the conceptualization of life and death as biological statuses (§3.221 & 3.231), as embodiment (§3.222 & 3.232), as purposive activity (§3.223 & 3.233), and as horizonal boundaries or limits (§3.224 & 3.234).

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The intention here is to present a balanced view of the ways in which words related to life and to death are used in English. Certainly, it would be possible to discuss just a selection of the usages which best make the case that EPA considerations underlie the nonbiological applications of words such as *alive* and *dead*. In fact, it is common practice in linguistics to argue for semantic hypotheses in just this way, by presenting just the data which supports the hypotheses at issue, even though no other social science is allowed this kind of latitude in manipulating the research sample. What is missed, therefore, in many linguistic presentations is a feeling for the scale of the semantic phenomena being discussed. In the present connection, it would hardly be worthwhile to argue that *some* nonbiological uses of life- and death-related words are spurred by EPA considerations: it is only really of interest if *a sizeable proportion of all* of the nonbiological uses of life- and death-related words are so spurred, and if the absolute number of these nonbiological uses is sizeable relative to the absolute number of biological uses. Only if this appears to be the case can it be reasonably argued that the animistic sensibilities of childhood are preserved in the adult in sufficient force to give rise to conventionalized expressions of animism in language.

The question of how lexical samples are to be constituted has always been a methodological embarassment to linguistics, a field which is virtually without any scientific or impartial means of lexical data selection. The lexical sample presented here is no exception, consisting of more or less all of the idiomatic expressions which come to mind, and more or less all of the life- and death-related entries which have previously come to the mind of lexicographers, and hence been entered into dictionaries. What saves this kind of a sample from methodological ridicule is that it is reasonably large, and that it is constructed in good faith insofar as it includes data which both supports and fails to support the hypothesis

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that EPA considerations underlie a sizeable proportion of the nonbiological uses of life- and death-related words.[91]

In the presentation below, an asterisk (*) will follow a collocation, idiom or compound if other senses are discussed in different subsections of the text.

3.22 The English lexicon in reference to life

3.221 Life as a biological status

Life is represented as a biological status in the most basic senses of the life-related lexicon of English, and in a large number of collocations, idioms, and compounds. The lexical entries presented below emphasize the lexically basal nature of the biological characterization of life and, collectively, represent the way in which life-related words are used when they are not advanced figuratively in areas outside of the biological domain.

Relevant roots and derived forms:

life, n.

1. *(biological)* that property of plants and animals which makes it possible for them to take in food, get energy from it, grow, adapt themselves to their surroundings, and reproduce their own kind: it is the quality that distinguishes a living animal or plant from inorganic matter or a dead organism.

---

[91]It should be noted though that there has been a systematic exclusion of lexical entries whose only sense is acquired from religious doctrine. These include:

future lives; past lives
this life (as opposed to the future life said to follow death and redemption)
afterlife; eternal life; life everlasting; the future life
living bread; living flesh
the second death (the punishment or destruction of lost souls after biological death)
(seven) deadly sins

The really remarkable thing about these exclusions is that they are so few. One might have expected that the influence of specific religious thought systems on the conceptualization and representation of life would have been much greater.

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2. *(biological)* living things collectively.

plant life
the life on earth
teeming with life

3. *(biological)* a higher sentient living being

The plague did not spare a single life.
The %antkiller / !weedkiller / !fungicide did not spare a single life.

lifeless, adj.

1. *(biological)* a. without life; specifically, inanimate or dead.

2. *(quasibiological; metonymic)* devoid of life or living beings or signs of life.

a lifeless mountaintop
lifeless streets
a lifeless stretch of road.

live, v.i.

1. *(biological)* to be alive; have life.

living, adj.

1. *(biological)* alive; having life.

2. *(quasibiological; metonymic)* having life in it.

living ocean
living desert
living tidepool

alive, adj.

1. *(biological)* having life; not dead; in the living state.

2. *(quasibiological; metonymic)* having life in it.

Industrial pollution may determine how long our oceans remain alive.

live, adj.

1. *(biological)* having life; not dead; in the living state.

2. *(quasibiological; metonymic)* containing life.

live stream
live lake
live nest

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Relevant collocations and idioms:

the living

1. those who are alive, collectively.

One should weep for the living, yet one weeps for the dead.

the land of the living*

1. where people are alive rather than dead.

She had not heard from him for years, and did not even know if he was still in the land of the living.

to begin (one's) life; for (one's) life to begin; to be the beginning of life, etc.*

1. to be born.

He began life in Augsburg; his family later moved to Frankfurt.

to come alive; (CAUSATIVE) to bring alive*

1. to become biologically alive.

It was said that the rocks the alien walked on later came alive.
How convenient it would be if vacuum cleaners were to come alive.

to come to life; (CAUSATIVE) to bring to life*

1. to magically or miraculously become biologically alive.

It was said that the shaman had the power to bring arrows to life.
The standard way to bring a Frankenstein to life is with electrical stimulation.
He was sure he was too high when the beer cans began to come to life.

to give life to X*

1. *(infrequently)* to give birth to.

She gave life to nine children.

to be alive and kicking*

1. to be in good health or fine fettle; to be energetic or, esp., revived.

He is eighty years old, but he is still alive and kicking.
She didn't look too good after surgery, but now she's alive and kicking.

within living memory

1. not so long ago as to be beyond the reach of the memory of living people.

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It is amazing that so many parents fail to secure vaccinations for their children when such terrible polio epidemics are still within living memory.

to take one's life into one's (own) hands*

1. to risk one's life or put one's life in peril.

It is really taking one's life into one's hands to go walking around Guayaquil after sunset.
He took his life into his hands when he attempted a free ascent on the treacherous south face.

a matter of life and/or death

1. a matter on which the life of some person(s) depends.

The ambulance service was assured that it was a matter of life or death.

for someone's life to hang in the balance

1. for whether someone dies or not to depend on something else.

While her life hung in the balance, he did everything he could to accumulate the kidnappers' ransom.

for dear life

1. to, or as if to, save one's life.

His horse began to gallop and he had to hang on for dear life.
When a farm boy hits Times Square, he better hang on for dear life.

to save someone's life*

1. to rescue someone from dying.

I'd like you to meet the lifeguard who saved my life when I almost drowned.
Doctors ought not to get puffed up about being in the business of saving lives.

to keep X alive*

1. to sustain the life of X.

The paramedics kept her alive until they reached the hospital.
He planned to keep his goat alive on a diet of weeds.

to breathe life back into someone

1. to resuscitate via artifical respiration.

Before the paramedics even arrived, he had breathed life back into the nearly drowned infant.

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to come back to life; (causative) to bring back to life*

1. to begin biologically living again; to be resurrected; to return to life; to return from the dead.

He could not help but superstitiously fear that the corpse would come back to life.
Anyone knows that a good jolt of lightning will bring a monster back to life.
She explained that ghosts were folks who sort of had come back to life.

2. to revive or be resuscitated.

They could only hope that he would come back to life when the paramedics arrived.
Artificial respiration brought him back to life.

to get a new lease on life*

1. to secure a probable extension of one's lifetime.

The artificial heart gave him a new lease on life.
Quitting smoking would give you a new lease on life.

to live on borrowed time

1. to live past the point where death might reasonably be expected; hence, a reference to the sense that the 'account' of time reasonably allotted to one has been overdrawn (and so might be 'closed' at any time); to cheat Death.

Though his kidney transplant was successful, he felt that he was only living on borrowed time, and that he might die at any moment.
Considering all the risks he has taken over the years, you might say that he has lived on borrowed time since he was about sixteen.

to cling to life

1. to resist death.

Though he was in great pain, he clung to life until the end.

a spark of life*

1. sufficient biological activity in an individual to constitute a possibility of that individual's reviving.

The doctor continued to perform heart massage until he was quite sure that there was not a spark of life left in him.

to lose one's life

1. to die.

His father lost his life in the war.
They lost their lives in a boating accident.

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to take someone's life; to take a life; to take the life of a X, etc.

1. to kill.

It never occurred to him to take her life until he read that whodunit.

to take one's own life

1. to commit suicide.

It was a summer of great ennui: should he take a siesta or take his own life?

to end (one's) life; for (one's) life to end; to be the end of life, etc.*

1. to die.

His debauched life ended in the merry, merry month of May.
Jarry ended his life stinking of ether; and de Maupassant, of excrement.

to come back to life; (causative) to bring back to life*

1. to begin biologically living again; to be resurrected; to return to life; to return from the dead.

He could not help but superstitiously fear that the corpse would come back to life.
Anyone knows that a good jolt of lightning will bring a monster back to life.
She explained that ghosts were folks who sort of had come back to life.

2. to revive or be resuscitated.

They could only hope that he would come back to life when the paramedics arrived.
Artificial respiration brought him back to life.

Relevant compounds:

life-and-death; life-or-death 1. of the gravest importance; upon which life depends.

life belt 1. a belt for restraint or attachment as a precaution against fatal accidents.

lifeblood* 1. the blood necessary for life.

lifeboat
1. a boat kept on shore for use in rescuing drowners.
2. any boat kept on board ship for the purpose of surviving ship sinkings or rescuing persons in the water.

life buoy 1. a life preserver.

life force
1. vital energy; the internal force which is said to make one alive.

life form 1. any kind of living thing.

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life-giver 1. a life-giving person or thing.

life giving*, adj. 1. that gives or can give life: as, a life giving antidote.

lifeguard 1. a person assigned to watch against accidents to bathers (at a beach resort, etc.).

life instinct 1. the instinct for self-preservation and reproduction; Eros.

life insurance 1. insurance which pays a benefit to the survivors of one who has died.

life jacket 1. a bouyant sleeveless garment to keep people afloat and prevent drowning.

life mask/death mask 1. a cast, usually in plaster or wax, of the face of a living/dead person which shows how the person looked when alive/dead.

lifeline* 1. *(naval)* a line secured along the deck to lay hold of in heavy weather; any line attached to a life boat or life raft to assist people in the water; other lines associated with assisting personnel or with hoisting or lowering lifeboats.

life net 1. A net designed to catch people who might otherwise fall to their death.

life preserver 1. a bouyancy device to keep an individual afloat and prevent drowning. It may be constructed as a jacket, ring, knapsack, belt, yoke, or vest.

life raft 1. a raft to preserve the life of survivors of ship sinkings.

lifesaver*
1. a person assigned to watch against accidents to bathers (at a beach resort, etc).
2. something that may save one's life (e.g., an antibiotic).

life science 1. any of the sciences which deal with living organisms (zoology, botany, etc.); such sciences collectively.

life sentence 1. a sentence to be imprisoned for the duration of one's life.

life signs 1. *(in medicine)* pulse, blood pressure, and other indications of the presence of biological life.

life-support 1. applied to equipment designed to make possible the continued normal functioning of the body in hostile or dangerous environments.

live bait 1. in fishing or trapping, the use of something living as bait rather than the use of fish eggs, lures, human food, pheromones, etc.

live-bearer 1. an ovoviviparous fish, as a guppy.

live birth 1. a birth which results in live offspring.

live cannibalism 1. cannibalism involving live victims.

livestock 1. domestic animals used on a farm or raised for profit.

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live weight 1. the weight of an animal before it is slaughtered and prepared as a carcass.

living death* 1. a kind of death that one endures while one is yet alive; death made 'real and present'; a life of unrelieved misery; a state of misery not deserving the name of life; death-in-life; living hell.

living fossil 1. a life form that has survived the extinction of others of its group (e.g., ceolacanth).

living hell* 1. a kind of hell that one endures while one is yet alive; hell made real and present; a life of unrelieved misery; living death.

living will 1. *(in law)* a document which stipulates an individual's desire that his life not be prolonged by artificial means in the event that he enters into a vegetative state with little chance of recovery; hence, an expression of an individual's last requests which takes effect while the person is still alive.

The entries above all represent life as a biological status. However, they additionally provide an oblique, not entirely biological commentary on how life is normally conceptualized. One may observe from these entries:

that life is conducted under social conditions (e.g., *the living*; *the land of the living*; *within living memory*);

that life begins and ends (e.g., *to begin life*; *to end life*; *to come alive*; *to come to life*);

that the actions of others may give life or take it away (e.g., *to give life to X*; *to take a life*; *to breathe life back into someone*; *to save someone's life*; *life giving*; *lifesaver*);

that life may be at risk (e.g., *to take one's life into one's hands*; *for someone's life to hang in the balance*);

that dying can be postponed (e.g., *to cling to life*; *to live on borrowed time*; *to get a new lease on life*);

and that death may not be final (e.g., *to come back to life*).

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It would not be correct to say that lexical entries such as these demonstrated animistic sensibilities per se; however, they do represent the kind of holistic regard for living that is central to the animistic outlook. It is striking that so many entries which are primarily directed toward life as a biological status already bring into issue facts of life which are beyond the direct purview of biological science.

3.222 Life as embodiment

In the previous chapter it has been posited that our understanding of ourselves as embodied beings includes an understanding of ourselves as being physically real, as being three-dimensional, as being solid and of definite form, as being spatially located and oriented, as being composed of functional parts of natural tissue designed for action and interaction, as being whole, and as being temporally enduring. We have demonstrated that children and adults often adduce these characteristics of embodiment when they offer rationales for animistic judgments of life status. Corresponding to these embodiment-based judgments of life status, we find that various quasibiological and nonbiological references to life and death elaborate on embodiment themes. In particular, we find that life is represented in terms of its temporal extension, in terms of its simply being real or physicalized, in terms of its having a form, and in terms of its occupying a spatial location. When speaking figuratively, as when speaking animistically, it may well be enough for an entity to be temporally extended, physically real, etc. for it to be regarded as being 'alive.'

3.2221 Being temporal

Corresponding to statements such as that the wind is alive because it has a beginning, a duration, and then an end, or calm (DelVal, 1975:267), we observe in quasibiological and nonbiological references to life that life is represented as being temporally extended from a beginning to an end, and internally divisible into phases

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which are defined maturationally (e.g., her early life) or in terms of activities (e.g., his life as a daddy). We see here a close association between the conceptualization of life in terms of its temporal extension and the conceptualization of life in terms of the activities which one undertakes over time. In these usages, therefore, we begin to see more plainly the relevance of animism to the nonbiological uses of words related to life.

Relevant roots:

life, n.

4. a. *(quasibiological)* a lifetime; the time during which an entity is alive.

A dog's life passes quickly.
During one's life one faces many challenges.
He was a joker all his life.
He lived part of his life in Naples.
With his generous trust, he was set for life.
a life full of adversity
the life of a maple tree

b. *(quasibiological)* a specified portion of the time during which an entity is alive

Shakespeare's life in London
Her life as a mother began at 32 years of age.
He would never again know as much contentment as he had known in his early life.

5. *(nonbiological)* the time during which something exists, endures, lasts and, especially, flourishes or functions or is useful.

Fads have a short life.
The life of a political alliance, like the life of a romance, can never be predicted.
The life of a federal grant is often all too short.
The life of a marriage can now be ended on short notice.
The life of yesteryear's toasters exceeds the life of current models.
The life of a storm system cannot be predicted algorithmically.
The Roman Empire had a long life.
The life of a good car is now about 150,000 miles.

live, v.i.

7. *(nonbiological)* to endure, last, survive, or escape obliteration.

Despite the medication, the pain still lives in my joints.
Though the Western affiliates are in chaos, the national TV network still lives.
The shirt didn't live past the third washing.
The powerless monarchy was not expected to live another five years.
The image of it lives in my memory still.

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Relevant collocations and idioms:

keep X alive*

1. to maintain, preserve, or perpetuate X so that X endures.

He kept the thought of her alive by surrounding himself with her drawings.
It is good for young people to keep good traditions alive.
The Red Guard was founded to keep revolutionary spirit alive.

to live on*

1. to remain biologically alive (usually, past some temporal landmark).

After his accident, he lived on for another two months.
It has been said in reference to the 1960's that the picnic is now over, but the ants live on.
I would rather die than live on in that manner.

2. to endure; to continue to exist; to remain.

By July 5, the campers are gone but their litter lives on.
God may be dead, but gravity lives on.
We may have been defeated here, but hope for a final victory lives on.

to live out X*

1. to live until the end of X.

He had hoped to live out his life in the country, but a heart attack took him on the assembly line.
I never thought she would live out the night.

2. to last through X; to endure X.

She was not sure she could live out the two days before her dentist could fill her tooth.
It was not certain the ship would live out the storm.

X functions here as a time expression. *The storm* or *his life* represent the period of time through which the storm or his life continues.

to live through X*

1. to experience and survive X.

Some who lived through the war found that they were then afraid of nothing — a result, not of acquired courage, but of total fatigue.
Against all odds, they had lived through the typhoon of the decade.

for life

1. for the duration of one's life.

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Many do not nowadays regard marriage as a commitment for life.
When he received his inheritance, he was set for life.

all one's life; any of one's life; part of one's life; some of one's life; half of one's life; the better part of one's life, etc.

1. all, references to a portion of one's lifetime.

He worked all of his life as a hardware salesman.
She spent part of her life in the South.
He spent the better part of his life in psychoanalysis.

one's new life; one's old life; one's past life, etc.

1. references to the current phase or some previous phase of one's lifetime.

His new life as a daddy is leaving him quite short on sleep.
His old life as a bank robber was behind him now.
As she signed the contract with Doubleday, her past life as a rural schoolteacher seemed a million miles and a million years away.

to begin (one's) life; for (one's) life to begin; to be the beginning of life, etc.*

2. to embark on a new phase of life; to refurbish one's life.

In Topeka, he began his life as an insurance man.
After his release from prison, he threw away his address book and began life entirely anew.

to end (one's) life; for (one's) life to end; to be the end of life, etc.*

2. to terminate a phase of life.

His life as a single man ended shortly after he met Mary.
His life of crime ended when he found religion.
That life ended and she began another.

to have all of one's life ahead of one

1. to be young; to have lots of potential, possibilities, and options.

At twenty-one, you have all of your life ahead of you.
He could always count on his grandfather to assure him that he was still young, and that he had all of his life ahead of him.

This is a very interesting expression in that it suggests quite pointedly that what counts in life are the projects that one begins to undertake as a fullfledged adult. One's childhood and apprentice adulthood can be exhausted, and yet it may still be said that one has all one's life ahead.

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for one's life (in some area) to be behind one

1. to grow old; for one to no longer be active or productive (in some area).

At eighty, he had to admit that most of his life was behind him.
At twenty-five, his life as a competitive skateboarder was behind him.

Relevant compounds:

life annuity 1. an annuity received until one dies.

life cycle 1. that course of human, cultural, etc. existence from birth or beginning through development and productivity to decay and death or ending.

life expectancy 1. the length of time which one may reasonably expect to live, taking into account various factors of one's life.

life history
1. the history of the changes undergone by an organism in development from the egg, spore, etc. to its death as an adult.
2. one series of such changes.

life interest 1. interest (in property) that is payable to a person during his lifetime but cannot be passed on by him to another or others at his death.

lifeline* 1. a line in the palm which represents the length of one's life.

lifelong
1. lasting for the duration of one's life: as, it is a lifelong task to minister to the poor.
2. having lasted for as long as one has lived: as, it is his lifelong dream to go to the South Pole.

life member 1. a person entitled to be a member of an organization for the duration of his lifetime.

life savings 1. the monetary savings which an individual has accumulated in his lifetime.

life sentence 1. a sentence to be imprisoned for the duration of one's life.

life span 1. the length of time that an individual is alive or may be expected to be alive.

lifetime
1. n., the time during which an individual is alive.
2. adj., lasting for a lifetime: as, a lifetime job.

lifetime guarantee 1. a guarantee that is in force for the lifetime of the owner of the merchandise.

-lived 1. having life, a life, or lives, as specified: as, a many-lived cat; a short-lived New Year's resolution; a long-lived feud.

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outlive 1. to live or last longer than: as, he outlived his wife by two years; our Ford has already outlived our old Chevy, and it's still going strong.

3.2222 Being real, actualized or physicalized

Corresponding to statements such as that monsters are not alive (Carey, 1985a:31), or that trees are alive because one sees them (Carey, 1985a:30), we observe the use of a life-related lexicon to refer to entities which are physically real, physically actualized, physically instantiated, or otherwise in evidence, extant, or present to hand.

Relevant roots and derived forms:

live, v.i.

6. *(nonbiological)* to exist; to be in evidence.

Didn't democracy live first in Iceland?
Economic injustice continues to live in every country with landlords.
The earth will outlive us all.
No charity lives in the heart of a despot.
God's grace lives in the order of nature.

live, v.t.

1. *(quasibiological)* to practice, express, instantiate, make actual or real or carry out in the course of one's life the principles of.

The cleric lived Christianity a full six days a week, and lived a lie but one.
To live poetry, indeed, is always better than to write it (Blackie).

living, adj.

3. *(nonbiological)* extant, actualized, or actually ongoing.

My boss, the Marquis de Sade, makes my job a living hell.
That Bob is a living doll.
The number of angels that could climb on board the head of a pin is not a living issue in the modern mind.
The potholes in Berkeley are a living monument to the City Council's disdain for autos.
The ascending crime rate is living proof of the decline of virtue and godliness.
Muhammed Ali is a living legend in the boxing world.
She is the living image of Aunt Sally.

alive, adj.

3. *(nonbiological)* in existence; in evidence.

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No one can say whether the UN will be alive in 100 years.
Democracy is alive and well in Europe.
Sooner or later, everything is reduced to heat energy, so that only heat escapes the characterization: 'Alive today; gone tomorrow.'
The Russian fear of invasion has remained alive to this day.

live, adj.

3. *(nonbiological)* in the flesh; physically real rather than recorded.

live models
live appearance
live music
live demonstration
live entertainment
live performance
live broadcast
live report
live account
(in film or TV) live footage
(in film or TV) live action (as opposed to animation, graphics, etc.)
living picture (i.e., a tableau vivant)

Relevant collocations and idioms:

as big as life*

1. to be physically and proximally present, 'in the flesh.'

Guess what? I was reading on Carmel beach and, when I looked up from my book, there was Clint Eastwood, as big as life!
I was looking for the Mona Lisa in the Louvre. I turned a corner, and there it was, as big as life!

from life

1. using real life experience as a reference; using a real model, esp. a living model.

Though Burroughs writes from life, his novels cannot be used as evidence against him in a court of law.
In the life class they drew nudes from life.

to be true to life

1. to correspond to what happens or exists in real life; to be true to reality; esp. for a representation to accurately resemble its real model.

They argued over whether tragedy or comedy was more true to life.
The account in the newspaper was riveting, but it was filled with exaggerations, and hardly true to life.
Chardin painted people who were true to life, and plums that were not.

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to be larger/bigger than life

1. when one's reputation or image becomes overblown or unrealistically inflated, and hence does not correspond to actual facts; to be made out to be heroic.

Now they have made her out to be bigger than life, but I knew her when she hiccupped and stuttered.
He was about as dangerous-dashing as that larger than life character, James Bond.

for someone to be the living image of X*

1. for an individual to strikingly exemplify a specified quality or type of person.

She's the living image of youth gone wild.
He's the living image of an Ivy League lawyer.

to know (or realize, etc.) that someone is alive

1. *(most often used in negative expressions)* to know that someone exists; to take special notice of a person; especially, for a person to realize that another person is romantically interested in him/her.

He had a crush on her for years, but she didn't even know he was alive.
I worked like crazy at IBM, but management didn't even know I was alive.
When I blew up the lab, they finally realized I was alive.
The literary world was just realizing that Corso was alive about the time he committed suicide.

The collocations and idioms above associate life with being physically real and having a definite form. The collocations and idioms below associate life with the actualization of purposive intentions, representing an amalgamation of E and P sensitivities.

to come to life; (CAUSATIVE) to bring to life*

1. to instantiate; to make actual; to make real.

R. Buckminster Fuller brought his dymaxion technoethos to life by introducing various dymaxion artifacts: a dymaxion car, a prefab dymaxion house, a dymaxion map...
Good Shakespearean actors can bring Elizabethan times to life.
When the Peruvian Indian appeared, she thought that her dream had come to life.

to give life to X*

1. to instantiate; to make real or to make happen; to give form to X.

His drawings of the sculpture were given life first in styrofoam and then in bronze.
He thereafter tried to comport himself in a way that would give life to his vision of a compassionate utopia.
Bosch's paintings gave life to apalling thoughts and situations.
His words gave life to truths which the audience had somehow known and yet not recognized before.

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to live out X*

3. to instantiate; to realize through one's own actions.

He moved to Montana to buy some ranch land and live out his dream of a Western life.
The TV ad invited her to live out her vacation fantasies by waving, not a magic wand, but a national credit card.

to live up to X*

1. to live or act in accordance with X (one's reputation, image, etc.); to actualize X by one's behavior.

Seeking to live up to his image as a crime fighter by actually making an arrest (his first), J. Edgar Hoover put the nab on Alvin Karpis amid a swarm of FBI.
We found that Ken Kesey exhibited only a few of the attributes of a good house guest, but that he did live up to his reputation as a lusty, hop-driven, bull goose looney.

Relevant compounds:

half-life 1. the time required for the disintegration of one-half of the atoms in a sample a radioactive substance.

live action* 1. normal cinematography as opposed to stop action, still shots, animation, titles, or other graphics. It is 'live' because it is moving (as opposed to stop action or stills), and because it is filmed as the event being depicted actually occurs (as opposed to animation, graphics, etc.).

living death* 1. a kind of death that one endures while one is yet alive; death made 'real and present'; a life of unrelieved misery; a state of misery not deserving the name of life; death-in-life; living hell.

living hell* 1. a kind of hell that one endures while one is yet alive; hell made real and present; a life of unrelieved misery; living death.

living picture 1. a tableau vivant. The picture is living because the people in it are alive, but also because they are actually there and not simply depicted. Hence, the live props involved are also a part of the living picture, since they too are there 'in the flesh.'

living proof
1. an extant demonstration of something.

The homeless on Telegraph Avenue are living proof of our insensitivity to the needy.
The collapsed Cypress structure in Oakland is living proof that earthquakes are destructive.

real life*
1. the real world, as opposed to some fantasied world: as, there are no unicorns in the real world.

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3.2223 Having a form

Corresponding to statements such as that pictures of people are not alive (Schecter, 1980:84), or that a river is not alive because it is just like air: you can go right through it (Schecter, 1980:86), we observe the use of the life-related lexicon to refer to the possession of a definite three-dimensional form.

A relevant derived form:

lifelike, adj.

1. *(nonbiological)* closely resembling a real person, actual locale, etc.; accurately representing the conditions of life.

a lifelike portrait
lifelike plastic fruit
a lifelike doll
lifelike imitation leather
a lifelike styrofoam rock
a superrealist painting in which everything is lifelike
a lifelike stage set
a lifelike portrayal of early America

Relevant collocations and idioms:

as big as life*

1. to be life-sized; to be a replica or representation as big as the original model.

The papier mache elephant was as big as life.

for someone to be the living image of X*

1. for a person to bear a virtually exact resemblance to another specified person.

Al's aunt says that Al is the living image of his father as a young man.
It sounds ridiculous, but he's the living image of George Washington.
The model was the living image of Rodin's Thinker.

Relevant compounds:

life class 1. an art class using live models and devoted to the representation of human form.

life-size(d) 1. equal in size to the original.

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3.2224 Having a location

As discrete physical entities, we understand ourselves to occupy a specific location in space. Entities which lack this spatially discrete character are relatively unlikely to be animistically regarded as alive. Hence, animists may advance opinions such as that wind is not alive because it is all around the world in every part of the world (Schecter, 1980:87). In the lexicon, the spatialized character of life is represented by entries which make reference to the dwelling of living beings. We see in these references to dwelling a combined acknowledgement that to be a living being is intrinsically to be spatially located, and that the way of life of higher beings is social.

Relevant roots and derived forms:

live, v.i.

2. *(quasibiological; perhaps said only of sentient beings)* to dwell; to reside; to make a home; to habitually frequent; to habitually mingle with.

They emigrated so that they might live in liberty.
He lives alone.
He lives with his uncle.
He lives out of town.
She lived a month in Rio.
Fish live in the sea.
They live in bars and nightclubs.
They live with riffraff.
Dogs will live with cats if they are raised together.
% Trees live in forests.
% His comatose cousin lives in an institution.

These final, marginally acceptable sentences suggest that our notion of dwelling includes some sense that the dweller be self-aware.

liveable, adj.

1. *(quasibiological)* fit or pleasant to live in; habitable, as said of a house, room, etc.

In the summertime, the large back porch was more liveable than the stuffy parlor.

Relevant collocations and idioms:

to live together

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1. to cohabit.

They lived together for two years before marrying.
They decided to live together as friends rather than lovers.

to live in; to live out

1. *(in domestic service)* to sleep at, or away from, one's place of work

to live with X*

1. to dwell or cohabit with X.

He is living with a Quaker family on the Northside.

Relevant compounds:

life space, psychological 1. the basal concept in topological psychology (as in that of Lewin); the totality of facts determining the behavior of an individual at a given moment, regarded as a spatial construct.

lived-in 1. occupied; inhabited: as, the kitchen looked much more lived-in than the formal living room.

live-in 1. adj., resident: as, a live-in maid.

living area 1. in a house, an area suitable for informal activities; a family room.

living room 1. in a house, a parlor or room for entertaining or receiving guests.

living space 1. the habitable area of a room or house.

3.223 Life as purposive activity

For the most part, it is quite difficult to disentangle purposes and activities. It is hard to imagine a purpose which is not instantiated as an activity, and it is hard to imagine an activity which does not achieve its definition via some regard for the utility or purpose with which it is infused.

3.2231 Being purposive in general

Corresponding to animistic proclamations such as that the sun is alive because it gives light (DelVal, 1975:188), or that a tree is not alive because it cannot do nothing (sic; Smeets, 1974:24), we observe the use of a life-related lexicon to refer to entities which

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are either intentionally oriented toward goals, or operational, influential, hooked up, charged up, or ready to be purposively engaged or deployed.

Relevant roots and derived forms:

live, v.i.

8. *(nonbiological)* to continue to function or flourish, or exert influence or force.

It looks like my vintage Cadillac is going to live forever.
Evil deeds live after evildoers.
The ideas of Jefferson still live.
Morpheme Structure Conditions Live! (an article by Jonathan Kaye)
Rock and roll lives!

living, adj.

4. *(nonbiological)* vigorous; flourishing; in use; influential.

Indo-European is not a living language.
What a wonder that my electric toothbrush should still be living after all these years.
He was sustained by a living faith in Jesus.

alive, adj.

4. *(nonbiological)* operative, influential, flourishing or functioning well.

Haight-Ashbury was most alive in the summer of 1967.
The Puritan work ethic is very much alive in America, although the accumulation of wealth is not now regarded as a sign of grace or virtue.
The opposition held almost half the legislative seats but, for lack of leadership, was barely alive.

live, adj.

4. a. *(nonbiological)* operational, activated; hooked up; hence, purposively engaged.

live phone line
live microphone
live circuit
live wire (i.e., a wire connected to a source of electrical potential)
live wire (i.e., a go-getter)
live issue
live ball

b. *(nonbiological)* energized, charged up or ready to be purposively deployed.

live battery
live coals

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live steam
live match
live ordinance
live ammo
live rounds
live bomb
live type (i.e., type set up and ready to be printed).

Relevant collocations and idioms:

to face life

1. to confront the challenges of life.

She will probably continue to drown her troubles in gin until she decides to face life.
He found that it was difficult to face life alone after 30 years of marriage.

to take one's life into one's (own) hands*

1. to seize control of one's own life; to impose self-direction on one's life.

Finally, he took his life into his own hands, quit his office job, gave up alcohol, moved to Sonoma, and began earnestly to raise organic lettuce.

to live one's own life

1. be self-directed and independent.

Though she has been married for five years, she still lives her own life.

to live by X; to live by doing X*

1. to live in accordance with X, or in such a way as to uphold X.

He lives by a strict code of conduct.
He not only mouths high principles; he lives by them.

to live for X

1. to regard X as the sine qua non of a satisfying life; to always be looking forward to X.

It is often said of actors that they live for applause.
He lived for Saturday(s).
She lived for the day when she would pass the state bar examination.

2. for one's activities to be directed for the benefit of X; esp. to sacrifice oneself for X.

She's always doing for her children, and they don't miss a chance to ask her to do more: really she lives for them more than she lives for herself.
In her later years, she lived for the Girl Scouts, and raised quite a lot of money for the organization.

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The man is unique among politicians: he is completely selfless and lives only for the good of the country.

to have something/nothing to live for

1. to have, or fail to have, a project or goal which gives meaning to one's life.

For awhile, after they forced me to retire, I felt that I had nothing to live for.

to live up to X*

1. to fulfill X (something expected).

In his first term, Richard Nixon failed to live up to his promise to end the Vietnam War; in his second term, he failed to live up to his promise to uphold the Constitution.
If one even dropped a wrench or defaced the head of a bolt, then one had failed utterly to live up to the standards of the Bugatti auto works.

to live through X*

2. to surmount X; to succeed in facing the challenge posed by X.

If you live through the question and answer period, you will be rewarded with light applause; if you do not, you will be condemned with light applause.

to save someone's life*

1. *(hyperbolic)* to rescue someone from some adversity or misfortune; to do something useful for someone; to render assistance which enables someone to resume or complete a purposive activity.

That aspirin saved my life.
Al saved my life by typing up my term project for me.
The money she wired saved my life.
That was advice which saved my life.

to take the life out of someone

1. to devitalize someone and strip them of purpose.

The cynicism of the bank loan officer took the life out of him for a week.
When he lost his job, it really took the life out of him.
That low blow in the fourth round really took the life out of Al.

to waste one's life

1. to fail to realize one's potential; to fail to make use of one's life.

He never returned to music school and wasted the rest of his life as a millionaire rock musician.
He wasted much of his life as a graduate student trying over and over again to get through "On WH-Movement."

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for X to take on a life of its own

1. for X to develop its own momentum, direction, goals.

As the revolution progressed, the leaders lost control, and the confusion and violence seemed to take on a life of its own.
The idea of the robbery had at first been just a cafedream, but the plan had taken on a life of its own, and turned on its planners so to speak, so that they could not extricate themselves from its grasp until the deed was done.

to live on*

1. to continue to be used; to continue to be influential.

Einstein is dead but his theory lives on.
Romans are gone but their alphabet lives on.

Relevant compounds:

lifesaver* 1. *(hyperbolic)* something that helps a person to endure adversity: as, the money she telegraphed was a lifesaver; that detailed map of Paris was a lifesaver.

lifework 1. the complete work or the principal work of an individual.

live ammo; live ammunition; live ordinance; live rounds; live bomb, etc.
1. ordinance with a charge; ordinance capable of being fired or exploded.

live ball 1. in games (e.g., baseball, kickball), a ball which is in play.

live steam 1. steam that comes directly from the boiler, before its expansion in work, as distinguished from exhaust steam.

live type 1. *(in printing)* type set up and ready to be printed.

live wire; live rail; live circuit, etc.
1. an electrical device or conductor carrying electrical current or connected to a source of electrical potential.

Considerable international discussion has been devoted to the color coding of live and neutral wires.
On model trains, it is the center rail that is live.
The live rail of subway trains presents opportunities for suicide which are unknown in rural parts.

2. a person who is alert, energetic, ambitious.

Joe is such a live wire that his friends fear he may burn out before he is thirty.
He's just the live wire we need to shock us out of this corporate lethargy.

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3.2232 Being sentient

Corresponding to animistic proclamations such as that a tree has its own purpose ... a tree is doing it so that it can be a tree, be alive and keep growing (Schecter, 1980:127), we observe the use of a *life-related lexicon to refer to the sentient status* which underlies our human capacity for entertaining purposes and engaging in activities to achieve them.

A relevant derived form:

lifeless, adj.

3. *(quasibiological; hyperbolic)* unconscious or asleep.

The lifeless form under the quilt turned out to be Randy.

Relevant collocations and idioms:

the land of the living*

1. where people are conscious rather than unconscious, asleep, etc.

She shook his shoulder to bring him back to the land of the living.

to come alive; (CAUSATIVE) to bring alive*

1. to recover consciousness, wake up or revive.

He came alive when we threw a bucket of water on him.
He'll come alive if you feed him some coffee.

to come to life; (CAUSATIVE) to bring to life*

1. to recover consciousness, wake up, or revive.

We threw a bucket of water on him and he came to life right away.
Artificial respiration brought him to life.
He was brought to life by a cold shower.

the life of the mind

1. all mental activities with intentional content, but esp. thought devoted to intellection and aesthetic appreciation. The life of the mind does not include autonomic activities.

He was an inspired teacher ... arousing in us a feeling for literature and poetry and the life of the mind. (Wigg)

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3.2233 Being active in general

Corresponding to statements such as that wind is alive because it moves (DelVal, 1975:182), or that a mountain is not alive because it just stays there (Carey, 1985a:30), we observe the use of the life-related lexicon to refer to all manner of activity, activation, interaction, and liveliness.

Relevant roots and derived forms:

life, n.

6. a. *(quasibiological)* the activities and interactions which occupy a living being.

military life
political life
professional life
love life
life in Tsarist Russia
life in the company of adoring fans
life in the circus
life among the common folk
life on the Western frontier
Life with his uncle was never dull.
He led a wise life.
She led a fast life.
We are all inspired by the lives of famous eccentrics.

b. *(quasibiological)* an account of these activities; a biography.

His Life of Samuel Johnson is famous.
A new life of Freud is available.

7. *(nonbiological)* vigor, liveliness, animation, vivacity, spontaneity, emotion; the source of vigor or liveliness.

The party had plenty of life.
There's not much life in a small town after dark.
Her jokes were the life of the party.
Freedom of speech is the life of democracy.
Through the later Depression and World War II, FDR was the life and soul of the Democratic Party.

lifeless, adj.

4. *(nonbiological)* dull; boring; listless; without emotion.

the lifeless decor of budget motels
lifeless prose
a lifeless conference

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a lifeless gathering of condominium alcoholics
a lifeless smile

live, v.i.

4. a. *(quasibiological)* to comport oneself in some fashion; to have a specified way of life or manner of living.

He was advised to live more wisely.
They want to live fast and die young, like bacteria.
He has nothing better to do than to live like an animal.
He hoped to live like a king from the royalties of his invention.
Bears live like hermits during the winter.
Trees live like sentinels, immobile and staunch.
They live in poverty.
Living in this way, they are not happy but they survive.

b. *(quasibiological; quasitransitive, with life as an object).*

She lived a charitable life.
She lived a life of ease.
Each of us lives a hundred lives at once.
This is no life for an educated person to live.
He desired only to live his life in peace.

alive, **adj.**

5. *(nonbiological)* lively; activated; vibrant; invigorated.

The antique dealers conference was more alive than he had expected it to be.
He felt more alive after the tennis match.
The library science conference was more alive than he had expected it to be.
Guests began to arrive around seven, and the party was alive by eight.

live, **adj.**

5. a. *(nonbiological)* vibrant, reverberant; zestful, lively.

live party
live atmosphere
live colors
the live sound of an acoustically live room

b. *(nonbiological; esp. in mechanics & engineering)* moving; imparting motion or power.

live axle
live center
live pulley
live load
(in film or TV) live action (as opposed to stop action, stills, etc.)

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lively, adj.

1. *(nonbiological)* active, full of life, full of spirit, vigorous;

a lively eighty-year-old

exciting or animated;

a lively session of the council

moving quickly and lightly;

a lively dance

brisk;

a lively breeze

vivid or intense.

lively colors

lively, adv.

1. *(nonbiological)* in a lively manner.

livelily, adv.

1. *(nonbiological)* in a lively manner.

liveliness, n.

1. *(nonbiological)* the quality or condition of being lively.

liven, v.t. & v.i.

1. *(nonbiological; typically with **up**)* to make or become more animated or lively.

He wondered whether this soiree of wax figures would ever liven.
The conversation livened up when they began talking about soccer.

enliven, v.t.

1. *(nonbiological)* to make more animated or lively.

Al liked to enliven chess games with gambits.

Relevant collocations and idioms:

to be full of life

1. to be ebullient, invigorated, lively, or marked by spontaneity.

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Al is full of life since they made him a junior partner.
The fireworks display was full of life.
The act was full of life: nothing but ad libs.
The babbling brook was full of life.

a full life*

1. a life which is booked up, busy, saturated with activities.

Her life is so full these days that she hardly has time to sleep.

an empty life*

1. a life in which little happens.

Her life in the evenings was empty except for her knitting and, of course, the radio.
Rushing to meet both deadlines, he longed for an empty life.

to give life to X*

2. to innervate; to make vibrant or lively.

His plans were given life when he received a grant from the Sloan Foundation.
She gave life to the party with her boogie-woogie piano.
The decorations gave life to the drab meeting hall.

to bring new life to X

1. to make X lively again; to reinvigorate X or rescue X from desuetude.

It is a sorry fact that it took a professional actor to bring new life to the political party of Lincoln.
It brought new life to the discussion to consider the policy's ethical ramifications.

to breathe (some) life into X; to breathe (some) life back into X*

1. to energize, vitalize or invigorate X; *(with back into X)* to re-energize, revitalize or re-invigorate X.

A little scandal never fails to breathe life into local politics.
Pathetically, he tried to breathe some life into the party with his imitations of insects.
Everyone expects the fresh young pastor to breathe some life into the congregation.
The mere appointment of Goodfellow to CEO was enough to breathe some life back into the troubled corporation.

to come alive; (CAUSATIVE) to bring alive*

3. to become energized, activated or vibrant; to start up.

The party came alive when the keg of beer finally arrived.
Even now, when I see the ocean, my fear of drowning comes alive.
He always comes alive when he reads the editorial page.
The old fan proved to be as good as new: as soon as he plugged it in, it came alive.

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to come to life; (CAUSATIVE) to bring to life*

4. to become energized, activated or vibrant; to start up or begin to function.

The Pluto Project came to life when the Agency gave it all the secret funds it could handle.
The convention came to life when Trotsky ascended to the podium.
Good actors can bring even boring plays to life.
Cleaning the rug brought the colors to life.
He pressed the starter button and the old Lincoln came to life.

to come back to life; (causative) to bring back to life*

1. to undergo a revival; to become lively again; to flourish again; to be reinvigorated or rescued from desuetude.

The cafe came back to life when the after-theatre crowd began to arrive.
I understand that a No Television League has been formed to bring the art of conversation back to life.
Art nouveau came back to life in the 1960's; art deco came back to life in the 1970's; we had a 50's revival in the 80's: look for op art to come back in the 90's.

keep X alive*

1. to keep X functioning or flourishing.

It was his hobby to keep the old MG alive.
She spent 60 hours a week trying to keep her small business alive.

to be alive with X

1. to be teeming with, covered with or swarming with X.

The picnic spot was alive with ants.
The church basement was alive with volunteers.
The air above them was alive with confetti.
The bay was alive with small craft.
His mind was alive with fabulous schemes.

a spark of life*

1. a glimmer of vitality or interest.

Since his business failed, he doesn't seem to have a spark of life left in him.

Relevant compounds:

lifeblood* 1. the vital part or animating influence.

life force* 1. animating influence.

His science fiction genius was the life force of the motion picture studio.

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life giving*, adj. 1. strengthening; refreshing; inspiring: as, a life giving vacation.

live action* 1. normal cinematography as opposed to stop action, still shots, animation, titles, or other graphics. It is 'live' because it is moving (as opposed to stop action or stills), and because it is filmed as the event being depicted actually occurs (as opposed to animation, graphics, etc.).

live axle 1. *(in mechanics)* an axle communicating power, as opposed to a dead or blind axle; an axle that rotates or houses rotating shafts.

live center 1. *(in mechanics)* the center of a rotating spindle, turning with the work, as on a lathe or other machine on which work is turned.

live load* 1. *(in engineering)* any moving load, not constant in its application, which a bridge or other structure carries in addition to its own weight.

live pulley 1. *(in mechanics)* pulley which turns on its axle, as opposed to one which is fixed to its axle so that it turns with the axle.

live ring 1. *(in mechanics)* the rotating external ring of a needle bearing assembly.

3.2234 Just subsisting

Not surprisingly, activities related to subsistence and survival are a common quasibiological theme.

Relevant roots and derived forms:

live, v.i.

3. *(quasibiological)* to subsist.

He lives by his wits.
He lives on only $800 a month.
Big fish live on little fish.

living, n.

2. *(quasibiological)* the means of sustaining life; livelihood.

He must work for a living.

livelihood, n.

1. *(quasibiological; only in connection with humans or, infrequently, human organizations)* means of living or of supporting life; subsistence.

His livelihood as a lawyer is substantial.
He gets his livelihood from crime.
His livelihood depends on the strength of the stock market.
The livelihood of the state is obtained by taxation.

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The club depends on dues for its livelihood.

Relevant collocations and idioms:

to live by X; to live by doing X*

1. to subsist by (doing) X.

He lives by his wits.
He lives by her wits.
He lives by being an itinerant houseguest.
He lives by doing odd jobs.

to live off the land

1. to obtain sustenance from the produce of the countryside without payment.

He decided to camp out and live off the land and never work, and to write in the style of Hemingway.

to live from hand to mouth

1. to subsist marginally so that whatever resources which are obtained are immediately required.

They lived from hand to mouth throughout their student years.
After their savings were exhausted, the family was really living from hand to mouth.

Relevant compounds:

cost of living 1. the total financial burden of providing for life's necessities and amenities, conceived of as an average load against income.

lifeline* 1. an important commercial route or line of supply.

living conditions 1. the general physical conditions under which one lives; esp. the availability of essentials such as water and shelter.

living wage 1. a wage just sufficient to provide for the necessities of life.

standard of living 1. level of affluence or poverty.

3.2235 Having social and cultural experiences

A subset of collocations and idioms regards life as being constituted by social and cultural episodes. There is a high regard here for the prominence of social interactions among life's activities, and for the cultural expectations relating to the activities which one should expect to undertake in one's lifetime.

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Relevant collocations and idioms:

to see life

1. have a wide variety of social experiences; especially, to broadly and deeply experience the human condition or deeply appreciate human pathos.

He joined the Merchant Marine, hoping to see life in foreign lands.
As a country doctor, he never saw Paris or even New York, but he saw a lot of life.
As a refugee, he had seen more life than perhaps a boy of nine ought to see.

Here, life is maximally revealed through sensitive interaction: to be alive is to interact, to engage with others.

the land of the living*

3. *(jocular; snidely superior)* where people are socially interactive; where people are urbane and convivial, etc.

After six months of moping and isolation, she decided to rejoin the land of the living.
Returning to New York from the small town where she was raised seemed to her like a return to the land of the living.

to live a lot, etc.

1. to have experienced a great deal.

The boy had lived a lot for one so young.
Listening to the sailor's tales, he thought that he had never met a man who had lived so much.

to have hardly lived, etc.

1. to have experienced little; to have led a sheltered life.

He was thirty years old and yet had hardly lived.
He disliked movies for the reason that they reminded him of how little he had lived.

the X of one's life

1. *(usually hyperbolic)* denoting the most important event of its kind in one's lifetime.

He had the thrill of his life shaking hands with Gunter's tiger.
We had the time of our lives in college.
He had the race of his life up 9 from Saratoga, passing Alfas like hay bales and two TR4's on sweepers at 90.
He had the train ride of his life on the Orient Express.

to live and learn

1. to profit from one's experience; esp. to learn from mistakes or failures.

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Contemplating his first effort to establish a small business, he said, "Well, you live and learn."
All of us make mistakes: we live and learn.

the life and times of someone

1. the lifehistory of someone in terms of its high points or prominent activities.

The life and times of Richard Haliburton would make a wonderful travel-adventure film.
He was melancholy with the thought that his life and times seemed to be behind him.

A relevant compound:

life story 1. an account of the events of an individual's life; a biography;

3.2236 Having a lifestyle

Several collocations, idioms, and compounds address the style which which activities are undertaken by individuals. One irony here is that a lifestyle is regarded as being an individual thing, while it is actually determined by social norms: it is the individual who has it, but it is the society which says what it is that the individual has. The lifestyle is a characterization of the individual via a characterization of his activities, and this characterization is imposed by cultural convention, and sensitive to social stereotype.

Relevant collocations and idioms:

to lead a life of X; to live the life of a X, etc.

1. to live in a way which is characterized or devoted to X, or characteristic of a X.

She led a life of crime.
She lived a life of luxury.
As his summer house guest, she lived the life of a millionaire.

for someone to be the living image of X*

1. for an individual to strikingly exemplify a specified quality or type of person.

She's the living image of youth gone wild.
He's the living image of an Ivy League lawyer.

to live well

1. to live in affluence or comfort.

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He does not have a dime, but he is constantly conceiving of fresh ideas and constantly sharing these in the company of friends so that, by any reasonable assessment, he lives well.
They do not have a great deal of money but, by being careful money managers, they live well enough.

to live high on the hog; to live like a king, etc.

1. to live as a rich person would live; to live in great material comfort; high living.

Ever since they discovered oil in the south 40, the Judds have been living high on the hog.
Landlords live like kings and pharoahs; tenants live like serfs.

to live it up

1. to extravagantly indulge oneself.

Receiving his bonus on Friday, he went to London to live it up on Saturday.
You can't live it up when you're down and out.
They came to Havana to live it up. They lived about two years in two days. (P. Frank)

to live a little

1. to indulge in moderate extravagance.

I always set a couple hundred dollars aside so that on my vacation I can live a little.
Let's live a little and go to the wine country for the weekend.

life in the fast lane

1. a life of intense pleasure seeking or fortune seeking activity; fast living.

Living life in the fast lane of Wall Street had left him rich and haggard.
He was not sure that a simple farm boy like himself could get up the speed to live life in the fast lane.

to live for today; to live for the moment

1. to live without regard for the future; to abandon oneself to one's zest for the moment.

He has no long term ambition except to live for the moment.
Let's just live for today and forget about tomorrow.

to live on the edge; to live over the edge

1. to live in a way that the risk of failure approximates (or, with **over**, exceeds) the probability of success; esp. to live fast and hard so that there is considerable risk of physical, mental, or financial ruin.

He had lived on the edge for so long that the thought of taking it easy no longer even occurred to him.

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In order to finish the paintings before the show, she had been living over the edge for a month, sustained primarily by protein powder and pints of iced espresso.
We pointed out to Ned that, just because he had bought a motorcycle, he was not required to live on the edge.

to live in one's head

1. to be obsessively cerebral, oppressively intellectual and withdrawn.

He lived in his head to such a degree that people often had to speak twice to him before he heard what they had said.
He developed his curious views over years of living in his head and without the benefit of any open discussion: he set them out for us, I thought, like so many old spice jars that did not sit quite flat on the table.

to live in the past

1. to obsessively dwell on one's past life.

After Grandma died, Grandpa began more and more to live in the past.

2. to be behind the times; to have outmoded ideas or beliefs.

You are living in the past if you think you can afford a house on a clerk's salary.

to live a lie

1. to live hypocritically; to lead a secret life which is incompatible with one's public or shared life.

He has been living a lie for years, leading everyone to believe that he worked in management rather than in maintenance.
He considered marrying her for her considerable wealth, but he recoiled at the thought of feigning love and living a lie.

to live down X

1. to live so as to allow X (a scandal, etc.) to be forgotten or forgiven.

Though his management decisions were thereafter quite astute, the board of directors would never quite let him live down his doomed attempt to develop plastic gum.
Office parties have been described in this way: First you live it up; then you live it down.

to live and let live

1. to do as one pleases and let other people do the same; to be tolerant.

In order to successfully live and let live, it helps if one has fences, or has no neighbors and no dogs.
The live and let live philosophy of 60's young folk was held by many older conservatives to undermine the need for law and order.

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Relevant compounds:

high life 1. life lived in the fashion of the rich.

lifestyle 1. a way or style of living.

lowlife 1. any individual or collectivity representing the rude moral underclass or the bestial down-and-outers of society.

nightlife 1. social events and activities held at night.

real life* 1. everyday life; normal life; a sphere of life regarded as less contrived, constricted, self-absorbed or artificial than some other sphere being considered: as, real life as opposed to cafe life, military life, academic life, or life in world of Washington DC.

3.2237 Finding fulfillment

To the degree that life is an active pursuit of purposes, one may achieve one's purposes and desires, or fail to do so. Since fulfillment is gradient, it is natural that lexical references to life as fulfillment should also be gradient. One may live, and yet not really live, or live life to the fullest, etc. When life is newly infused with purpose or pleasure, it may be said that one had never really lived until that event. One's life may be full or empty, complete or incomplete, to varying degrees. When one's dearest hopes and desires are dashed, it may be said that one has been struck where one lives. All of these expressions present life as a variably intense flourishing of purposes fulfilled or denied.

The relevant root:

live, v.i.

5. *(nonbiological; emphatic; said only of sentient beings)* to revel in life; to experience life to the utmost; to enjoy a full and varied life; to have life that is worthy of the name.

She felt that she only really began to live when she moved to the big city.
He says he wants to live before he dies.
I want to really live.
From the Disney film it is clear that otters truly know how to live.
Let's just live for today and forget about tomorrow.
Let's live a little.
He had never lived until he went to Paris.
He lived every day of his life.
I don't call this living.

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Relevant collocations and idioms:

where one lives

1. at a vital point; in a way that it especially matters.

When they stole his art collection, they struck him where he lives.
Get that jaw! Hit him where he lives!
She made light of his poetry, which wounded him where he lived.

for one's life to be worth living

1. for one's life to be such that one wants to be alive; for one's life to be satisfying

When I first became paralyzed, I felt that my life was not worth living.
It was her opinion that life in the military was not a life worth living.
In a move that everyone regarded as suicidal, he returned to automobile racing, and then, ironically, began to feel that life was worth living again.
After she met Al, she began to feel that life was worth living again.

to really live; to live life to the fullest; to live every day of one's life; to get the most out of life; to know how to live, etc.

1. all, references to living energetically, and to reveling in being alive.

I want to quit my job and really live.
From the Disney film it is clear that otters truly know how to live.
As a globetrotting correspondent, he felt that he lived every day of his life.
In retirement, doing damn near nothing was his idea of living life to the fullest.
He decided that he would go out every night in an effort to get the most out of life.
The Divers vowed that they would never be tired and that they would live life to the fullest.

to have never lived until X; to have not lived until X; for one's life to be incomplete until X/unless X, etc.

1. *(often hyperbolic)* to have not experienced the full range of life's possibilities until X has been done; for a fulfilling life to require X.

You have never really lived until you have had a piece of my cheesecake.
He had not lived until he went to Paris.
She said that her life would not be complete unless she had children, and her mother said that it would not be complete until her children had left home.

to begin (one's) life; for (one's) life to begin; to be the beginning of life, etc.*

3. *(often with really)* for life to become quantally more fulfilling or engaging.

Life didn't really begin for me until I got into music.
Most of the people that believe that life begins at 40 are 60.
They found retirement to be the beginning of life.

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to end (one's) life; for (one's) life to end; to be the end of life, etc.*

3. for life to cease to be engaging or fulfilling or worth living.

His life ends every year when football season is over.
He regarded it as the end of life when they sent him to military school.

to get a new lease on life*

2. to have one's life renewed.

You ought to go out and meet someone: it would give you a new lease on life.

a full life*

2. a life which is satisfying, fulfilling; a life which lacks nothing of human value.

Though he had never been rich or traveled, he had loved and worked and played and wondered: he felt that, by any human standard, he had led a full life.

an empty life*

2. a life which is devoid of purpose or of human fulfillment, esp. a life of exiguous human contact; a life which is not worth living.

She said that her life was empty without him.
She said that her life was empty without music.
He wanted something more genuinely bohemian than the empty life of Hollywood.

for one's life to be complete; for one's life to be incomplete

1. for one's life to be fulfilled; esp. for one's primary ambition to be satisfied or for one's primary goal to be attained.

He said that his life had become complete when he married Wanda.
The prosecutor said that his life would not be complete until he saw Big Al behind bars.

This is the life!

1. This is a life worth living! This is really living! This is how I would like life to be!

Get a life!

1. Find the means of fulfilling your life! Esp., engage in more social activities and enjoy yourself more.

The directive is prohuman in its emphasis on the desirability of social interaction, but rude and demeaning in its not so oblique assertion that the addressee's life is currently empty, not socially fulfilling, meaningless.

Proverb: Man does not live by bread alone.

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1. To be whole and happy, people require more than just the bare necessities.

Relevant compounds:

life-affirming 1. affirming the higher value of life; affirming the virtuous character of humankind.

living death* 1. a kind of death that one endures while one is yet alive; death made 'real and present'; a life of unrelieved misery; a state of misery not deserving the name of life; death-in-life; living hell.

3.2238 Being natural, spontaneous, or free

Corresponding to statements such as that a clock is not alive because it is created by people and does not have its own life (Del-Val, 1975:266), or that rivers are alive because they are a part of nature (King, 1961:14), there is some usage of life-related words to refer to the quality of being in some sense natural, wild, unconstrained, spontaneous or free. References to these qualities may at times emphasize purposiveness and activity equally, since spontaneity exemplifies the capacity for free will and novelty in general; i.e., the capacity for purposive activities to be modified and adapted to the emergent conditions of the real world. In other cases, however, spontaneity exemplifies an ascendance of activity over purposiveness, since purposes typically impose a constraining structure on activities which spontaneity only undermines.

Relevant roots and derived forms:

life, n.

7. *(nonbiological)* spontaneity; *(in cricket)* that quality in a pitch which causes the ball to rise abruptly, unevenly, unpredictably.

a dance performance with life rather than mere choreography

live, adj.

3. *(nonbiological)* produced on the spot (and hence, potentially, unrehearsed and spontaneous).

live appearance
live music
live demonstration
live entertainment

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live performance
live broadcast
(coming to you) live from New York
live account
(in film or TV) live footage

5c. *(nonbiological)* in its native state; unconstrained or uncontained; loose; spontaneously changing.

live stone (i.e., unquarried rock)
live sparks (i.e., loose sparks)
(in engineering) live load (i.e., the varying load imposed on a structure by its being put to use)

living, adj.

5. *(nonbiological)* in its native condition and site.

living stone

A relevant collocation:

to be full of life*

1. to be ebullient, invigorated, lively, or marked by spontaneity.

Al is full of life since they made him a junior partner.
The fireworks display was full of life.
The act was full of life: nothing but ad libs.
The babbling brook was full of life.

Relevant compounds:

live load* 1. *(in engineering)* any moving load, not constant in its application, which a bridge or other structure carries in addition to its own weight.

3.224 Life as a boundary, horizon, or limit

The most basic phenomenological fact of our existence is that there is nothing outside of it — nothing beyond the reach of it, so to speak. Intellectually, however, we understand ourselves to be limited relative to the spatial and temporal expanse of the universe, and it is possible to contemplate things which lie within or beyond these limits. In language, we encounter life-related words referring to that which is absolute or cannot be exceeded, or that which subsumes all existing possibilities whatever. Hence, that which is liveable is that which is within the limits of what can be endured; that

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which can be tolerated or lived with. That which is unliveable is that which, for the life of one, one cannot endure; that which lies beyond the capacities afforded by being alive. One's limits may be regarded as externally imposed, as when one tries to cope with an unliveable workplace, or when nothing in life gives one comfort. Alternately, one's limits may be regarded in terms of internal capacities, as when one cannot live with oneself, or when one cannot for the life of one perfect a back flip, or when one manages to live with existential angst.

To the degree that life is conceptualized as an absolute — i.e., as a system of capacities or potentials ebbing out to a limit — it is not surprising that life-related words should come to have the semantic force of intensifiers or markers of emphasis. When it is said that 'Bob is a living doll,' one first tends to interpret this as an affirmation that Bob is so sweet as to be like a doll which has come to life. However, the fact that Bob is alive is no secret: it is hard to believe that the word *living* is included in the expression in order to affirm his biological status. The difference between 'Bob is a doll' and 'Bob is a living doll' is really only one of enhanced emphasis in the latter case. Similarly, it is hard to believe that *alive* is included in expressions like 'the fastest gun alive' for the purpose of restricting the potential referents of the expression to those gunslingers who haven't been gunned down. Of course, one can use *alive* in that manner, but under normal pragmatic conditions one already assumes that expressions like 'the fastest gun' refer to people who are living. Apparently then, despite some putative value as a predicative operator, *alive* for the most part functions as a marker of emphasis in expressions of this ilk. This seems to be generally true of life-related words whenever they may be optionally omitted from an expression without any critical change in meaning. Such expressions are presented below with the relevant life-related word in parentheses; e.g., *a real (live) X.*

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A relevant derived form:

liveable, adj.

2. *(quasibiological)* that can be lived through; within the limits of what can be borne; endurable; tolerable.

This is just not a liveable arrangement any longer.
Her homelife is barely liveable.

Relevant collocations and idioms:

to live with X*

2. To endure X; to tolerate X.

He has been living with cancer for two years now.
She has been living with a 50-mile-a-day commute for two years now.

to (be able to) live with oneself

1. to be able to tolerate whatever discrepancies exist between one's idealized self-image and the reality of one's character, actions, etc.; hence, to retain one's self-respect.

He found that he could not live with himself after the theft.
How can you live with yourself after the cruel and untrue things you've said?

not for the life of one

1. not even if one's life were at stake; not by any means.

I cannot for the life of me understand why anyone would care to learn to eat fire.
He could not for the life of him budge the timber which had fallen on his leg.

Here, to be alive is to have resources (either mental or physical), but resources which are limited. One comes up against this limit when, for the life of one, one cannot do X.

nothing in life

1. nothing that one might encounter in the course of one's life; nothing drawn from life; nothing in human existence.

He didn't find anything in life which interested him.
Nothing in life would satisfy her.
Unfortunately, he knew of nothing in life which would decisviely contradict the bitter social philosopher's cynical views of class relations.
I don't know of anything in life which would give me greater pleasure than to babysit Billy — however, I am previously engaged for New Year's Eve.

This expression acknowledges that life affords a limited range of possibilities.

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Not on your life!

1. By no means! No way! Absolutely not!

This expression asserts that there is nothing that the hearer can do (including put his life at stake) to make the speaker do or think what the hearer wants the speaker to do or think. The expression informs the hearer, brusquely, that his capacities of persuasion have been outstripped; that he has come up against his limits of influence. The expression also asserts, somewhat rudely, that the importance of the hearer's life is not so great that it has unlimited influence on the decisions of the speaker. Presumably, it is only one's own life which represents the upper limit on some internal scale of importance. It is in fact because the speaker tells the hearer that his life could hang in the balance and yet have no influence that the hearer is made to understand that the absolute limit of his ability to influence has been reached. This is a way to speak to the hearer in the hearer's own terms. If the speaker meant to affirm that nothing whatever could influence him, the expression might have been 'Not on *my* life!'

You bet your life!

1. Absolutely! By all means!

This expression assures the hearer that some state of affairs is so certain to come about or to be true that the hearer could, without risk, stake his life on the matter. The certainty of the state of affairs is so assured that one could safely risk one's life on the matter, where one's life represents the limit of what one could risk in general; the possession that one holds dearest on a scale of importance.

to be the (living) end

1. for X to be the ultimate expression of (an often unnamed) X.

Well isn't that just the living end! [e.g., as far as scandalous behavior goes]
He's the living end! [e.g., as far as saxophone playing goes]
She's the living end when it comes to pettiness and jealousy.

to be a (living) doll

1. emphatically, to be a doll; to be an individual, male or female, who is first of all very attractive and secondly of affable disposition.

We had such a good time. That Bob is a living doll!

a real (live) X

1. an exuberant reference to a genuine X; an X in the flesh.

He was excited to meet a real live philosopher.
They had a real live army tank at the fairgrounds that they let you climb all over.

to scare the (living) daylights, etc. out of someone

1. to frighten someone badly; *(hyperbolically)* to scare someone into fainting.

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When he jumped out at me from the shadows, he scared the living daylights out of me.
She scared the living crap out of Al with that knife.
Her screaming scared the living hell out of the neighbors.

Man (alive)!

1. Oh, man! Good grief! For gosh sakes!

any man (alive); no man (alive)

1. both, emphatic references to humankind.

No man alive could scale that cliff by free ascent.
So what! Any man alive can do a somersault. Can you do a back flip?

Land sakes (alive)!

1. *(old fashioned)* My gosh!

the Xest person (alive); to be the Xest Y (alive)

1. an assertion that, of all the persons living, the person specified is the Xest, or the Xest Y; an emphatic assertion that someone is the Xest, or the Xest Y.

He's the fastest man alive in the United States.
He's the meanest man alive who ever lived.
She's the most powerful politician alive.
She's the slowest cook alive.

A relevant compound:

livelong 1. an intensifier or intensified form suggesting long or tediously long in passing; whole; entire: as, livelong day.

They worked like beavers all the livelong day.
Cp. We worked like beavers the whole day long.

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3.23 The English lexicon in reference to death

This dissertation is concerned with how life, rather than death, is conceptualized and represented in language. The inclusion of death-related lexical entries is intended only as a supplement to the life-related lexicon. The relationship between concepts of life and death is complex, and the death concept really requires its own analysis. In particular, it should not be assumed that death is regarded as a *kind* of opposite of life. Nevertheless, the relationship between life and death vocabulary is to some degree a relationship between approximate antonyms. Death is in one sense the status which is the biologically incompatible counterpart of life. Also, figuratively speaking, entities are represented as being dead when they are nonexistent, nonpurposive, nonsentient, and nonactive, just as they are represented as being alive when they are existent, purposive, sentient, and active. In these usages, the English death-related vocabulary is very much the reverse reflection of the life-related vocabulary. In other respects, however, the senses associated with the death-related vocabulary are more orthogonal than opposed to those associated with life-related words. Death is not only a biological state, but a biological process and a biological event; in consequence, death is temporalized as an end, or as a progression toward an end, rather than as a temporal duration in the fashion of life. In other senses, death-related words are used in ways that are strikingly similar to the ways in which life-related words are used. Death-related words, like life-related words, may make reference to an outer limit of capacities or possibilities, and may essentially function as intensifiers, as in the expressions *dead level* 'absolutely level' or *to do to death* 'to overdo.' Below, for the most part, death-related lexical entries are presented without further comment.

3.231 Death as a biological status

Relevant roots and derived forms:

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death, n.

1. *(biological)* the act or fact of dying (i.e., being at the point of death or being about to die); permanent cessation of life in an animal or plant.

Death is a certainty.
Her cousin's death continued to grieve her.
His death came at 12:01.
There was much death at Little Big Horn.
Before the execution, an atmosphere of death hung over the entire community.
Signs of death were found at the altar.

2. *(quasibiological; metonymic)* the death of living entities in a place.

The death of a river or lake may be permanent.

4. *(biological)* the state of being dead.

Death follows life.

5. *(quasibiological; metonymic)* bloodshed; corpses.

Across the battlefield there was death as far as the eye could see.

6. *(quasibiological)* the cause of death.

The atom bomb was death to thousands.
It would be death to be caught while escaping.

deathlike, adj.

1. *(nonbiological)* like, or as in, death.

deathlike quiet
deathlike paleness
deathlike lethargy

deathly, adj.

1. *(quasibiological; very limited usage)* causing death; deadly; fatal.

Cleopatra lies deathly ill from snakebite.
The deathly gush of blood could not be stopped.

2. *(nonbiological)* like or characteristic of death.

the deathly pallor of the bespectacled clerk
the deathly cold of January
the deathly quiet of the nunnery
the deathly stiffness which he suffered in cold weather

deathly, adv.

1. *(quasibiological; very limited usage)* liable to cause death.

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She was deathly ill by the time she was rescued.

2. *(nonbiological)* like or characteristic of death.

It was deathly cold in those stony lanes. (C. F. Woolson)

die, v.i.

1. *(biological)* to cease to be alive.

to die from a heart attack

2. *(biological)* to undergo the process by which life comes to an end.

to die slowly

3. *(quasibiological; metonymic)* for the life in a place to die.

Our oceans are dying.
This trout stream died as a result of pollution.

dying, adj.

1. *(biological)* at the point of death; about to die.

2. *(quasibiological; metonymic)* where the living entities in a place are dying.

In spite of recent clean up efforts, it remains a dying river.

dead, adj. & adv.

1. *(biological)* no longer living.

2. *(quasibiological; metonymic)* devoid of living entities.

While Death Valley is a living desert, the Dead Sea is a dead sea.

deadly, adj. & adv.

1. *(quasibiological)* tending or liable to cause death; fatal.

deadly poisonous
deadly disease

2. *(quasibiological)* to the point of death.

locked in deadly combat

Relevant collocations and idioms:

the dead

1. collectively or abstractly, all dead people; any dead people.

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Don't speak ill of the dead.
Prayers were offered to the dead.

to death*

1. to the point of death; until death occurs.

They beat the thief to death.
In those days, a couple was stoned to death for conceiving illegitimately.
I thought he would choke to death.
(Hyperbolic) I thought they would laugh themselves to death.

to the death

1. to the point of death; until death occurs.

He was ready to fight to the death for his honor.

to be the death of X*

1. *(literal)* to cause X to die.

His drinking and cigarette smoking will be the death of him, if his cholesterol doesn't get him first.
Then on Tuesday he had another heart attack, and that was the death of him.

to be death to/for X

1. to cause X to die.

A thermonuclear explosion could be death to millions.
The cave-in was instant death for the miners on the third level.

to look or feel like death warmed over

1. extremely ill or exhausted; more dead than alive.

After three days in the jungle, they looked and felt like death warmed over.

the living dead*

1. individuals who are highly emaciated or near death.

The battlefield was strewn with the living dead.
The prison camps were populated with living dead.

to be nearly dead; to be near death; to be nearly dead; to be half-dead; to be all but dead; to be more dead than alive; to hover between life and death; to be at Death's door; to be in the jaws of death; to be at the gates of death

1. to be in such physically grave condition that death may be imminent.

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He hovered between life and death for two days, but on the third day his fever diminished, and he was sometimes conscious.
With the arrival of the antidote by bush pilot, he was snatched from the jaws of death.

to give someone up for dead

1. to give up hope that someone is still alive.

When no sign of him had been found for two weeks after the hurricane, they gave him up for dead.

to be dead as a doornail

1. to be unquestionably dead; hence, to be dead beyond the point of spasms or other spurious signs of life.

We found the mouse, as dead as a doornail, with his teeth still in the electric cord.
He was dead as a doornail and stiff as a deacon by the time the cavalry arrived.

to be (cold) stone dead

1. to be decidedly (and not too recently) dead with no hope of revival.

Hitler has been cold stone dead for 45 years, but seeing him strut around in old news clips still scares the hell out of me.

to be dead and gone for + TIME EXPRESSION

1. to have been dead for some period of time.

She's been dead and gone for 20 years, but I remember her as if I had spoken to her yesterday.

to return from the dead*

1. to be resurrected; to reappear on earth as a ghost.

He intended to return from the dead and haunt the best casinos in Europe.

to die back

1. to wither to the roots or woody part.

To conserve water during the drought, they allowed the grass and shrubs to die back.

to die down*

1. to wither to the ground.

For lack of water, the wheat died down to the ground.

to die off

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1. to die gradually, or one by one, until all are gone.

Almost all of the convicted Nazi war criminals have died off.
The grass begins to die off in May, and is all quite sun bleached by July.

to die out*

1. to become extinct.

We now fear that thousands of species will die out as a consequence of human bumbling in the biosphere.

to die for X; to lay down one's life for X

1. to sacrifice one's life in order that X (usually, another person, collectivity of persons, or cause) may survive.

Soldiers are called on to lay down their lives for their country.
IBM's a fine employer, but it's not a company I would lay down my life for.
There is no doubt that he would have gladly died for his sister.
She believed in the cause, but she was not willing to die for it.

to die on someone*

1. a. to die in the presence or while in the charge or care of someone.

Her azaleas keep on dying on her.
She had two patients die on her that week.

b. *(resentfully)* to die, and so fail to fulfill someone's expectations, needs or desires.

I was only a mile outside of Jerome and my horse died on me.
I was just five years old when my ma died on me.
I spent $300 on a new aquarium and all the fish died on me.

to die the death of a X; to die as/like a X; to die a X's death

1. in one's last moments, to comport oneself as a X.

He died the death of a hero, and was decorated posthumously.
He died like a coward, in trembling flight.

to die in the harness; to die in the saddle

1. to die on the job; to die while still engaged in the work activities of life.

The old nitpicker died in the saddle, writing memos to minions.

to die with one's boots on

1. to die engaged in manly activity or in accordance with manly honor; esp., to die a violent death.

He died with his boots on, wrestling a bear on his trap line.

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to put to death

1. to execute a human or terminate an animal's life

His court appeals exhausted, he was finally put to death.
They decided to put the suffering animal to death.

for someone to be dead meat/a dead duck/as good as dead*

1. for the life of someone to be at risk with no avenue of escape.

He'll be dead meat if Big Al ever finds him.
You're as good as dead if you walk in that neighborhood at night.
With assassins lining the streets, the Archduke was a dead duck in an open car.

(a fate) worse than death

1. *(usually hyperbolic)* a misfortune, situation, etc. regarded as being worse than death.

A bad seat at the opera: a fate worse than death.
They all agreed that turning thirty would be a fate worse than death.

to rather die than X

1. *(usually hyperbolic)* to prefer death to X.

I would rather die than be in an iron lung.
He would rather die than speak in public.

wouldn't be seen (or found) dead with (or in)

1. *(hyperbolic)* an expression of extreme distaste or loathing.

Al said he wouldn't be seen dead with a haircut like that, and Billy said he would die for one.
She said she wouldn't be seen dead with him at a bus stop, much less go out on a date with the guy.

Relevant compounds:

deadfall
1. a trap for animals arranged so that a heavy weight is dropped on the prey, killing or maiming it.
2. a tangled mass of fallen trees or brush.

dead head, deadhead
1. n., a faded flower head.
2. n., a log floating on end and mostly submerged (also called a sleeper).
3. n., a heavy post on a pier to which lines are secured.
4. v.t., to pluck off the dead heads from a plant.

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It is a grizzly bit of imagination to regard a floating log or heavy post as resembling a corpse, but there you have it: the reference is biological (cp. **deadman**; **dead-mans' fingers**).

deadhouse 1. a mortuary.

deadline*
1. originally, a line around a prison beyond which a prisoner could go only at the risk of being shot by a guard.

deadly nightshade 1. belladonna, a poisonous plant.

dead man, deadman
1. various objects secured to or buried in the ground to offer anchorage or leverage (if in ice, it is also called an ice anchor).
2. *(naval)* an untidy line end left adrift (also called an Irish pennant).

dead march 1. solemn funeral music in slow march tempo; especially a military funeral march.

dead-mans' fingers; dead men's fingers 1. a low level marine animal.

dead man's float 1. in swimming, the act of floating in a prone position with the arms and legs extended; hence, a floating position resembling that of a corpse.

deadwood*
1. the dead part of a tree, etc.

deathbed 1. the bed in which an individual dies.

death bell 1. a bell tolled on the occasion of a person's death.

deathblow*
1. a blow which causes death.

death camass 1. a lilylike plant with a poisonous bulb and clusters of small greenish-white flowers.

death camp 1. a prison camp where many die, or a camp specifically designed for the extermination of the people there interred.

death chair 1. an electric chair designed for execution.

death chamber 1. the room in which one dies or is put to death; esp. a gas chamber designed for executions.

death cult 1. a cult involving practices wherein people are put to death, or take their own lives.

death cup 1. the cup from which one drinks a deadly poison.

death-defying 1. daredevil; mortally risky.

death feigning 1. tonic immobility as a defensive behavior in animals.

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death house 1. the wing of a prison in which prisoners sentenced to death or a death chamber is located.

death instinct 1. self destructive inclinations of a deep-seated nature; Thanatos.

death knell*
1. the announcement of a death or funeral by the solemn ringing of bells.

death march 1. a forced march in which many die.

deathmask 1. a mask made from a cast of a person's face taken soon after his death.

death penalty 1. the legal penalty of dying for one's crime.

death rate 1. the proportion of the number of deaths to a given population, usually rendered as so many per 1000 per year.

death rattle 1. a rattling sound in the throat of a dying person, caused by the partial obstruction of the air passage by mucous.

death ray 1. a ray weapon capable of killing at a tactically significant distance.

death ring 1. a finger ring designed to convey poison when shaking hands.

death sentence 1. a legal sentence to die as the punishment for one's crime.

death's-head 1. a human skull, or a representation of it symbolizing death.

death'shead moth 1. a large hawk moth with markings on its back which resemble a human skull.

death-song 1. a song sung by one prior to dying.

death throes; throes of death 1. the agony of dying.

death toll 1. the total number of deaths resulting from a given event.

death train 1. a train used to convey prisoners to a death camp.

deathtrap 1. a structure that is so unsafe as to threaten the lives of those within it.

death warrant 1. a legal document which gives license to impose a death penalty.

deathwatch
1. a vigil kept beside a dead or dying person.
2. a guard set over a person soon to be executed.

death wish 1. a pathological desire to die.

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3.232 Death as a lack of embodiment

3.2321 Fading away; coming to an end; ceasing to exist

Relevant roots and derived forms:

death, n.

3. *(nonbiological)* any ending, cessation, or passage into nonexistence.

the death of Imperial Japan
the near death of the American steel industry
the death of progress in civil rights
a program to bring the death of poverty in America

7. *(nonbiological)* the cause of any ending, cessation, passage into nonexistence, or failure.

Economic mismanagement was the death of Russian communism.
Pride will be the death of him yet.

die, v.i.

4. *(nonbiological)* to cease to exist; to diminish or fade away; to pass out of memory (cf. §3.2331).

After his son's drowning, the gentleness inside him died.
His knowledge of the conspiracy died with him.
His affection for her died over the course of their vacation together.
When she caught sight of the knife in his hand, her words died on her lips.
His smile died as soon as she turned away.
The sound of the church bells died in the distance.
We will speak of it once, and then let the issue die.
The motion died for lack of a second.

deathless, adj.

1. a. *(nonbiological; very limited distribution)* everlasting.

the deathless greed of capitalists

dying, adj.

3. a. *(nonbiological)* drawing to a close; about to end

the dying days of the century

b. *(nonbiological)* fading away; ceasing to exist.

a dying social order
dying footsteps
a dying glacier

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our dying lead in aerospace technology
dying enthusiasm for nuclear power

undying, adj.

1. *(nonbiological; limited distribution)* unending; everlasting; eternal.

the undying wheel of karma

2. *(nonbiological; limited distribution, requiring reference to a mental state; hyperbolic)* steadfast or persistent.

his undying patriotism
his undying love and devotion
his undying fascination with the Civil War

dead, adj. & adv.

4. *(nonbiological)* no longer in existence.

a dead civilization
a dead bank account
Her love for him is dead.

Relevant collocations and idioms:

to die away

1. to become weaker and cease gradually; to fade out; to die out.

The footsteps became fainter and finally died away altogether.

to die out*

1. to become weaker and cease gradually; to fade out; to die away; to progressively go out of existence.

When the sun began to die out at dusk, we went indoors.
All the pool parlors seem to have died out and been replaced by video game arcades.
It took generations for the enmity to die out between the two tribes.

for something to be as good as dead*

1. for something to be highly likely to pass out of existence.

There followed shortly thereafter a general celebration of the conviction that Structuralism was as good as dead.
When the tour buses began to ply Haight Street, everyone realized that the community as we had known it was as good as dead.
Looking at her tax bill, she remarked that her tobacco shop was as good as dead.

Relevant compounds:

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civil death 1. *(in law)* deprivation of all civil rights and normal social intercourse through banishment or life imprisonment. From the perspective of society, the individual ceases to exist.

deadhead

1. n., [< dead head of cattle] a person who rides on trains, goes to the theatre, etc. using a free ticket.
2. adj. & adv., without passengers or without load.
3. v.i., to behave as a deadhead.
4. v.i., to operate a train, truck, etc. without a load.
5. v.t., to treat as a deadhead.

Insofar as generating revenue is concerned, it is as if the deadhead had never been there at all; it is as if the unloaded train had never run, etc. (cp. **dead time**).

3.233 Death as a lack of purposive activity

3.2331 Being nonpurposive in general

Relevant roots and derived forms:

die, v.i.

5. a. *(nonbiological)* to cease to function or operate or be used.

Their marriage slowly died.
His car died in the center lane.
Many languages which have died are preserved in written records.

b. *(nonbiological)* to cease to influence or exert force.

We just hoped and prayed that disco would die.
One theory dies and is replaced by another.

Note: in many cases, the senses of *die* which mean 'cease to function' or 'cease to influence' cannot be separated from the sense of die which means 'cease to exist' (cf. §3.2321). E.g.,

The agency died for lack of funding.
Amid bickering, the political alliance between the two countries died.
The scandal eventually died.
The elders complained that the old customs were dying.

dying, adj.

4. *(nonbiological)* ceasing to operate or function; ceasing to influence or exert force.

a dying water heater
a dying bureaucracy which grows ever larger and less effective
a dying issue
a dying tradition

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deathless, adj.

1. b. *(nonbiological; very limited distribution)* ever relevant and admirable

the deathless words of Lincoln

dead, adj. & adv.

5. a. *(nonbiological)* no longer used or usable; no longer operational, hooked up, or purposively engaged.

Grosso modo, Latin is a dead language.
dead laws
dead phone line
dead microphone
dead wire
dead circuit
dead issue
dead ball

b. *(nonbiological)* discharged; expended; exhausted.

dead steam
dead battery
dead coals
dead match
dead type (i.e., type already printed and ready to be disassembled and melted down for re-use)

Relevant collocations and idioms:

the living dead*

1. individuals with no sense of self direction or purpose; those who have become devoid of hope and ambition; zombies.

No job, no money, no prospects, no clue, and now no apartment: he had joined the living dead of the street.
The wan faces of the living dead at quitting time had dissuaded him from office jobs.

to refuse to die

1. *(with humans)* to persevere despite adversity, or hardship; to refuse to cease or give up.

Despite a burdensome tax system, the American small businessman refuses to die.
In their last match up, Sugar Ray Robinson beat Jake La Mata's face into oatmeal, but the guy refused to die.

2. *(with inanimates or incorporeals)* an X which endures and continues to function or flourish despite some reasonable expectation that it should not.

Those old Sunbeam toasters just refuse to die.

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Some say that religion is a social neurosis which refuses to die.
He suffered from an unrequitted love which refused to die.

to go dead*

1. to cease to function; to become unresponsive.

The tiller went dead in the storm.
The wheel went dead when the front tires began to drift.
I'm on hold for twenty minutes and then the phone goes dead.
There was a huge crack of thunder and the lights went dead.
If the flashlight goes dead, there's a backup in the cabinet.

to die on someone*

1. to cease to function for someone.

My electric razor died on me this morning so I went to work without shaving.

to be dead in the water*

1. to have been brought to a halt; to be at an impasse.

If he couldn't get a ride to get the parts to fix his car, he was dead in the water until Monday, when the buses ran.
Plans for prison reform are dead in the water without new taxes or bonds.
Resistance by the administration has stopped reform dead in the water.
Concerns about the quality of the foundation stopped construction dead in the water.

to be dead and buried

1. to have been resolved (esp., forgiven or smoothed over); to no longer be of current importance.

It's true that he had behaved quite badly, but that's an issue which has been dead and buried for 10 years.

for X to be dead and done with

1. for the matter concerning X to have been resolved; for X to no longer be of current relevance or importance.

So far as he was concerned, the issue was dead and done with and deserved to be forgotten.

to let something die

1. to allow something to be set aside, forgiven, forgotten, smoothed over, etc.

It was only a faux pas, and not ill intended, but she refused to let it die.
It's a ridiculous foundation for a feud: you should just let it die.

to beat a dead horse

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1. to continue in a course of action (especially, to elaborate or to reiterate an intellectual theme or assault) past the point that any further advantage can be expected.

Even after the mayor resigned, the demonstrators continued to beat a dead horse by appearing in front of his house for another month.

Relevant compounds:

dead ball 1. a ball which is out of play.

deadbeat, dead beat 1. a lazy, idle person; a person who tries to evade paying for things; a sponge.

dead end

1. *(literal)* a dead end street; a street, alley, etc. which is blocked at one end and which fails to connect with other streets.

2. a policy, course of action or way of life that diminishes possibilities or potential to the zero point, and leads to no new possibilities or potential.

Total linkage finally just produced total diplomatic gridlock, and came to be regarded as a dead end.
For most, auto mechanics is a dead end street: few mechanics ever ascend into management or come to own their own shop.
His heroin use was a dead end street.
Rommel was a wonderful master of motorized attack, but his collaborations against Hitler turned him down a dead end street from which there would be no backing out.

3. an impasse; a point devoid of possibilities, ideas, or progress.

They remained at a dead end in their negotiations.
Contract negotiations arrived at a dead end when neither side could agree on health care benefits.
Philosophical dead ends include infinite regresses, solipsism, the other minds problem, conceptual relativity, and the metaphysical nature of reality.
They felt that their relationship had come to a dead end, and that it was time for either counseling or divorce.

4. *(in radio)* any part of a coil not connected with the circuit.

dead letter

1. a law or ordinance no longer enforced but not repealed.
2. an unclaimed letter, or one that cannot be delivered because of an incorrect address, etc.

The letter is dead because it ceases to travel in the mails, but also because the communicative intention it represents is brought to an impasse.

dead soldier; dead marine 1. an empty, consumed bottle of liquor.

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dead space 1. *(military)* the area within maximum range of weapon, radar, radio, or observer which nevertheless cannot be covered because of obstacles or other local limitations.

dead time 1. time during which the active work of accomplishing a purpose is not going on, although preparations for it may be in progress; e.g., *(in pile-driving)* the time occupied in lifting the hammer; *(in physics)* the recovery period during which a detector or counter, etc. is not yet ready to register another pulse, count, etc.

dead type 1. *(in printing)* type already printed and ready to be disassembled and melted down for re-use.

dead water 1. *(naval)* internal waves; waves that occur along the interface separating two water masses, usually at a thermocline. Wave heights, periods and lengths are usually large compared to surface waves. Possibly, the designation represents a comment on the difficulty of conducting sonar and passive sound detection activities across such interfaces (cf. **dead space**).

deadwood*
1. a person or persons within a group regarded as useless or inefficient.

diehard
1. n., a stubborn person who clings to an unlikely cause or in some other way resists to the last.

3.2332 Being nonactive in general

Relevant roots and derived forms:

die, v.i.

6. *(nonbiological)* to diminish in activity; to come to a stop.

The wind died as soon as we had unraveled our kite string.
The baseball rolled up to him and died at his feet.

dying, adj.

5. *(nonbiological)* ceasing activity or motion: as, dying winds.

dead, adj. & adv.

6. a. *(nonbiological)* not vibrant, not reverberant; dulled, dull; lacking zest, not lively.

dead colors
the dead sound of an acoustically dead room
dead clanking of muffled bells
dead tennis ball
dead atmosphere
dead party
Business is dead this time of year.

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b. *(nonbiological; hyperbolic)* disinvigorated; unresponsive; without spontaneity or emotion.

feeling dead
dead smile
dead performance
advice consisting of dead words

c. *(nonbiological; esp. in mechanics & engineering)* not moving or imparting motion or power.

still dead waters of an inland sea
dead air space
dead load
a dead pulley
a dead axle

deaden, v.t. & v.i.

2. *(nonbiological)* v.t., to lessen the vigor or intensity of; to diminish; to dull: as, the boss' presence had the effect of deadening discussion among the workers; to deaden vibrations; to deaden noise; to deaden the overbright colors of a painting.
3. *(nonbiological)* v.i., to lose vigor, intensity, vibrancy, responsiveness, etc.: as, his eyes deadened as he lost consciousness; the colors deadened as they dried; he felt the steering wheel deaden as the front tires began to drift.

Relevant collocations and idioms:

to be (just) dead; to be dead on one's feet; to be half-dead; to be more dead than alive

1. to be physically exhausted, enervated, incapable of movement.

Max was just dead after running the marathon.
The all-nighter left her simply dead.
Sue was dead on her feet after working for 12 hours.
After the shipwreck, the sailor collapsed, half-dead, on the beach.
When I had the flu, I felt more dead than alive.
After the fight, he was more dead than alive..

to die down*

1. diminish in activity.

I was sailing on the Bay when the wind suddenly died down.
It takes some time, but all scandals finally die down.
The wind died down at dusk.

to go dead

1. to cease to be lively.

The party went dead after Elvis left.

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for a horse to die in the stretch

1. *(in horseracing)* for a horse to lose energy, slow down, and fall behind in the final straightaway.

15 to 1 odds, a three length lead, and that moonblind nag dies in the stretch!

to be dead in the water*

1. *(nautical)* for a vessel to be stopped in the water with no means of propulsion and no means of mooring or anchoring.

In midocean, her boilers down, she was dead in the water two days.

to stop dead in one's tracks; to stop X dead in X's tracks

1. to halt suddenly and completely; to cause to halt suddenly and completely.

Catching sight of the lion, I stopped dead in my tracks.
She had been romantically pursuing him for a month, but when she discovered that he was the single father of three, that stopped her dead in her tracks.

Relevant compounds:

dead air
1. still, stale air; esp. air contained in a dead air space.

Willy actually enjoyed the mustiness of the dead air in the attic.

2. *(in radio)* a period of silence occurring because of technical transmission failure, or because the radio personnel are at a loss for words.

The transmitter broke down and there was dead air for an hour.
The radio show guest's shocking joke was followed by a long period of dead air.

dead air space 1. *(in construction)* a sealed air space within a wall, attic, etc.; esp. one designed to provide heat and sound insulation.

dead axle 1. an axle that does not rotate or house rotating shafts.

dead-bat 1. *(in cricket)* adj., where the bat is held loosely so that the ball will drop to the ground upon striking it.

deadbeat, dead-beat, dead beat
1. tired out; exhausted.
2. *(in mechanics)* making a beat without recoil; characterized by abrupt stoppage of motion without recoil.
3. *(in mechanics)* a beat without recoil.

dead-beat compass, dead beat compass 1. a liquid-damped compass for use aboard ships or under other perturbed conditions, designed so that its north-pointing element returns to its equilibrium position by one direct movement.

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deadbolt 1. n., a locking device employing an unsprung bar which is prevented from moving unless a key is inserted in a lock. 2. v.t., to lock via a deadbolt.

dead center
1. adj., *(in mechanics or clockmaking)* that position of a crank and a connecting rod in which both are exactly in the same straight line, so that no rotational or counterrotational force is exerted (cf. **top dead center, bottom dead center**).

He advanced the ignition timing to 6° BTDC (before top dead center).

2. n., *(in mechanics)* a nonrevolving center (cp. **live center**).

Most phonographs have a dead center, which causes the holes in records to wear.

dead color 1. n., lay-in; the monochromatic paint laid-in as an undercoat to establish the tonality of a painting; the nonvibrant color background of a painting.

deadeye 1. a circular block with three holes and no sheaves (pullies) or other moving parts. With pairs of deadeyes, the rigging could be set taut by lanyards. The designation may refer to the lack of moving parts, or perhaps to a perception that the two holes at the upper end of the deadeye resemble the blank eyes of a corpse.

dead head, deadhead
3. n., (cited above) a heavy, immobile post on a pier to which lines are secured (cp. **deadman**).

dead ice 1. any part of a glacier which has ceased to flow.

dead letter 1. (cited above) a letter which cannot be delivered because of an incorrect address, etc.; hence, a letter which has ceased to progress through the mails.

deadlight
1. *(naval)* a non-opening porthole or skylight of heavy glass in the deck or side of a ship.
2. *(naval)* a hinged metal cover for an air port; a battle port. A cover fitted with light-obscuring baffles to permit ventilation without the escape of light is called a ventilating deadlight.

dead load 1. *(in engineering)* a load whose weight is constant and invariable; the load imposed on a structure by the structure itself plus its fixed contents.

deadlock
1. n., a stoppage, standstill or stalemate resulting from the opposition of equal forces.
2. v.i., to come to an impasse or to stalemate.

dead man, deadman
1. (cited above) various objects secured to or buried in the ground to offer an immobile anchorage.

dead-pan 1. with an expressionless face.

dead pan
1. an expressionless face.

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2. a person, as an actor, who has or assumes such a face.

dead pedal 1. in an automobile, a flat stable support next to the pedals for the left foot.

dead point 1. *(in mechanics)* the point at which positional dead center is achieved.

dead pull 1. dead lift.

dead pulley 1. a pulley which turns with its axle rather than rotating on it.

dead set
1. the unmoving position of a hunting dog in pointing game.

dead storage 1. storage of vehicles, equipment, etc. for an indefinite period; deep storage; storage which is undisturbed by intermittent activity.

dead weight, deadweight
1. the weight of an inert person or thing.
2. The weight of a vehicle without a load; the weight which does not change.

dead wind 1. a wind blowing in the direction opposite to a ship's course; head wind; hence, a wind that does not contribute to the forward motion of a vessel.

3.2333 Being nonsentient

Relevant roots and derived forms:

dead, adj. & adv.

3. a. *(nonbiological; hyperbolic)* as if dead; numb or insensate.

The dentist will not drill until your tooth is dead.
He was passed out dead on the floor.

deaden, v.t. & v.i.

1. *(quasibiological)* v.t., to make as if dead; to make numb, less sensitive, or insensate.

He will deaden the tooth with novacaine.
His ability to react had been deadened by alcohol.

Relevant collocations and idioms:

to be dead to the world

1. to be unconscious or fast asleep; unaware of the external world.

He was snoring loudly, dead to the world.
An inside hook in the second round left him dead to the world.

to return from the dead*

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1. to wake up.

When he still had not awakened by noon, she began to wonder whether he would ever return from the dead.

dead from the X up/down; for a body part to go dead

1. to be paralyzed, numb or physiologically nonfunctional (from the X up/down, etc.).

The sort of dead-from-the-neck-up dumb brick who wouldn't have thought of it. (Wodehouse, 1963)
His arm is pretty much dead from the elbow down.
His hand functions reasonably well despite the two dead fingers.
When he awakened from sleeping on his side, he found that his arm had gone dead.
His nose had gone dead during his smoking years, and never really recovered.

3.234 Death as a limit

In §3.224 above, we spoke of life as a complex of capacities or resources running up against limits, and about the use of the life-related lexicon to refer to the absolute reach of life in expressions such as *for the life of one,* or to convey emphasis in expressions such as *to be the (living) end.* There are clear analogies to these usages in the death-related lexicon, where a large number of roots, derived forms, collocations, idioms, and compounds refer in a nonbiological fashion to death as that which cannot be gone beyond.

3.2341 Being overwhelmed; failing

In life, one may find fulfillment or failure. The extreme emotional and intellectual limits of individuals are often referred to via death-related words, and incidences of being overwhelmed or failing are presented as a kind of death. Here death is represented as a limit in the sense of being something which overcomes us, or which we cannot surmount.

Relevant roots and derived forms:

death, n.

7. *(nonbiological)* the cause of any ending, cessation, passage into nonexistence, or failure.

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Economic mismanagement was the death of Russian communism.
Pride will be the death of him yet.

8. *(nonbiological)* any condition or experience thought of as being like dying or death in that it can hardly be survived or endured.

It was just death for her to revisit the scene of the tragedy.

die, v.i.

7. a. *(nonbiological)* to fail to overcome some challenge or obstacle; to come up against one's limits.

I did very well on the homeworks, but on the final I died.
The bicyclist was leading the pack in the valley, but he died on the mountain grades.
The new recruits all died on the obstacle course.
The waves died against the breakwater.

b. *(nonbiological)* to be overwhelmed by some emotion, by some mental state, or by physical sensations.

He just died when he met the President.
She was dying of remorse.
She is dying to go to Disneyland.

deadly, adj. & adv.

3. *(nonbiological)* seemingly or actually insurmountable; that cannot be gotten beyond.

deadly interview
deadly college entrance exam

4. *(nonbiological)* unbearable.

deadly dinner party

Relevant collocations and idioms:

for someone to (just/nearly, etc.) die (of X); so X that someone thought he would die

1. to be overwhelmed (usually adversely) by some emotion (especially embarassment or exasperation), by some mental state, or by physical sensations.

When I realized at the interview that my socks were different colors, I could have just died (of embarassment).
I nearly died of boredom at the reception, but I kept a smile on my face.
I was dying of curiosity to hear what had been said in executive session.
I was dying of thirst and the Coke machine wouldn't take my quarter.
She was so good looking that he just died when he was introduced.
They were so hungry they thought they would die.
He was so happy he thought he would die.

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to be the death of X*

1. to cause X to undergo extreme worry, annoyance or distress.

She says her picky husband will be the death of her.
This feud between the two sisters will be the death of their loving mother, Martha.
I predict that little Billy and his popgun will be the death of that babysitter.

2. to be the cause of any ending, cessation, impasse, passage into nonexistence or failure of X.

These county regulations will be the death of this housing development.
These homework assignments in genetics will be the death of me.
Then on Tuesday he failed to turn in his term paper, and that was the death of him.
The inability to reestablish civil order was the death of the fragile new government.
Economic mismanagement was the death of Russian communism.
Pride will be the death of him yet.

to die laughing

1. to laugh heartily or uncontrollably.

I thought I would die laughing when I saw him in his Halloween costume.
I didn't think it was funny, but the audience around me died laughing.

to be dying to X; to be dying for X

1. to intensely desire to X; to be wholly fixated on doing X.

He's dying to go to Disneyland.
She's dying to become a lawyer.
I'm dying for a cold drink.

to die for something

1. *(hyperbolic; with would;)* desire intensely; give anything for; pay any price for.

I would die for a chance to meet Bob Hope.
She would die for a date with that boy.
I would die for ice cream.

for someone to be dead meat/a dead duck/as good as dead*

1. for someone to be highly likely to be vanquished, beaten, discredited, etc.

He'd be dead meat in the (boxing) ring with Chavez.
He was as good as dead when he got into the ring with Chavez.
He was a dead duck in the ring with Chavez.
The prosecutor gave him a look that told him that he would be dead meat in cross-examination.
The dictator's Minister of Information would be a dead duck on Meet the Press.

for something to be as good as dead*

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1. for something to be highly likely to fail.

The deal was as good as dead when it came out that we did not have an overseas office.
The marriage was as good as dead when he discovered her letter to Enrique.
TR's bid for a second full term as President was as good as dead when he failed to secure his party's nomination.

Relevant compounds:

deathblow*
1. an action or event which has the effect of destroying or stopping something.

The failure of the legislature to pass the new tax was the deathblow to the governor's plan for a revival of state supported arts.

death knell*
1. an omen of extinction or failure.

Carter's speech on diminished expectations was the death knell of his presidency.
A failure to dredge the Bay would be the death knell of the Port of Oakland.

sudden death overtime 1. in games played under a time limit, an overtime period which immediately concludes if one team scores (and hence wins the game).

3.2342 Being extreme; being exact

Corresponding to the use of life-related words as markers of emphasis in expressions such as *the meanest man (alive)*, death-related words often function as intensifiers with the sense of 'extremely' or 'exactly.' In such expressions as *dead sure* or *dead ahead*, the notion of a general limit which cannot be gone beyond is figuratively recast as a limit in the specific semantic field at issue. Hence, a person who is dead sure is one who could not have greater conviction; a bouy which is dead ahead is one which could not be any more centered in one's forward path.

BEING EXTREME

Relevant roots and derived forms:

dead, adj. & adv.

7. a. *(nonbiological)* to an extreme degree; absolutely; complete.

dead tired	1. extremely tired.
dead broke	1. completely without funds.
dead drunk	1. exceedingly drunk.

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dead loss	1. complete loss; complete waste.
dead wrong	1. completely wrong.
dead right	1. absolutely right.
dead level	1. completely and absolutely level.
dead even	1. absolutely even.
dead calm	1. absolute calm.
dead run	1. full run; full speed.
dead stop	1. complete stop.
dead silence	1. complete silence.
dead quiet	1. complete quiet.
dead serious	1. completely serious.
dead set	1. absolutely, stubbornly determined.
dead sure	1. absolutely sure.

While these expressions are represented as nonbiological, it is certainly true that several of them relate to extreme inactivity or inertness in a way that may evoke images of biological death. Hence, in expressions such as *dead tired, dead drunk, dead calm, dead stop, dead silence*, and *dead quiet*, the word *dead* has the semantic force of *deathlike*.

She was dead tired after sailing all day.
On paper, he was damn near dead broke by the time the stock market closed.
The new statistics proved incontrovertibly that she had been dead wrong/ dead right.
For drainage purposes, the parking lot was not graded dead level.
To facilitate wheelchair access, they specified that the door sill be dead even with the stoop.
In the dead calm before dawn, the neighbor's cat began to yowl.
The police thought it suspicious that she should be dead calm after her husband's murder.
From his incoherent speech, I could tell that he was dead drunk.
We weren't sure at first whether the collapsed man was dead, or just dead drunk.
At the end of a year, the business showed no profit at all: it was a dead loss to all involved.
As for tracking down the elusive Ms. X., the trip to Acapulco proved to be a dead loss.
To show their vigor, they finished the hike at a dead run.
As soon as he smelled the smoke, he took off at a dead run for the nursery.
The car came to a dead stop when it hit the tree.
His speech came to a dead stop when he discovered that he had misplaced page twelve.
The hecklers brought the performance to a dead stop.
The offensive remark was answered by dead silence.
They proceeded in dead silence in order not to awaken the dogs.
He is one librarian who believes in dead literature and dead quiet.
His suggestion to open a lemonade stand was met with dead quiet by the moppets.
Anyone could see that he was dead serious and utterly committed to his insane plan.
He was dead set on having his own way.
He was dead set against the idea.
He was dead sure that he had locked the door when he left.

deadly, adj. & adv.

5. *(nonbiological)* to an extreme degree.

She was deadly earnest in her desire to renounce bourgeois materialism.

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He was so deadly serious when he asked for her hand in marriage that the proposal sent a chill through her body.

deathly, adv.

3. *(nonbiological)* to an extreme degree.

deathly serious
deathly afraid of heights

Other expressions using *deathly* which relate more directly to conceptions of physical death may also represent death as an extreme. Hence, to be deathly ill is to be ill to the point of physically dying but also, more simply, to be extremely ill. Deathly cold may be life threatening or may evoke images of corpses, or may just suggest extreme cold.

Relevant collocations and idioms:

to death*

1. to an extreme degree; extensively; excessively.

He was bored to death in algebra class.
I'm sick to death of your complaining.
He practiced the étude to death, never quite getting it right.
Her grandmother just loved her to death
Al sneaked up behind me and scared me to death.
When Mary didn't come home, I was worried to death.
Max hates raw vegetables, so he cooks them to death.
A Midsummer Night's Dream has been done to death.

Not all of the expressions in which *to death* is used to mean 'to an extreme degree' are equally nonbiological. Some appear to also draw on the sense of *to death* which means 'to the point of death'; e.g., *sick to death, scared to death, worried to death.* Also, when one is bored to death, one becomes increasingly nonresponsive in something like the fashion of a person whose life processes are shutting down. When one cooks vegetables to death, they become decomposed in a way that suggests the decay of dead material. Plays which have been done to death lack the spontaneity and novelty which one associates with being alive in general. These expressions bridge the biological and nonbiological senses of *to death.*

to be death on X

1. to be extremely good at X, or at some activity in connection with X.

He is death on rollerskates (i.e., rollerskating).
He's death on flies (i.e., killing flies).
He's death on resumes (i.e., writing resumes).

the dead of night; the dead of winter

1. the deepest, darkest, coldest, quietest part of night or winter.

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He woke me up at 4:00 AM, in the dead of night.
There are places on earth where the dead of winter is almost wholly devoted to alcohol and literature.

The association between physical death and extreme dark, quiet, and cold cannot be missed here.

to have/catch someone dead to rights

1. to possess positive proof of someone's guilt; *(with **catch**)* to catch redhanded.

He was just breaking in when the police nabbed him: they caught him dead to rights.
His disgruntled secretary faxed the IRS his secret ledgers, and they had him dead to rights.

A relevant compound:

deadline*
1. originally, a line around a prison beyond which a prisoner could go only at the risk of being shot by a guard; hence,
2. a boundary which it is forbidden to cross; thence,
3. a time limit, as for a payment, news story, etc.

BEING EXACT

The relevant root:

dead, adj. & adv.

7. b. *(nonbiological)* exact.

dead center*	1. exactly in the center. 2. *(in mechanics or clockmaking)* that position of a crank and a connecting rod in which both are exactly in the same straight line, so that no rotational or counterrotational force is exerted.
dead level	1. exactly level.
dead even	1. exactly equally matched.
dead heat	1. exactly tied in the heat of a competition or race.
dead shot	1. one who shoots exactly on target; an expert marksman.
dead length	1. an exact length.
dead ahead	1. directly ahead, bearing 000 degrees relative.
dead astern	1. directly behind, bearing 180 degrees relative.
dead on course	1. exactly on course.
dead on target	1. exactly on target.
dead on	1. adj. exactly correct. 2. adv. in a forward and square orientation.
dead ringer	1. one who exactly resembles another. 2. *(in horseshoes)* a pitch which lands the shoe squarely around the target post.

The arrow was dead center in the bullseye.
He announced that he had invented a tripod which would adjust itself to dead level.

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Nixon and Kennedy were dead even on the eve of the 1960 election.
Either would make a superb treasurer: as far as ability goes, they are both dead even.
The two race cars were dead even as they crossed the finish line.
Nixon and Kennedy were in a dead heat on the eve of the 1960 election.
Long after the horserace had ended, Particle Movement and Affix Hopping were in a dead heat for 10th place.
The two boxers were in a dead heat on points as they entered the fifth round.
According to Al, he and Sir Isaac Newton are in a dead heat for the title of History's Most Intelligent Man.
He's a dead shot with a bow and arrow, but handguns make him tremble.
Look out for little Billy: he's a dead shot with a rock.
He spent his days in the mill stacking iron bars cut to a dead length.
He knew he was going to crash when he saw the guardrail dead ahead.
The stern lookout reported a periscope dead astern.
The ship was dead on course but five hours behind schedule.
The artilleryman boasted that he was dead on target four times out of five.
I think she's dead on when she blames the American drug dilemma on American consumers of drugs rather than on foreign traffickers and producers.
When the figures finally came in, they proved his predictions to be dead on.
He struck the car in front of him dead on.
Wait till you meet Bob — he's a dead ringer for Rasputin.
He's been pitching horseshoes for years; he throws a dead ringer about one time in four.

3.24 Summary

One of the aspects of the literal-figurative distinction is that the literal meaning is taken to be the basic and normative meaning, the 'real' meaning, the default meaning under standard pragmatic conditions. Since deviation from the default case requires more specification than the default case, literal forms are generally less morphologically or syntactically embellished than forms with figurative meaning. In the English life- and death-related lexicon, derived forms and compounded forms are more likely to have a figurative meaning than root forms, and collocations and idioms are more likely to have a figurative meaning than derived or compounded forms. The sample here suggests that better than half of the senses of life- and death-related words and expressions in English are non-biological in character. In spite of this, the native speaker of English will readily affirm that the senses considered basic are those relating to biology — a clear testament to the prestige of concepts scientifically or criterially defined.

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A sizeable proportion of all of the nonbiological uses of life- and death-related words are spurred by EPA considerations: embodiment, purposiveness, and activity are the principal semantic axes in terms of which words such as *alive* and *dead* are made meaningful outside of the biological sphere. It appears that the animistic sensibilities of childhood are preserved in the adult in sufficient force to give rise to conventionalized expressions of animism in language. The case of English serves as a demonstration of a semantic pattern which is held to be general across languages.

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3.3 ANIMACY Governed Phenomena

In linguistics, ANIMACY refers to a semantic dimension of nouns according to which nouns are classified into two or more groups (e.g., ANIMATE v. INANIMATE) and treated differently in the language as a consequence of this categorization. The relationship between linguistic ANIMACY and biological animacy is at least as tenuous as the relationship between linguistic GENDER and biological gender. It is very often the case that ANIMACY distinctions fail to observe the biological dipolarity between the living and the nonliving, though it seems that biological considerations are always relevant to some degree. Intact adult humans are inevitably included in the ANIMATE class; inert artifacts and inert objects of nature can be pretty well counted on to be assigned to the INANIMATE class. However, it sometimes occurs that inanimates are categorized as ANIMATE, and that animates are categorized as INANIMATE. In Chinantec, which applies ANIMATE or INANIMATE affixes to all nouns, the sun and the moon and the stars and lightning are classified as ANIMATE, while plants are classified along with stones as INANIMATE. Furthermore, a language may recognize graduated levels of ANIMACY, while biological animacy is essentially a binary distinction. In Navajo, eight different levels of ANIMACY are distinguished — and here again lightning is assigned to a higher ANIMACY class than plants.

In ANIMACY systems worldwide, the overall pattern of divergence from biology is consistent. First, as mentioned, ANIMACY systems may be graded, while judgments of biological life status are binary. Second, ANIMACY systems are anthropocentric. Intact adult humans are always assigned to the highest ANIMACY class, and may be the only entities assigned to that class. Also, higher animals are often assigned to a higher ANIMACY class than lower life forms which are far less similar to humans. Third, the ANIMACY distinctions among humans relate to matters of human capacities, prestige and relations rather than to biological life status. Fourth, whole animals are likely to be regarded as more ANIMATE than body parts, though an animal and his parts are equally alive. Fifth, the status of plants is

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problematic. They may be classified with animals (presumably in appreciation of their biology), or classified with inanimates (presumably on account of their inertness), or given their own class.[92] Sixth, dramatically active or motile inanimates may be classified in a higher ANIMACY class than quiescent inanimates, and may even be assigned to a higher class than plants or some animals. Seventh, natural inanimates are more likely than manmade inanimates to be accorded a higher ANIMACY classification. Eighth, entities which are countable or definite in discourse may be regarded as more ANIMATE than inanimates that are noncountable (i.e., mass entities) or less definite in discourse. Ninth, entities which are physically real may be regarded as more ANIMATE than entities which are abstract. Tenth, ANIMACY classes and classifications may alter from one grammatical occasion to the next, while biological status is fixed. For example, in Swahili, nouns referring to intact adult humans and animals are assigned to separate noun classes and generally fall into separate patterns of morphological agreement; however, the distinction is not preserved in the third person plural form of possession markers. Here, reference to humans and animals alike requires the suffix *-ao* 'their$_{animal}$,' while *-ake* 'their$_{nonanimal}$' is used in reference to plants or inanimates.

The upshot of these differences between ANIMACY systems and biological systems should be clear: ANIMACY distinctions in languages tend to distribute the entities of the world into just the same groups and hierarchies that young children form when they assess the life status of the things around them animistically. In ANIMACY systems we find reproduced the gradability, the anthropocentricity, the EPA sensitivity, and the inherent plasticity or volatility of animistic thought. This dissertation will argue, on the basis of such observations (and from original empirical research reported in Chapter Four) that perseverant animism directed by EPA sensibilities is uni-

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[92]Cp. Gale's remark in 1677 (*Crt. Gentiles* II. iv. 309) that "Plants are said by some kind of analogie to live ... yet they cannot be said properly to live ... Brutes are said properly to live, because they have a true self-motion."

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versally the causal ground for the development of linguistic ANIMACY systems (or, more modestly, for the divergence of such systems from biological models).

3.31 The crosslinguistic ANIMACY hierarchy

In the languages of the world, there is good evidence for a crosslinguistic ANIMACY hierarchy. The notion of such a hierarchy has been popularized by Comrie (1981), though the general existence of some such hierarchy has always been recognized, and sometimes explicitly presented, by scholars involved with ANIMACY systems or animacy effects (e.g., Clark and Begun, 1971; Hawkinson and Hyman, 1974).

> As an initial characterization of animacy, we define it as a hierarchy whose main components, from highest to lowest degree of animacy, are: human > animal > inanimate, although, as we shall see, some languages in fact make use of less fine distinctions (e.g. human versus non-human, animate versus inanimate), or of finer distinctions. (Comrie, 1981: 178)

In consideration of the data which Comrie advanced as being demonstrative of universal practices in language, and of additional data which will be presented below, the structure of the crosslinguistic ANIMACY hierarchy is taken to be as shown below.

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The Crosslinguistic ANIMACY Hierarchy

Overall

Humans > Animals > Plants & Inanimates > Incorporeals

Humans

Adult > Nonadult
Male/MASC gender > Female/FEM gender
Free > Enslaved
Able-bodied > Disabled
Linguistically Intact > Prelinguistic/Linguistically Impaired[93]
Familiar (Kin/Named) > Unfamiliar (Nonkin/Unnamed)
Proximate (1p & 2p pronouns) > Remote (3p pronouns)

Animals

Higher/Larger Animals > Lower/Smaller Animals > Insects
Whole animal > Body part

Plants

Plants

Inanimates

Motile/Active > Nonmotile/Nonactive
Natural > Manmade
Count > Mass

Incorporeals

Abstract Concepts, Natural Forces, States of Affairs, States of Being, Emotions, Qualities, Activities, Events, Time Periods, Institutions, Regions, Diverse Intellectual Objects

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[93]Linguistic considerations are very much nonindependent of other considerations. The prelinguistic v. linguistically competent distinction may be regarded as a particularization of the adult v. nonadult (in this case, infant) distinction; the linguistically impaired v. linguistically intact distinction can be thought of as a particularization of the able-bodied v. disabled distinction.

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It should be borne in mind that no language exemplifies all of these distinctions, and that the major distinctions are far more common than the minor ones. Also, certain classificatory arrangements are in keeping with the hierarchy without being strictly predicted by it, as when a two-class system poses humans against nonhumans or animals against nonanimals, or when a dramatically active inanimate is classified along with animals, or when disparaged persons are classified with inanimates, etc.

The crosslinguistic ANIMACY hierarchy diverges from biology and accords with animistic sensibilities in several respects, as listed below.

1) ANIMACY systems, like animistic attributions, may be graded, while judgments of biological life status are binary.

2) ANIMACY systems, like animistic attributions, are anthropocentric.

3) The ANIMACY distinctions among humans relate to matters of human capacities to act and interact rather than to biological life status. It is adults, and the freeborn, and the able-bodied, and the linguistically intact who are most effectively engaged in purposive activities. It is the kinsperson or familiar person who most assists in these activities, or impedes them. It is in the canonical encounters between first and second persons that projects are prototypically forged. It is the male who (rightly or wrongly) is most often associated with the projects receiving the most social attention.

4) Whole animals are likely to be regarded as more ANIMATE than body parts, though an animal and his parts are equally alive.

5) In ANIMACY systems, as for animists, the status of plants is problematic. They may be classified with animals, or classified with inanimates, or given their own class.

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6) In ANIMACY systems, as with animists, dramatic inanimates may be more highly regarded than quiescent inanimates.

7) Natural inanimates may be more highly regarded than manmade artifacts.

8) Countable entities with good form may be more highly regarded than entities which come in a mass.

9) Entities which are physically tangible may be more highly regarded than entities which are intangible.

Note well that EPA themes run all through the crosslinguistic ANIMACY hierarchy.

Embodiment themes are represented in

the overall anthropocentricity of the hierarchy;
the superiority of physically real entities over incorporeals;
the superiority of whole animals over body parts;
of countable entities over entities which come in a mass;
of natural entities over artifacts;
of adult humans and physically intact humans over the immature and disabled; and
of 1p and 2p pronouns referring to humans who are present over 3p pronouns referring to absent or nonhuman parties.

Purposiveness themes are represented in

the superiority of adults over nonadults;
of the able-bodied over the disabled;
of the free over the enslaved; and
of the linguistically intact over the prelinguistic or linguistically impaired.

Activity themes are represented in

the superiority of motile or active entities over quiescent entities; and in
the superiority of animals over plants.

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In short, in ANIMACY systems one finds reproduced the gradability, the anthropocentricity, and the EPA sensitivity of animistic thought. The misalignments between ANIMACY and biology are most striking in the grouping of dramatic inanimates with animates, and the grouping of plants with inanimates. All of this constitutes a prima facie case for the view that perseverant animistic sentiment in adults is universally the causal ground for much of the divergence of linguistic ANIMACY systems from biological models.

In the following sections, the crosslinguistic ANIMACY hierarchy will be exemplified by data from diverse languages. Some examples of ANIMACY phenomena will be 'harder' or more grammatically explicit than others. Most explicit of all are those cases where a noun class system marked by overt morphology is organized in terms of ANIMACY classes. Least explicit or 'softest' of all, perhaps, are those cases where the topic-worthiness of an entity co-varies with the degree of its ANIMACY, or when ANIMACY-sensitive selectional restrictions impose graded limitations on the use of certain predicates; e.g., *grow old* is most easily used in connection with humans, and more easily used in connection with animals than plants. Given the variety of grammatical processes which may involve ANIMACY considerations and the ubiquity of 'soft' ANIMACY phenomena, it is safe to say that every natural language finds some grammatical occasions to treat noun phrases differently in acknowledgement of a difference in their ANIMACY.

Since ANIMACY effects are seemingly everywhere, it is not really clear to anyone what constitutes a legitimate or sufficient sample. At any rate, while the data presented below is advanced as typical of ANIMACY phenomena, it is much more of a sampler than a sample. In this scrapbook of ANIMACY phenomena, this collection of linguistic snapshots, languages are sometimes just glimpsed microscopically from one or two perspectives. There is no attempt here to exhaustively examine the operation of ANIMACY considerations within any of the languages discussed, but only to observe a few phenomena

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of interest which support the general structure of the essentially uncontroversial crosslinguistic ANIMACY hierarchy.[94]

3.32a Swahili

In connection with the following discussion, the learned consultancy of Mr. Josephat Rugemalira is gratefully acknowledged. Mr. Rugemalira is from the village Rwanyango in the Karagwe district about 100 miles west of Bukoba, the regional capital on the shores of Lake Victoria. His native language is Runyambo. He is, at the time of this writing, completing his doctoral studies in the Linguistics Department of the University of California at Berkeley. Published sources which have aided in the preparation of this section have included Krapf (1882), Johnson (1939a; 1939b), Perrott (1951), Rechenbach (1967), Wilson (1970), Hinnebusch and Mirza (1979), and Kamusi ya Kiswahili Sanifu (1981).

Selectional Restrictions:

An annotated glossary of basic Swahili life- and death-related vocabulary is presented in Appendix A. The Swahili lexicon resembles the English lexicon in that prominent nonbiological senses of these words are given over to matters of embodiment, purposiveness, and activity. Recalling that embodiment is first and foremost a matter of being real, existent or extant, note that *kifo* 'death' may in connection with incorporeals (e.g., fascism) mean 'cessation; passage into nonexistence,' much as *ua* 'kill' may in these connections mean 'cause to end.' In a complementary fashion, while *isha* ordinarily means 'bring to an end,' it may be pressed into idiomatic service

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[94]In discussing ANIMACY phenomena, it is common and convenient to employ the 'shorthand' whereby affirmations such as *humans are ranked as superior to other animals* or *plants are grouped with inanimates* are taken to mean that nominals referring to humans are privileged with respect to some grammatical phenomenon in a way that nominals referring to other animals are not, or that nominals referring to plants and nominals referring to inanimates are grammatically treated alike in some fashion, etc. To speak of ANIMACY is to speak of nominals and grammatical phenomena.

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to mean 'finish someone off; kill.' A number of embodiment focused words related to drying up, withering, losing substance, etc. are also associated with death and with afterlife: *kauka* 'dry up, (for a plant to) die'; *kizimwe* 'something dried up and dead'; *kizimwi* 'evil spirit, ghost'; *zimu* 'to be about to die, to become invisible, to disappear,' etc.[95] The adjective *-zima*, which has 'alive' as its primary meaning, may also predicate wholeness, healthiness, or maturity — which all relate to embodiment or functionality, a matter of purposiveness. The word *fa* 'die' may in connection with inanimates and incorporeals mean 'cease to function.' In connection with humans, the word may mean 'be overwhelmed': *kufa kucheka* 'to die laughing' is an idiom in Swahili as well as in English.

In Swahili, as in English, it is evident that the sense of a life- or death-related word may change depending on what type of entity the word is used in connection with. Another way of stating this is to say that a given sense of a word selects for certain kinds of entities; e.g., the 'cease to function' sense of *fa* selects for nonliving rather than living entities. The interesting thing about the selectional restrictions placed on the Swahili life/death lexicon is that the classifications of entities embodied in these restrictions are in important ways consistent with animistic sensibilities, and inconsistent with biological considerations. The full details and exemplification of the Swahili selectional restrictions are presented in Appendix A; however, the gist of these restrictions is presented below in Tables 5 and 6. We see in Swahili a powerful exemplification of what may be the most pervasive ANIMACY phenomenon in human language: the imposition of selectional restrictions that attest to

[95]The etymological connections or nonconnections between these and other '*zim*-words' are *not* clear. There appears to be no etymological relationship between *zima* the verb meaning 'put out, extinguish' and *-zima* the adjective meaning 'alive, whole, healthy' (and their senses are approximately opposite). Johnson (1939b) relates *kizimwe* to *zima* the verb. If there is a connection between *kizimwi* or *zimu* and *zima*, it may be only ideophonic. However, the strength of semantic connection for the average speaker is not known. The glossary contains additional notes.

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the conceptualization of life in terms which are anthropocentrically graded and only approximately biological in foundation.

Table 5.

SWAHILI SELECTIONAL RESTRICTIONS IN LIFE-RELATED WORDS

+	Acceptable
?	Awkward
-	Unacceptable
s	Use Restricted to Special Circumstances or to Selected Entities
-----	These Lines Separate Word Families

The word:	used in connection with a:								
	fetus	body part	human being	higher animal	lower animal	insect	plant	inanimate	incorporeal
----------									
hai									
1. alive	? s	? s	+	+	+	+	? s	-	-
uhai									
1. life	? s	+ s	+	+	+	+	+ s	-	-
----------									
ishi									
1. live	+	-	+	+	+	+	? s	-	-
2. dwell	+	-	+	+	+	+	-	-	-
maisha									
1. lifetime	-	-	+	+	+	+	+	-	-
2. duration	-	-	-	-	-	-	-	+	+ s
----------									
mimba									
1. fetus	+	-	-	-	-	-	-	-	-
2. ear of plant	-	-	-	-	-	-	+	-	-
----------									
mwili									
1. body	-	-	+	-	-	-	-	-	-

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Table 5, cont.

The word:	used in connection with a:								
	fetus	body part	human being	higher animal	lower animal	insect	plant	inanimate	incorporeal
-zima									
1. alive	?s	?s	+	+	+	+	?s	-	-
2. healthy	?s	+s	+	+s	+s	?s	-	-	-
3. functional	-	-	-	-	-	-	-	+	-
4. mature	-	-	+	-	-	-	-	-	-
5. whole	+s	+s	+s	+s	+s	+s	+s	+	+s
uzima									
1. life	-	-	+	-	-	-	-	-	-

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Table 6.

SWAHILI SELECTIONAL RESTRICTIONS IN DEATH-RELATED WORDS

+	Acceptable
?	Awkward
-	Unacceptable
s	Use Restricted to Special Circumstances or to Selected Entities
-----	These Lines Separate Word Families

The word:	used in connection with a:								
	fetus	body part	human being	higher animal	lower animal	insect	plant	inanimate	incorporeal
----------									
fa									
1. die	-	-	+	+	+	+	-	-	-
2. cease to be or to function	-	-	-	-	-	-	-	+s	+s
3. be overwhelmed	-	-	+	-	-	-	-	-	-
fiwa									
1. die on one									
deceased:	-	-	+	+s	+s	-	-	-	-
bereaved:	-	-	+	+s	+s	-	-	-	-
2. stop on one									
'deceased':	-	-	-	-	-	-	-	+s	-
'bereaved':	-	-	+	-	-	-	-	-	-
jifia									
1. pass away	-	-	+	-	-	-	-	-	-
kifo									
1. death	-	-	+	+	+	+s	-	-	-
2. cessation	-	-	-	-	-	-	-	-	+s
----------									
fariki									
1. depart	-	-	+	-	-	-	-	-	-

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Table 6, cont.

The word:	used in connection with a:								
	fetus	body part	human being	higher animal	lower animal	insect	plant	inanimate	incorporeal
haribu									
1. spoil; (cause to) miscarry	+	-	-	-	-	-	-	-	-
kauka									
1. dry up	-	-	-	-	-	-	+	+	-
2. dry up; die	-	-	-	-	-	-	+	-	-
-kavu									
1. dry	-	-	-	-	-	-	+	+	-
2. dead	-	-	-	-	-	-	+	-	-
maiti									
1. corpse	-	-	+	-	-	-	-	-	-
mauti									
1. death	-	-	+	-	-	-	-	-	-
mwili									
1. body; corpse	-	-	+	-	-	-	-	-	-
mzoga									
1. carcass	-	-	-	+	+	?	-	-	-
toa									
1. put out; abort; kill	+	-	-	-	-	-	-	-	-
toka									
1. go out; be miscarried; die	+	-	-	-	-	-	-	-	-
ua									
1. kill	-	-	+	+	+	+	-	-	-
2. cause to end	-	-	-	-	-	-	-	-	+s

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Let us examine some cases where selectional restrictions fail to observe biological boundaries. In English, the predicates such as *alive* or *living* or *has life* may in principal be used to characterize any entity which meets the biological criteria for life. However, it would be thought cartoonish to speak of 'living fingers,' since this seems to suggest fingers that have come into a life of their own. The point is this: the English speaker recognizes the biological status of body parts, and yet may hesitate to acknowledge this status with a biological predicate because the biological notion of being alive is closely bound up with the holistic notion of being whole. Fingers are alive but they are not whole: therefore, their aliveness seems deficient.

The Swahili speaker is more inhibited by holistic considerations than the English speaker when it comes to making biological predications. Not only are body parts problematic on account of their partlike nature, but so are fetuses. In addition, it is often uncomfortable to speak of the life status of plants and insects in the same terms that one uses to speak of the biological life of humans and other animals. This discomfort in applying biological predicates is not a defeat for biology — the full biological understanding of the speakers is not in doubt — rather, it is a victory for sensibilities which are largely orthogonal to biology, sensibilities of a holistic or animistic hue. Now to cases.

Hai 'alive' can be used in connection with anything which is biologically alive, including fetuses and body parts and plants but, in the normal course of events, an occasion for such use is unlikely to arise. The word can be used in connection with fetuses if, for example, one needs to speak of the life of the fetus independently from the life of the mother. Normally, however, one conceives of these lives as united. To say that a mimba 'fetus' has uhai 'life' suggests that the mimba has a life of its own, and this paradoxically suggests that the mimba is an mtoto 'child' rather than a fetus. Hence, the use of *hai* in connection with fetuses is always awkward, even though *hai* properly describes the life status of the fetus. The words *hai* and

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uhai can be used in connection with body parts if, for example, one needs to distinguish between body parts which are alive and body parts which are not alive (e.g., the scalp vs. hair). Again, the occasions which permit such usage seem contrived. References to the life of plants via *hai* and *uhai* seem always awkward, and are likely to occur only under special circumstances (e.g., in botanical discussions).

The restrictions on *hai* 'alive' (of Arabic origin) are equivalent to the restrictions on the adjective *–zima* 'alive' (of Bantu origin). However, the abstract noun *uzima* 'life' which corresponds to *–zima* is more restricted than the abstract noun *uhai* 'life.' *Uzima* refers only to human life; uzima is an abstract state of human being. Anthropology is not the study of uzima per se, because uzima is not constituted by culture, society, or evolution. Biology is not the study of uzima per se, because the biologist is too oriented to physical matters to be truly involved with uzima. It might be said that the biologist studies uhai rather than uzima. There is a feeling that *uzima* is more appropriate than *uhai* in religious contexts. However, it could easily be said that God gave us uhai as well as that He gave us uzima. A body part has uzima insofar as a whole body has uzima, and a fetus has uzima insofar as the mother and the fetus together have uzima — but *uzima* would never be used in connection with fetuses or body parts alone. Being a human is special — if not biologically, then holistically and spiritually.

The anthropocentricity of *–zima* and *uzima* is underscored by the fact that, when *–zima* is used to mean 'mature,' it can only be applied to humans. Further, *–zima* in the sense of 'healthy' is only used readily in connection with humans, though it can be used in special circumstances in connection with fetuses, body parts, and animals (including insects). Use always assumes that one has some concern for the health of the entity being described, and the likelihood of having such a concern differs between entities. For example, *–zima* could be easily enough used in connection with a domestic animal, but its use in connection with wild animals is not very

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likely. Use is always awkward in connection with fetuses, since the health of the fetus is not ordinarily considered to be independent from that of the mother. Use is also always awkward in connection with insects, since interest in the health of insects (excluding perhaps bees) is quite unusual, and criteria for their health are not mentally established. Regardless of any interest that one might take in the health of plants, the use of *-zima* in connection with plant life is proscribed.

Even *ishi*, which can be readily applied to all whole animal organisms, is only awkwardly used in connection with plants. *Ishi* means roughly 'live (through a period of time).' Since *ishi* makes reference to living as a temporally continuing process, the word maintains a certain tension with:

dumu	'last'
chukua	'carry; take; take (a certain length of time)'
kaa	'stay, remain'
endelea	'go on, advance, progress, continue'

In connection with fetuses, some speakers may prefer *ishi* while others prefer *kaa*, a form with no necessary semantic connection to biological life, while others feel equally at ease (or equally awkward) using both. *Ishi* is not used in connection with body parts at all. In connection with plants, lay speakers are very likely to favor *kaa*, while *ishi* would be awkward. And in the second sense of *ishi*, 'dwell,' use with plants is unheard of. Only the related form *maisha* 'lifetime' is extended to plants. In fact, *maisha* is the <u>only</u> basic life-related word which can be used in connection with plants with full felicity. The sense of this seems to be that the life of plants is only like the life of human beings in the fact that there is a generational aspect to the succession of plants. *Maisha* is naturally enough not used in connection with body parts or fetuses. The time that a fetus spends in the womb is not considered to be a lifetime; rather, a lifetime begins at birth. The use of *maisha* in connection with body parts could only be imagined in, for example, some strange discussion among doctors about the relative longevity of different organs.

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While it is difficult enough to speak of the life of body parts and fetuses and plants, it is even more difficult to speak of their death. In fact, there is *no* natural way to speak of the death of a body part, since it can hardly be conceived that a body part might die independently from its host being.[96] Neither do trees or fetuses 'die' (*fa*) or have a 'death' (*kifo*). Trees 'dry up' (*kauka*) or become 'dry' .(*-kavu*), while fetuses 'are spoiled' (*haribika* — cf. *haribu*), 'go out' (*toka*) or 'are put out' (*tolewa* — cf. *toa*). Even the very generic *ua* 'kill,' which is readily applied to all animal life, cannot be used in connection with fetuses or plants.

These usages may strike the English speaker as indirect and, at least in regard to fetuses, euphemistic. It needs to be emphasized that this vocabulary is the *only* vocabulary available to speak of the death of fetuses and plants. When it is said of a plant that it has 'dried up,' or of a fetus that it has 'spoiled,' etc., this is accepted as the normal way to affirm that the plant or the fetus has died. In consequence, a dead plant, even if physically soaking wet, will be referred to as 'dried up.'[97] Clearly then, the pragmatic force of these expressions is far more direct in Swahili than would be the case in English. At any rate, pragmatics is just really not the issue here:

---

[96]There is a collocation used with body parts which associates numbness with death:

kufa ganzi 'to become numb' (lit., 'to die' + 'numbness')
mkono umekufa ganzi
arm has-died numbness
'the arm is benumbed, is asleep'

The collocation is not used in connection with a whole body — e.g., in connection with a sleeping or anesthetized person. In Runyambo, Mr. Rugemalira can say 'eyes die' to mean 'go blind'; however, this locution is not acceptable to him in Swahili.

[97]If the speaker wishes only to affirm that the plant has dehydrated to a degree but is not yet dead, then he will use *kaukiana* 'dry up' or *nyauka* 'dry up.' These terms may also be applied to animal life, with the sense of 'shrivel, wither.' In connection with animals, *kaukiana* is preferred. In connection with humans, *dhoofika* or *dhoofu* 'become feeble' or *konda* 'emaciate, pine, grow thin' would be preferred. Neither *nyauka* nor *kaukiana* can be used in connection with body parts to mean 'wither; atrophy.' Neither *nyauka* nor *kaukiana* is used in connection with mere insects: the Swahili speaker has neither the interest nor the criteria to identify cases of insect emaciation.

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there is no escaping the inference that trees and fetuses are not believed to have quite the kind of being which is killed when animals are killed, and not believed to have quite the kind of being which dies when animals die. The point of interest is not that there are putatively indirect ways to refer to the death of fetuses and plants: the point of interest is that the putatively direct forms, *fa* and *ua*, which are broadly applied to animal life, are not even in principle applicable to fetuses and plants.

The selectional restrictions placed on the death-related vocabulary do not distinguish between higher animals such as mammals and lower animals such as reptiles, crustaceans, annelids, etc. For the most part, even insects have the same co-occurrence rights as mammals; however, it is considered peculiar to make reference to the *kifo* 'death' of an insect, and the dead remains of an insect could only awkwardly be referred to as an *mzoga* 'carcass.'

As in the case of the life-related vocabulary, humans receive special treatment in the death-related vocabulary. Only a human can 'depart' (*fariki*) or 'pass away' (*jifia*) or, ordinarily, 'die on or be lost to someone' (*fiwa*). Only human death can be referred to by *mauti*. Only a human corpse can be referred to by *maiti* or *mwili*. However, the Swahili speaker is barred from using this vocabulary in connection with a human fetus.

In summary, when we examine the Swahili life- and death-related lexicon, and the selectional restrictions applied to that lexicon, we find four structural effects which are inconsistent with a biological characterization of life and death, though consistent with animistic and holistic conceptualizations.

First, the sense of a life/death word may change depending on what entity the word is used in connection with, and these discontinuities in senses may align with holistic rather than biological discontinuities between the entities. For example, while *-zima* is used freely with all animal life to mean 'alive,' it may only mean 'mature'

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when it is used in connection with human life. Similarly, *fa* may mean 'die' in connection with all animal life, but it may only mean 'be consumed or overwhelmed' when it is used in connection with humans. Biological considerations fail to predict the discontinuity in senses between human life and other animal life.

Second, life/death words may be restricted so that they can only be used in connection with certain entities, and these restrictions may be holistically rather than biologically based. The awkwardness of many basic life- and death-related words in connection with fetuses, body parts, and plants makes it clear that these words do not function as pure biological predicates.

Third, the gradability of selectional restrictions in the Swahili life/death lexicon belies the notion that these words function in only a biological capacity. Since life and death are bipolar biological concepts, one might expect that a life/death word either definitely could or definitely could not be used in connection with a given entity, depending on whether or not that entity met the culturally approved biological criteria for life. In the Swahili lexicon, however, we find that selectional restrictions are not bipolar, but graded, and that the anthropocentricity of this graded character is consistent with holistic or animistic, rather than biological, sensibilities. The awkwardness of *-zima* 'alive' and *hai* 'alive' in connection with body parts, fetuses, and plants is one expression of this Swahili ANIMACY gradient. This gradient may also be inferred from other facts: e.g., that a special term *maiti* refers to the remains of a human; another term *mzoga* is used in connection with animals — though even this term is awkward with insects — and no term at all is available to speak of the dead form of a fetus or a tree.

Fourth, there is a certain lexemic inconstancy to the selectional restrictions discussed here which is itself a demonstration of the plasticity of holistic appraisals of 'life status.' If a given life/death root were accorded a biological characterization, then

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one would expect all words in which this root appeared to be semantically dominated by the given biological sense and, hence, one would expect the selectional restrictions within a word family to be the same. However, this is not what is observed in the Swahili life/death lexicon. For example, *fa* 'die' is readily used in connection with insects, while *kifo*, the root-related nominal form 'death,' can only awkwardly be used in connection with insects — a variation in selectional restrictions which biological considerations do not predict. Likewise, it is for some reason easier to refer to the 'life' (*uhai*) of body parts and plants than it is to say that body parts and plants are 'alive' (*hai*). It may be said that plants have a 'lifetime' (*maisha*), but one is hesitant to say that plants 'live' (*ishi*). If one pushes the issue, it can be affirmed that all biologically living things are 'alive' (*-zima*), but only humans have 'life' (*uzima*). We see here one demonstration of the fact that, in ANIMACY systems, in contradistinction to biology systems, the 'life status' of an entity is not necessarily fixed across all occasions on which it is considered.

Noun Classes:

All nouns in Swahili are assigned to noun classes. These classifications are overtly signalled by the shapes of singular and plural prefixes attached to the noun root, and by various agreement affixes which are attached to demonstratives, attributive adjectives, possessive adjectives (i.e., possessive pronouns), numerals, verbs, prepositions and proforms.

Historically, the noun classes in Bantu languages were more semantically cohesive than they are today. There was once a noun class which contained only nouns referring to human beings, another for nouns referring to animals, a different one for elongated objects, and for diminutives, and so forth. At that time, much of the system may have been dominated by considerations of ontology and of physical configuration. Semantic shifts, borrowings, and other processes of change have undermined the precision of these classifications. For instance, the Ndizi 'Banana' class, which does not morphologi-

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cally mark either the singular or plural forms of nouns, today includes a wide range of nouns because it is regarded as the ordinary depository for borrowings (Hinnebusch and Mirza, 1979:95). As the semantic motivation for the noun classifications has become more obscure, between-speaker and within-speaker variation in assigning nouns to classes has become common.

Nevertheless, a few interesting ANIMACY-related points can yet be made about the Swahili noun class system. First, no noun classes have been more semantically cohesive and resistant to change than the Mtu/Watu class, devoted to humans, and the Uzuri class of abstract qualities. It may be worth noting that humans and abstract qualities represent, at once, ontological kinds which are maximally distinct, and the upper and lower extremes of the crosslinguistic ANIMACY hierarchy.

Mtu/Watu 'Person/People' Class[98]

1. SG prefixes: m-
   mw- (often, before vowels)
2. PL prefix: wa-

This is a class of nouns denoting persons, except for the words *mnyama* 'animal' and *mdudu* 'insect.' Most kinship terms are not in this class, although the adjectives and verbs used in connection with kinship terms will take the agreement prefixes of the Mtu/Watu class. Nouns referring to body parts are not in this class, but are distributed between other classes, partly on the basis of the shape of the parts. Members here include:

mtu 'person'
mfu 'dead person' Cf. fa 'die'
mtoto 'young child'
mwana 'child, dependant, without reference to age'

[98]Traditionally, the noun classes of Swahili are numbered; e.g., the Mtu/Watu class may also be referred to as the 1/2 class.

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Uzuri 'Beauty' Class

14. SG prefixes: u-
w- (before vowels)

This class has no plurals.

uzuri 'beauty'
uhuru 'freedom'
wema 'goodness'

One may further note that the names of most animals have historically been assigned to the Ndizi 'Banana' class; that the natural home of nouns referring to plants is the Mti/Miti 'Tree/Trees' class; and that the greatest concentration of inanimates (and particularly artifacts) are to be found in the Kitu-Vitu 'Thing/Things' class — bearing in mind that the semantic focus of these classes is today quite obscure, that some animals or plants are assigned to other classes, that natural features such as mountains are often assigned to the Tunda/Matunda 'Fruit/Fruits' class in acknowledgement of their masslike character (since fruit comes in masslike collectivities), etc.

Given the robust demonstrated desire on the part of Swahili speakers to maintain a noun class devoted to humans, it is arresting that just being human does not guarantee an assignment to the Mtu/Watu class. Certain nouns referring to humans may be accorded Kitu/Vitu morphology, with semantic effects relating to diminution and disparagement.

kitoto (*hypochoristic*) 'little one'; cp. mtoto 'young child'
kibibi 'young lady'; cp. bibi 'lady; grandmother'
kisichana 'a young girl who has not yet reached puberty'; cp. msichana 'a young girl who has reached puberty but who is not yet married'
kijana 'young person; dependant; servant; slave'; cp. mwana 'child, dependent'

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kitwana 'youth of the slave class; brat; rascal'

Most nouns referring to disabled persons are permanently assigned to the Kitu/Vitu class, in a clear demonstration of diminished regard for disabled persons.

kipofu 'blind person'
kiziwi 'deaf person'
kiwete 'crippled person'

However *bubu* 'mute person' is assigned to the Tunda/Matunda 'Fruit/Fruits' class which, in association with the central image of fruit and collectivity, includes nouns referring to other plant parts, or to entities that are round like fruits, or come in masslike collectivities as does fruit, or are fertile or otherwise vitalized or powerful (since fertility is after all *the* psychoculturally idealized demonstration of potency and power among Bantu peoples). The Tunda/Matunda class also hosts the human nouns *mabibi* 'ladies; grandmothers'; *mababu* 'grandparents'; *majana* 'children; grubs or larvae' (obs.; cp. *mwana*, *kijana*); and *rafiki* 'friends' (a word which is also sometimes assigned to the Ndizi class). One is tempted to say that mabubu, mabibi, mababu, rafiki and majana are regarded as blending into a crowd, or as deficiently individualized. At any rate, the fact remains that at least some nouns referring to young people and old people and disabled people and women are excluded from the class which is the usual host for nonkin human nouns. These nouns find themselves instead in the classes typified by inanimate things, or by mass collectivity.

General Agreement Phenomena:

The agreement morphology required by a given noun need not exactly reflect the noun class to which the noun has been assigned: ANIMACY rather than noun class may determine the matter. Most nouns referring to people are in the Mtu/Watu class, while nearly all nouns referring to animals and many nouns referring to family relations

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are in the Ndizi class, and a few other nouns referring to persons or animals are scattered in other classes. Regardless, all nouns referring to persons or animals require any morphologically agreeing words to take the agreement affixes proper to the Mtu/Watu class (with exceptions[99]). In general, then, Mtu/Watu agreement morphology distinguishes between (humans + animals) and all other entities.

watu wawili	'two people' (Mtu/Watu class)
watoto wawili	'2 young children' (Mtu/Watu class)
vitu viwili	'two things' (Kitu/Vitu class)
* vitu wawili	'two things'
viongozi wawili	'two leaders' (Kitu/Vitu class)
* viongozi viwili	'two leaders'
viwete wawili	'two crippled people' (Kitu/Vitu class)
* viwete viwili	'two crippled people'
matunda mawili	'two fruits' (Tunda/Matunda class)
* matunda wawili	'two fruits'
mabubu wawili	'two mute persons' (Tunda/Matunda class)
* mabubu yawili	'two mute persons'
viboko wawili	'two hippos' (Kitu/Vitu class)
* viboko viwili	'two hippos'
vyura wawili	'two frogs' (Kitu/Vitu class)
* vyura viwili	'two frogs'

However, body parts, fetuses, and children referred to in the *Kitu/Vitu form do not trigger Mtu/Watu agreement* morphology.

viwiko viwili	'two elbows' (Kitu/Vitu class)
* viwiko wawili	'two elbows'
mimba mbili	'two fetuses' (Ndizi class)
* mimba wawili	'two fetuses'
watoto wawili	'2 young children' (Mtu/Watu class)

[99]When possessive adjectives (i.e., possessive pronouns) are used in connection with human Ndizi class nouns, the adjectives must take Ndizi class agreement morphology. When possessive adjectives are used in connection with animal Ndizi class nouns, the adjectives must take Ndizi class agreement morphology when the modified noun is singular, but may take either Ndizi class agreement morphology or Mtu/Watu class agreement morphology when the modified noun is plural. This is certainly a very counterintuitive exception: since the Mtu/Watu class is essentially a human being class, one would think that, if any Ndizi class nouns were allowed to take Mtu/Watu morphology, it would be the nouns referring to humans rather than animals.

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vitoto viwili '2 little ones' (Kitu/Vitu class)
* vitoto wawili '2 little ones'

We see a similar pattern in connection with object agreement. Verbs agree with their 'deep structure' direct objects, if the object is human or animal. (If there are two objects, and one is human or animal, then agreement proceeds with the human or animal object.[100])

ni-li-m-piga Rindi
1pSG—PAST—OBJ.AGREEMENT—strike Rindi
'I struck Rindi'

ni-li-m-piga twiga
1pSG—PAST—OBJ.AGREEMENT—strike giraffe
'I struck the giraffe'

ni-li-piga kitu
1pSG—PAST—strike thing
'I struck a thing'

ni-li-ki-piga kitu
1pSG—PAST—OBJ.AGREEMENT—strike thing
'I struck the thing' / *'I struck a thing'
[With indefinite things, object agreement is not allowed.]

Mtu/Watu object agreement proceeds in the case of disabled persons, even though disabled persons are not classified in the usual noun class for persons:

mama a-li-m-wona kipofu/kiziwi/bubu njiani
mama 3pSG—PAST—OBJ.AGREEMENT—saw
blind.person/deaf.person/mute.person on.the.path
'mama saw a blind person/deaf person/mute person on the path'

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[100]In other Bantu languages, it might be noted, the more ANIMATE object is more likely to be placed more proximally to the verb.

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However, in some cases, definiteness may play a role in whether or not object agreement occurs at all. There is a disinclination to extend object agreement processes to children or fetuses unless the child or fetus is definite.

mama a-li-beba mtoto mgongoni
mother 3pSG—PAST—carry child on.the.back
'the mother carried a child on her back'
[indefinite object; no agreement present]

ni-li-m-beba mtoto wangu mgongoni
1pSG—PAST—OBJ.AGREEMENT—carry child my on.the.back
'I carried my child on my back'
[definite object; agreement present]

a-me-toa mimba
3pSG—PRES.PERF—miscarry fetus
'she misscarried a fetus'
[indefinite object; no agreement present]

a-me-i-toa mimba i-le
3pSG—PRES.PERF—OBJ.AGREEMENT—miscarry
fetus AGREEMENT—that
'she miscarried that fetus'
[definite object; agreement present]

Possessive Adjectives:

Different 3p PL forms of possessive adjectives distinguish between (humans + animals) and all other entities.

SG		PL	
-angu	'my'	-etu	'our'
-ako	'your'	-enu	'your'
-ake	'his, her, its'	-ao	'their' (humans or animals)
		-ake	'their' (plants or inanimates)

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WH-words:

Two WH-forms, *nani* 'who' and *nini* 'what,' distinguish between human and nonhuman referents in the questioning of syntactic objects.

unataka nini
you.want what
'what do you want?'

unamtaka nani
you.want.someone who
'who do you want?'

unafikiri (ni) nini kimeanguka
you.think what it.has.fallen
'what do you think has fallen?'
* 'who do you think has fallen?'

umeona nini katika bustani ya wanyama
you.have.seen what in garden of animals
'what (animals) did you see in the zoo?'
* 'who did you see in the zoo?'

What we see in Swahili is that children and disabled persons and women and older persons are not always grammatically treated in quite the same way as adult males, and that children and body parts and fetuses are not always treated in the same way as complete mature humans and animals. To some degree, it seems that the language grammaticalizes the disparagement of the unborn, the young, the old, the disabled, and women. However, the degree to which social attitudes may be deciphered from grammatical structures can be debated at length, and here much of the data is indistinct.

We also observe that ANIMACY divisions may vary between grammatical processes, and this fact underscores the independence of ANIMACY classes from biological definition. In particular, while hu-

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mans and animals may be regarded as co-equally ANIMATE for certain grammatical purposes, it is never the case in Swahili that plants are included in this classification.

3.32b English

Actors, Topics, and Passives:[101]

Slobin and Bever (1982) have argued that the simple, active, declarative sentence is the prototypical sentence in any language. Correspondingly, one may be inclined to regard the canonical event as that event represented in a simple transitive sentence. Here, prototypically, an animate agent intentionally and punctually brings about a physical, perceptible telic change in the location or state of a pre-existing individuated patient (de Villiers, 1980; Hopper and Thompson, 1980; Slobin, 1981). In some accounts the prototypical patient is inanimate (e.g., Dixon, 1979; Slobin, 1981); other accounts give evidence that the prototypical patient is animate, or perhaps human (e.g., Clark and Begun, 1971; Corrigan, 1986). Whether or not the canonical event ought to be regarded in human terms as a canonical human encounter, an interaction between 'I and thou,' it is commonly agreed that the protagonist in the canonical event is conceived of in egocentric terms as a human being. It is with human activities in general, and with our own activities in particular, that activity per se best becomes circumscribed by the purposes it serves, and so takes on the shape of a discernible event against a background of mere worldly flux.

The prototypicality of events in which humans act as protagonists is rendered grammatically in English by a preference to use the active voice (i.e., the default, most simple, most direct and first acquired grammatical format) when reporting on events in which humans act as agents. Aligning with the fact that humans are the pro-

[101]In this discussion, in accordance with the custom of other writers on these topics, *animate* will be used to mean 'animal life form.'

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totypical actors in events, we find that, grammatically, they are the most prototypical agents and topics and subjects of English active sentences.

In contrast, when some event involves an inanimate actor and a human (or other animate) acted-upon, it becomes far more likely that the event will be reported in the passive voice. As a marked grammatical format, passive voice may serve in a general way to signal the nonprototypicality of the event relations being reported.[102] Simultaneously, passives minimize the upset of normal causal expectations by framing the nonprototypical event in as normative terms as possible. When animate patients are put into subject position, their topicality is maximized; when inanimate agents are mentioned either obliquely in a detransitivized *by*-phrase or not at all, their agentivity is minimized.[103]

Briefly here, using English as the principal demonstration language, we wish to take note of the influence of ANIMACY on our conceptualization of notions such as Actor, Agent, Instrument and Patient; on our assessments of topic-worthiness; and on our decisions

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[102]This is not to say that the form of the passive construction is, itself, a variety of metalinguistic comment sneaked in by the speaker. It is hardly the case that the disturbed word order of passives must be *intended* to iconically or metalinguistically signal the deviation of some event from the prototypical 'animate affects inanimate' event. There is no evidence that speakers (more or less) adhere to cognitive *rules* such as 'Topicalize animates,' or 'Use an atypical construction to refer to an atypical event,' or 'Reverse the word order of nominals if their animacy is the opposite of what you would ordinarily expect.' Nothing explanatory is gained by the postulation of such rules.

To explain why people (without much conscious deliberation) opt for a passive construction when inanimates affect animates, we must first and foremost evolve a natural account of why people want to topicalize animates in sentence-initial position. Preliminarily, we can already say, without any appeal to cognitive rules, that the tendency to topicalize animates arises because animates phenomenologically stand out relative to inanimates: by virtue of their similarity and relevance to ourselves, they are the natural focus of our empathy and our attention (Kuno and Kaburaki, 1975; Kuno, 1976; Ransom, 1977). The desire to place topics sentence initially surely relates to information processing efficiencies (Krauthamer, 1981; Bates and MacWhinney, 1982).

[103]The great preponderance of truncated passives in English has been noted since Jesperson. Givón (1979:57-64,191-193) reminds us that many languages (including Wappo and Ute) systematically omit reference to agents in passives.

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between active and passive voice formats for the reporting of events.

The most extensive examination of natural English language data contrasting active and passive formats is presented in Van Oosten (1984). Her corpus comprised edited women's verbal histories and several of the Watergate tapes from the Nixon presidency. She observed that, in active formats, the prototypical subject combines the properties of the prototypical topic and the properties of the prototypical agent. The properties of the prototypical sentence topic include:

> the topic is the focus of the speaker's and hearer's attention;
> the topic is the entity from whose perspective the speaker is viewing the event; that is, it is the important element in the speaker's view of the event;
> the topic is present in the immediate environment; and
> the topic is concrete and visible (1984:46).

Hence, topics tend to be referential, definite, and, since the interest of the speaker and hearer is determined egocentrically, topics tend also to be human or conceptually similar to humans. The properties of the prototypical agent include:

> the agent does something;
> the agent brings about a change in the patient;
> the agent's action is volitional and intentonal;
> the agent has primary responsibility for the action and the resulting change; that is, the resulting change would not have come about without the action of the agent;
> the agent is the energy source; that is, nothing is acting on the agent to cause the agent to bring about the resulting change;
> the agent is singular and specific;
> the agent uses his or her own hands, body or some instrument to perform the action;
> the agent is looking at the patient during the action;

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the agent is human; and
the agent experiences the action (1984:123).

Clearly, the prototypical topic and agent is a human being. However, some nonhumans are clearly better suited as topics and agents than others. Concrete entities are superior in this respect to abstract entities; physically present entities are superior to physically remote entities; entities which are regarded as self-sufficient energy sources are superior to entities incapable of independent action; and animals which can act intentionally and responsibly are superior to plants or inanimates. In short, many of the ranking themes of the crosslinguistic ANIMACY hierarchy appear to be operative in the *ranking of desirable topics and agents*.

In addressing the use of the passive as a marked construction, Van Oosten observed that

> the passive is used primarily when the agent and the topic do not overlap, and it is more important to code the topic than to code the agent as such. The function of the passive, then, is to pull the agent out of the focus of attention. (1984:204)

Van Oosten identified a dozen types of discourse situation which encouraged the use of either agentless passives (e.g., the identity of the agent is irrelevant, "somebody") or agented passives (e.g., the object of the *by*-phrase is new information, and is to be the topic of succeeding sentences). Clearly, not all of these discourse situations are related to ANIMACY — an important point to bear in mind. However, Van Oosten does note that passives become increasingly likely when the patient is the focus of attention, and when the object of the *by*-phrase would be understood as being too agentive or as bearing too much responsibility if it were the subject of an active sentence (1984:205,210). One cannot help but recognize that these particular discourse conditions are most likely to occur when sentences report on the action of inanimates on human beings. Hence, Van Oosten's work supports the view that a prominent subgroup of passives arises when the ANIMACY of the patient exceeds that of the agent — or, pro-

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totypically, an inanimate acts on a human. (And this seems to be especially true in relative clauses, 1984:253-255.) Passivization in these cases emerges, not as a strict syntactic encoding of agent-patient ANIMACY differences, but rather as a whole response to our desire to focus on more ANIMATE entities and to attend to issues of volition, responsibility and control.

In this connection, the syntactic habits of the adult begin to be formed in early childhood. Beginning with children's early two-word and three-word utterances, young children show a strong tendency to use animate nouns as actors and inanimate nouns as acted-upons, and to present nominals in an actor—acted-upon (i.e., animate-inanimate) order (Clark, 1965; Bloom, 1970; Bowerman, 1973; Brown, 1973; Limber, 1973; Bloom, Hood, and Lightbown, 1975; Dewart, 1975; Mallinson and Blake, 1980). De Villiers and de Villiers (1974), for example, examined all instances of actor-action-object and actor-object sequences in the earliest spontaneous utterances of eight children and found that 87% of these word combinations conformed to the pattern, animate actor + inanimate object. Angiolillo and Goldin-Meadow (1982) found that, although children 2:2-2:10 usually use actor + action order, their occasional deviations from this order mostly occur for inanimate actors. About one-fourth of their descriptions of events involving inanimate actors had aberrant word order. This shows that even beginning speakers are more consistent and conventional in their word order when actors are animate, and begins to uncover the natural path whereby aberrant syntactic formats become aligned with the reporting of nonprototypical events.

The propensity to identify actors with animates, and to identify patients with inanimates, and to topicalize animates via animate-inanimate ordering of nominals continues into later childhood and adulthood. In Hungarian, there is no active-passive contrast: word order is substantially free and sentence relations are signalled by casemarking. MacWhinney, Pléh, and Bates (1985) found that Hungarian 4-year-olds made good use of casemarking cues when interpreting sentences. However, 3-year-olds used animacy to decide up-

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on agent-patient relations. Sinclair and Bronckardt (1972) and Caselli and Devescovi (1981) found that French speaking Swiss children and Italian children, resp., relied heavily on animacy cues to interpret the agent-patient relations of NVN, VNN, and NNV 'sentences' in which the animacy of the nominals was systematically varied. Dewart (1979b) found that young children expected the first nominal to be animate and the second nominal to be inanimate in both active and passive sentences. Clark (1965) and Jarvella and Sinnott (1972) found a tendency *to create animate subjects and inanimate objects* in experiments where high school and adult subjects were asked to complete SVO sentences in which actor and acted-upon slots were vacant. Johnson (1967) asked college subjects to rate nonsense syllables occupying subject or object positions in sentences using the Semantic Differential. He found that the grammatical subject was felt to be more "animate" (here, "active and potent") than the grammatical object for both active and passive sentences.

Quite remarkably, the 'animate = agent' strategy has been observed, not only among children, but also among adults, particularly in linguistic contexts where grammatical clues to the identity of the agent are somewhat vague. Bates et al. (1982); MacWhinney, Bates, & Kliegl (1984); and MacWhinney, Pléh, and Bates (1985) tested the effect of independently varying word order, animacy, and other factors on the identification of sentence actors by speakers of English, Italian, German, and Hungarian. Among English speaking adults, word order accounted for 51% of the variance, whereas animacy accounted for only 3%. However, there was an intriguing interaction between word order and animacy. After analyzing their data for latency to assign agent, choice of agent and choice consistency, Bates et al. concluded that adults use word order when animacy is neutralized (as in animate-animate sequences) and both a 'first nominal = agent' strategy and an 'animate = agent' strategy for animate-inanimate and inanimate-animate sequences. When the word order and animacy strategies converged, there was greater consistency and shorter latency.

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The results also indicated that German adults relied on animacy more than did Americans (particularly in interaction with morphological agreement cues). With Italian adults, the English speakers' preference for word order cues over animacy cues was altogether reversed, apparently reflecting the fact that word order is considerably more fixed, and hence a more determinate and highly valued predictor, in English than in Italian. Finally, there was evidence that Hungarian adults continued to use animacy as a cue to sentence relations when casemarking did not decide the matter.

As children begin to really distinguish passive and active formats and to acknowledge that the actor is not always animate, they may initially regard the passive format as the form to be used when actors are inanimate and the acted-upon is animate. Prentice, Barritt and Semmel (1966) examined the effect of noun animacy on passive production. They asked subjects to describe cartoon pictures and found that the picture most frequently eliciting a passive involved an animate acted-upon (boy or girl) in conjunction with an inanimate actor (pot or ball).

Horgan (1978) examined passive sentences elicited from children ages 2-13 and from adults. For the youngest children (2-4 years old), she found that the majority of full passives had people and animals in the patient role. In 75% of their full passives, the actor was an inanimate. Horgan proposed that these "instrumental passives" emerged because children distinguished between agentive causation and nonagentive causation, and pressed the passive format into the service of the latter distinction. The instrumental passive was said to encode events other than those caused by people and animals and, in truncated form, events where the cause was unknown.

Dewart (1975; 1979a) investigated the influence of the actor's animacy on 6- to 8-year-old childrens' performance in a sentence recall task. She found that sentences with an animate actor and an inanimate acted-upon tended to be recalled in an active format re-

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gardless of the sentence voice at presentation, whereas sentences with an inanimate actor and animate acted-upon tended to be recalled as passives. In line with Dewart, Lempert (1984:39) found that 3- and 4-year-olds' ability to immediately recall and repeat passives in which an animate patient was acted upon by an inanimate was superior to their ability to recall and repeat passives in which an inanimate was acted upon by an animate.

Ransom (1977) has argued that adults' acceptance of passivized and dative moved sentences is *compromised when the promoted* argument is lower than the argument it replaces on an ANIMACY hierarchy constituted as: human > animal > other. Krauthamer (1981) has demonstrated that passivization by adults becomes increasingly likely as the animacy and discourse givenness of the patient comes to exceed that of the agent. By treating animacy, discourse givenness and agentivity as binary features, Krauthamer was led by a simple statistical algorithm to predict that her experimental subjects would employ passives 18.5% of the time when these three factors were systematically varied. As it turned out, 15.8% of the experimental responses were full passives, and 2.6% were truncated passives, yielding a combined figure astonishingly close to her prediction. Krauthamer's subsequent analysis suggested that the tendency to passivize is best represented as a gradient tendency, and that consideration of the relative animacy of the agent and patient may be the most important factor in deciding whether active or passive formats are to be used.

The tendency to topicalize animates, and hence to prefer passives when inanimates act upon animates, may not be consciously recognized by speakers. Adult speakers may think of passives as more or less logically equivalent to actives, or as more formal or more wordy or less direct alternatives to actives, but may not consciously regard passives as constructions which essentially recast nonprototypical events in as normative a format as possible by topicalizing animate patients and by deemphasizing the agentivity of inanimates.

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In the sizeable literature relating to agentivity, topicality and voice, many investigators have remarked on the role of biological animacy. In most cases, being ANIMATE has been equated with being animal. This is to say that discussions of ANIMACY in relation to agentivity, topicality, etc. have been highly biologized. We have to believe that a full understanding of the relationship between ANIMACY and these notions has been impeded by the tendency of investigators to investigate only the ANIMACY polarity of human and animal life on the one hand and inanimates cum quasi-inanimates like plants on the other hand. Even as investigators have increasingly come to view notions such as agentivity and transitivity in gradient terms, they have been slow to contemplate that these gradients may derive in large measure from a gradient conceptualization of ANIMACY. Nevertheless, their work occasionally presents some explicit recognition that linguistic ANIMACY ought not to be wholly equated with the biological animacy of animals; that, for example, the dynamism of motile inanimates may qualify them as agents, or that the roles of agent and instrument may merge with each other along a continuum of purposiveness or that, contrary to biology, humans may emerge as more ANIMATE than other animals. Below, a few studies are reported which show greater insight into the animistically colored, hierarchical character of ANIMACY as it relates to issues of agentivity, topicality, and voice.

Clark and Begun (1971) proposed that the subjects of transitive verbs in English are perceived as belonging to a semantic hierarchy, with human subjects more acceptable (hence, prototypical) and nonhuman subjects less so. Clark and Begun do not identify their hierarchy with ANIMACY per se; however, the concordance between their hierarchy and the crosslinguistic ANIMACY hierarchy is plain. The hierarchy: human nouns > animal nouns > nonanimate concrete count nouns > nonanimate concrete mass nouns > abstract count nouns (e.g., *fact*) > abstract mass nouns (e.g., *truth*). The hierarchy was derived via ratings of sentence acceptability when subject noun phrases from the six different categories were intersubstituted in frame sentences. The frame sentences had six different kinds of

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predicates, i.e., predicates identified as human predicates, animal predicates, concrete count predicates, etc. The hierarchy emerged because human nouns were the most substitutable, animal nouns were the next most substitutable, and so on.

This study also determined that the spacing on this hierarchy was variable. At the most general level of clustering, (human + animal) nouns were distinguished from all other nouns. The next level of clustering divided the nonanimate nouns into two clusters, the concrete nouns v. the abstract nouns. Human and animal nouns were also distinguished at about this level. Finally, the count v. mass distinction emerged. A second experiment using a related methodology yielded a very similar hierarchy, except that mass nouns this time held sway over count nouns — another indication that the count v. mass distinction was the least robust of the ANIMACY considerations built into the experiment. It would appear that anthropocentricity and biology played the leading roles in establishing the Clark and Begun hierarchy, and that embodiment considerations (i.e., concrete v. abstract; definite form v. mass) played supporting roles.[104]

Since the acceptability ratings used to establish the hierarchy involved the predicates of the sentences as well as their arguments, it was also possible to hierarchically rank the substitutability of the verbs used in the stimuli set. From this analysis, roughly, the following hierarchy emerged: (human + animal predicates) > (nonanimate concrete count + nonanimate concrete mass + abstract count predicates) > (abstract mass predicates). This hierarchy is clearly in accordance with the first, but not identical to it: it is another demonstration that ANIMACY relations in a language are not determinatively fixed across all grammatical phenomena.

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[104]Incidentally, note that Clark and Begun's adherence to a scheme of binary features (e.g., [+ human] v. [- human]) to specify these ANIMACY contrasts is *not* consistent with the emergence in their work of an animacy hierarchy of unequally spaced strata.

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Harris (1978) experimentally explored a truncated version of Clark and Begun's (1971) ANIMACY hierarchy: human > animal > concrete countable inanimate. Harris asked English children and adults[105] to describe what was happening in pictures in which the (3-level) ANIMACY of actors and acted-upons were systematically varied. Harris advanced two hypotheses. The first: that passives would be used most when the acted-upon was more ANIMATE than the actor, and least when the opposite condition obtained. This hypothesis was confirmed. The second: that the magnitude of the ANIMACY difference between actor and acted-upon would directly influence the propensity to passivize in those cases where the acted-upon was more ANIMATE than the actor. In accordance with her intuitive view that humans and animals were closer to each other than to inanimates in ANIMACY, Harris observed that passivization was very likely when an inanimate acted upon an animal or a human, and much less likely when an animal acted upon a human. Thus, Harris' investigation provided additional evidence, not only for the hierarchical ANIMACY relation, humans > animals > inanimates, but also for the view that these classes of entities are unequally spaced on an ANIMACY gradient.

Let us now address the nature of the prototypical actor in a somewhat different way. 'Case' is the general term for the types of semantic relations that the nouns in a sentence can have to the verb. However, as Braine and Wells (1978:101) note, it has proved difficult to resolve questions about the definition of a case category by the methods available to nonexperimental linguistics. In particular, the boundary between Agent and Instrument has been problematic. To which should *The hammer* be assigned in *The hammer broke the vase*?[106] In order to resolve these and other similar questions, it

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[105]Ss: 63 children MA 5:2-12:6, and 18 17-year-old female high school students.

[106]In Fillmore (1968; cp. 1971, 1977), the Agent is defined as "instigating" the action, and the prototypic Agent is the animate subject of a causative verb. Similarly, according to Jackendoff (1972:32), "the Agent NP is identified by a semantic reading

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seemed to Braine and Wells that systematic data were required on the perceived similarity of various kinds of case relations. In part, their findings demonstrate how the graded ANIMACY of nominals bears directly upon the conceptualization of their thematic roles in the sentence. We focus here on just a few of the results of their five experiments involving child subjects 3:2-6:2.

In Experiment II, Manhattan children 3:8-5:4 were trained to put Actor, Object, and Locative tokens on entities in pictures representing the actor, the object, and the location in rather prototypical sentences such as *The dog$_{actor}$ is drinking the water$_{object}$ on the floor$_{location}$.*[107] When presented with subject-verb-object sentences (e.g., *The bear is holding the boy*), the children put the Actor token on animate subjects (rabbit, monkey, bear) 74% of the time, while according the Actor token to dynamic inanimate subjects (fire, fan) only 44% of the time. Similarly, when presented with subject-verb-locative sentences (e.g., *The baby is crawling on the sand*), the children put the Actor token on animate subjects (baby, frog) 63% of the time, while according the Actor token to dynamic inanimate subjects (boat, train) only 53% of the time. When the sentence subjects were inert inanimates acting as the arguments of predicate adjectives (e.g., *The clothes are all heaped up on the floor*), they were accorded the Actor token only 40% of the time. With a small group of 6 children given more extensive training, the percentage of sentence subjects which were accorded the Actor tokens was increased by 15-20 points when the sentence subjects were animate, but remained the same for inanimates. These results suggest that the Actor

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which attributes to the NP will or volition toward the action expressed." However, Chafe's (1970) Agent also included inanimate actors.

[107]Each picture-with-sentence was presented in turn and the placement of the three tokens was demonstrated (e.g., "We're going to put this one on the dog because he's drinking and we're going to put this one on the water because it's the water that he's drinking, and that one goes on the floor because he's drinking the water on the floor"), and immediate recall was tested. Then, the set of pictures-with-sentences were presented anew, and the child placed the tokens without demonstration. These trials continued until a learning criterion was met of eight of the nine sentences correct, or eight successively. Order of mention of the nouns was varied by using cleft as well as standard word order, and by sometimes placing the locative initially.

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category is conceptualized by young children in terms of a hierarchy which is structurally completely consistent with the crosslinguistic ANIMACY hierarchy (and the crosscultural animism hierarchy): roughly, human/animal > dynamic inanimate > inanimate.

In Experiment III, Manhattan children 3:2-5:9 were trained to put Actor and Object tokens on entities in pictures representing the actor and the object in active transitive sentences. In the generalization trials, performance was quite good across the different sentences presented (69-94% correct token placement). However, it was noted that performance was significantly better when sentence subjects were animate than when they were inanimate. The cause of this performance increment with animate sentence subjects may be surmised by the remarks offered by the children when asked what the Actor token went on.

> [The general responses of the children] invariably used the word *do*, e.g., "on what was doing something", "the thing that was doing the work"; the Object token went on "what they're doing something to." One child said that the Actor token went on "the things that are doing the things to the things that are not doing anything." These descriptions obviously lend support to the notion that the children have an Actor concept based on the notion of an object performing an action, or "doing something." (1978:112)

In one sense there is nothing remarkable about what the children had to say. Of course a token designed as an Actor token would go on the thing 'doing' the action. What is interesting is the way in which the notion of 'doing things' gets applied to the nonintentional activity of inanimates as well as to the intentional acts of animals and people. And when we ask how it is that a dynamic inanimate can be more obviously 'doing things' than an inert inanimate, we find that we can hardly respond without speaking of animistic sensibilities, and of the animistic importance of activity and purpose in the constructive understanding of events.

In order to investigate more fully the relationship between animate Agent and inanimate Instrument, Braine and Wells undertook

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Experiment V, in which New York City children 4:7-6:2 were trained to put Actor, Object, and Instrument tokens on entities in pictures representing sentences presented in active, passive, and cleft formats. When the sentences presented had three arguments, the children performed very well indeed, with Actors, Objects, and Instruments distinguished correctly from 82-100% of the time. When the sentences presented had two arguments, animate actors (elephant, monkey) received the Actor token 95% of the time. Inanimate actors received the Actor token 50-60% of the time and the Instrument token 30-40% of the time. The children did not predominantly choose the Instrument token (as some contemporary case grammars would have predicted); rather, they vacillated between Actor and Instrument, choosing one or the other, but favoring the Actor token. While all details are not reported, it appears that 'the fan' and 'the fire' were about 16% more likely to be accorded Actor status than 'the knife' and 'the rope.' This is very much what one would expect in an exercise of animistic tendencies, given the motility and directedness of the fan and the fire relative to the inert knife and rope. Braine and Wells comment:

> [C]hildren appear to have a broad Actor category, which they characteristically describe as "doing something" or "doing something to something." Actors are not necessarily animate, although the most prototypic actor may be animate. The Actor category clearly embraces the subjects of large numbers of transitive verbs, and includes the traditional Agent. From Experiment V it was concluded that Actor can be differentiated into the subcategories of User (or Agent, in one sense of "Agent") and Instrument, which subcategories the children clearly possess. However, unless a sentence differentiates User from Instrument, the relevant case category is the supraordinate one. (1978:120)

> In his most recent proposals, Fillmore (1971) recognizes some similarity between his Agent and Instrument categories: Both "cause" the action, the Agent being "principal cause" and the Instrument "immediate cause"; he speculates that there may be a "hypercase" that includes both Agent and Instrument. One could reconcile these ideas with our conclusions by identifying the Actor with the "hypercase" ... (1978:121)

The category of the hypercase is remarkably comparable to the animistic category of living things. Its exemplars are true biological animates; however, dynamically acting inanimates are perceived as

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better examples of the category than inert acted-upon inanimates. The cohesion of the set is not owed entirely to the biological nature of the members but, in large measure, to their involvement in purposive activities.

Lempert's (1984) work underscores the animistic relevance of dynamism to ANIMACY, actor-patient expectations, topic-worthiness, and choice of voice. She reports on three experiments in which 60 children aged 2:10-5:0 were taught to produce sentences in a passive format. In the training phase, subjects imitated passive sentence descriptions of depicted or enacted events. Intermittently, the children were asked to describe the depicted or enacted event themselves "in the new way." Predictably, children produced more passives when animates were affected by inanimates than when animates affected inanimates or other animates. After training, the children were asked to use passives to describe new events in which animates affected either other animates, dynamic inanimates (e.g., airplane), or inert inanimates (e.g., a painting). Again, children produced more passives in connection with animate patients. Also, they produced more passives in connection with dynamic inanimate patients than with inert inanimate patients. "The findings suggest a gradient of generalization in which dynamic inanimates are treated as being more like animates than like static inanimates" (1984: 24f).[108]

We see that our understanding of the actor—acted-upon relationship is developmentally molded in important ways by the causal expectations associated with the ANIMATE and INANIMATE poles of an ANIMACY hierarchy. Our identification of Actors, our desire to topicalize Actors and, in this regard, our selection of active or passive

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[108]These findings accord with other reports that, when the referents of sentential agents and patients are physically similar, children are quick to identify the sentential agent with the real world referent which shows some motion, even if some other cues are in conflict with this decision (Huttenlocher and Strauss, 1968; Bem, 1970; Dewart, 1975; Bridges, 1980).

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voice are coordinated and powerfully influenced by considerations of ANIMACY that proceed along old animistic lines.

Genitive Constructions and Inalienable Possession:

The relationship between a whole and a part is often represented as one of inalienable possession: a part cannot be separated from its whole in the same way that an ordinary possession can be separated from its owner. In English, the possessive constructions which speakers choose for conveying part-whole relationships or relationships of inalienable possession depend, to a degree, on the ANIMACY of the possessor (Haviland, 1987:195f). This has been schematized below.

	X's Y	Y of X	XY
ANIMATE Possessor	**Well formed:** the man's head the dog's bark	**Well formed:** the head of the man the bark of the dog	**Ill formed** ! the man head ! the dog bark
INANIMATE Possessor	**Ill formed:** ! the refrigerator's door ! the line's head ! the cave's mouth ! the pencil's lead ! the broom's handle	**Well formed:** the door of the refrigerator the head of the line the mouth of the cave the lead of the pencil the handle of the broom	**Variable:** the refrigerator door ! the line head ! the cave mouth the pencil lead the broomhandle

Table 7a. Genitive Constructions in English

However, the treatment of plant part to plant whole relationships suggests that the ANIMACY of plants is indeterminate. Sometimes plants pattern like ANIMATES:

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	X's Y	Y of X	XY
	the flower's roots	the roots of the flower	! the flower roots

Table 7b. Genitive Constructions in English

Sometimes plants pattern like INANIMATES:

	X's Y	Y of X	XY
	! the tree's top ! the tree's bark	the top of the tree the bark of the tree	the tree top the tree bark

Table 7c. Genitive Constructions in English

And sometimes plants show a split pattern:

	X's Y	Y of X	XY
	the flower's petals ! the tree's fruit	the petals of the flower the fruit of the tree	the flower petals ! the tree fruit

Table 7d. Genitive Constructions in English

This variable treatment of plants was not commented on by Haviland, and does introduce something of a wrinkle into his analysis. However, the problematic, variable, and nonbiologically determined status of plants is consistent with the view that the determination of plants' ANIMACY is conditioned by an animistic ambivalence of very long standing.

While it can generally be said that a whole inalienably possesses its parts, we have emphasized in Chapter Two that we understand our own bodies to be constructed of parts which are intentionally connected in a very special way. Animals as a group relate to their parts in a sentient fashion that cannot be matched by the way in which plants or inanimates are related to their parts. This

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fact appears to be acknowledged by the fact that [Verb X in/on the Y] constructions are restricted to animal life.

	Verb X's Y **Verb the Y of the X**	**Verb X in/on the Y**
ANIMATE Possessor	pat George's head nick George's chin pinch the dog's ear rub the belly of the snake	pat George on the head nick George in the chin pinch the dog on the ear rub the snake on the belly
INANIMATE Possessor	prune the tree's branch dent the door of the car smack the face of the inflatable clown	! prune the tree in the branch ! dent the car in the door ! smack the inflatable clown in the face

Table 8. English Expressions of Possession and Intentionality

In these constructions, the choice of verb plays a role in determining the acceptability of different utterances. While it is acceptable to say that 'a rock fractured George's tooth,' it is anomalous to say that 'a rock fractured George in the tooth.' It appears to be a precondition for use of the [Verb X in/on the Y] construction that the predication effected by the verb must be transitive such that what is predicated of the part is also predicated of the whole. Thus it is anomalous to say that 'a rock fractured George in the tooth,' just because in this case we do not feel that George himself has been fractured by the mishap befalling his tooth.

The crucial thing to note above, however, is that we *do* feel that the tree itself was pruned when the branch of the tree was pruned, and we *do* feel that the car itself was dented when the door of the car was dented, yet we still cannot say that 'someone pruned the tree in the branch' or that 'something dented the car in the door.' What seems to prevent the employment of the [Verb X in/on the Y] construction in these cases is the lack of sentiency of entities such as trees, cars, etc. Note further that, since it is sentiency which seems to be at issue, and since plants are not sentient, there is none of the ambivalence we saw above when it comes to determining

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whether plants can act as direct objects in [Verb X in/on the Y] constructions. Here, plants consistently pattern with inanimates. (Again, this analysis diverges from that of Haviland, 1987:196f).

Dative Movement:

The Dative Movement of indirect objects is restricted to indirect objects which are conceptualized as recipients. Any living entity (e.g., grass), or collectivity of living entities (e.g., the Library Committee), or entity metonymically and conventionally representative of living entities (e.g., the White House), regardless of sentiency, may potentially be regarded as a recipient. Simple inanimates, however, are never regarded as recipients. In short, the restrictions on indirect objects involved in Dative Movement stipulate that:

1) grammatical ANIMACY is to be identified with biological animacy,

I gave some water to the cats / the crickets / the roses.
I gave the cats / the crickets / the roses some water.
I sent an ultimatum to Mary / IBM / the White house / his mailbox.
I sent Mary / IBM / the White house / ! his mailbox an ultimatum.

2) and the referent of the indirect object is to be regarded as a recipient.

We thought about sending wheat to $\text{Russia}_{\text{recipient}}$.
We thought about sending $\text{Russia}_{\text{recipient}}$ wheat
I want to send a letter to $\text{Australia}_{\text{location}}$.
! I want to send $\text{Australia}_{\text{location}}$ a letter.
I sent my parrots to the $\text{Zoo}_{\text{recipient}}$.
I sent the $\text{Zoo}_{\text{recipient}}$ my parrots.
I sent my children to the $\text{Zoo}_{\text{location}}$.
! I sent the $\text{Zoo}_{\text{location}}$ my children.

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Relative Pronouns:

The relative pronoun *who* is reserved for use in connection with humans; *which* is used in connection with all other entities.

the architect who/*which I met in Kansas City
the elephant which/*who I rode in India

However the human-nonhuman ANIMACY distinction disappears in the GENITIVE form of relative pronouns.

a person/persons whose opinions matter
a cat/cats whose lives are numbered
a bee/bees whose buzzing never ceases
a plant/plants whose roots are shallow
a diamond/diamonds whose flaws are invisible
an idea/ideas whose time has come

In the grammar of English, as in all languages, ANIMACY considerations play diverse roles, and ANIMACY classes may be variably constituted for different grammatical processes. In genitive constructions addressing inalienable possession, ANIMACY considerations distinguish animals from inanimates, and treat plants in an ambivalent fashion. However, in [Verb X in/on the Y] constructions, where Y is inalienably possessed by X, plants pattern with inanimates by virtue of their nonsentience. In Dative Movement, all biologically living things as well as more abstract entities conceived of as being constituted by living things can, if regarded as recipients, be Dative Moved. In the use of relative pronouns, the *who-which* distinction expresses an ANIMACY distinction along human-nonhuman lines; however, this distinction is effaced in the relativizer, *whose*. In contradistinction to biology, the ANIMACY of plants is problematic, and ANIMACY in general is not fixed across all grammatical occasions.

3.32c Navajo

Since the groundbreaking work of Kenneth Hale (1973), anthropologists and linguists alike have been fascinated by arguments from linguistic structure that Navajos implicitly rank the referents

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of common nouns according to an elaborate cosmological hierarchy. The hierarchical relations have been touted as an expression of a unique Navajo world view of actors and acted-upons (Creamer, 1974; and especially Witherspoon, 1980). However, when the cosmic trappings in which this hierarchy has been presented are torn away, and the simple facts of the matter are examined bare, there is no evidence to suggest that anything unique or especially Navajo is actually taking place. The hierarchical relations which are said to reveal unique aspects of Navajo mentality are in fact just the same hierarchical relations which we have advanced here as a crosslinguistic ANIMACY hierarchy reflecting the universal perseverance of animistic sensibilities into adulthood.

Let us first summarize the linguistic data from which the Navajo ANIMACY hierarchy is inferred. At issue here are two formats for transitive sentences when the subject and object are common nouns. In the basic, or active format, constituent order is

logical Subject (i.e., agent) — logical Object (i.e., patient) — Verb,

and an object pronoun, *yi-*, is prefixed to the verb. In the alternate, inverted format, constituent order is

logical Object — logical Subject — Verb,

and an object pronoun, *bi-*, is prefixed to the verb. (There are subject markers as well, but they do not concern us.) The sentence acceptability of the two formats depends on the ANIMACY of the nouns involved, as indicated below (Hale, 1973:307; Creamer, 1974:31f).

If, in ANIMACY,	Then
Agent > Patient	Active format is preferred or obligatory.
Agent = Patient	Either format may be used.
Agent < Patient	Inverted format is preferred or obligatory.

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The conviction with which Navajo speakers render their acceptability judgments varies according to the magnitude of the ANIMACY difference between the two nouns: the greater the disparity in ANIMACY, the more powerfully one format is preferred, and the surer the acceptability judgment (Hale, 1973:306f).

Mary Helen Creamer, a student of Hale and a native speaker of Navajo, is principally to thank for working out the details of the ANIMACY classes. She proposed a hierarchy with eight levels, as summarized below.[109]

Level 1

Here one finds nouns denoting persons. But for the few exceptions assigned to Level 2, all human beings are accorded equal status, regardless of ethnicity, sex, rank, or age differences, or whether they are represented individually or collectively. In addition, *lightning*, when used with the verb *strike* (Creamer, 1974:33; cf. Hale, 1973: 305), and *rain*, when used with the verb *wet* (Hale, 1973:305), may be treated as ANIMACY equals of human nouns.

Level 2

Here one finds nouns denoting larger animals as well as medium sized animals which are predators or of special intelligence or relationship to people. E.g., horse, donkey, mule, bull, cow, elephant, lion, bear, wolf, wildcat, elk. In addition, newborn infants are regarded as being of this level until they become "capable of intent

[109]Hale (1973:305ff) and, to a greater degree, Frishberg (1972:265) show affinity for the idea that the ANIMACY hierarchy is a continuum rather than a ladder of ranks. In addition to these ANIMACY rankings, factors which may influence the selection of active or inverted formats may include the specificity, definiteness or discourse givenness of the nouns (Hale, 1973:307; Frishberg, 1972:262,265). Note also that, in written legends and in storytelling, personified inanimates and animals may be treated as if they were ANIMACY equals to whatever entities they happen to be interacting with (Creamer, 1974:37).

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and movement" (Creamer, 1974:33). Deaf and dumb persons are regarded as being permanently of this level (Witherspoon, 1980:12).[110]

Level 3

Here one finds nouns denoting the medium sized animals. E.g., deer, antelope, fox, coyote, prairie dog, sheep, goat, cat, turkey, chicken, eagle, hawk.

Level 4

Here one finds nouns denoting the small animals. E.g., rabbit, squirrel, gopher, chipmunk, mouse, songbird, turtle, snake, frog.

Level 5

Here one finds nouns denoting bugs, including insects, spiders, worms, centepedes, and scorpions.

Level 6

Here one finds nouns denoting "natural forces" such as windstorms, flood, sunshine (heat), and forest or range fire.

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[110]Witherspoon (1980:12) suggests that infants and deaf and dumb persons are demoted on linguistic grounds as part of "the tremendous emphasis Navajos place on language as a means of controlling the universe." However, there is nothing uniquely Navajo about a special regard for the ability to wield language. Creamer affirms that infants are classified at Level 1 just as soon as they become capable of intent and movement, which seems to undermine Witherspoon's linguistic interpretation of the matter. Rather than insist on a wholly linguistic interpretation of these classifications, it seems more reasonable to acknowledge that being prelinguistic is always also a matter of being very physically immature, and that being hearing- or speaking-impaired can also be regarded in the way that other physical disabilities are regarded. In the crosslinguistic ANIMACY hierarchy, there is an overlap between considerations of maturity, linguistic capacity, and physical wholeness.

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Level 7

Here one finds nouns denoting plants and inanimate objects. E.g., tree, branch, potato, milk, running water, water, snow, sand, rock, stick, jewel, metal, carton, car. "A special rule governs the interactions of the nouns within this classification when verbs with *yi-* and *bi-* forms are used. In each case, the semantic content of the verb implies movement on the part of one of the nouns in the sentence [i.e., presumably, the agent], and this noun then takes higher status than the more stationary object" Creamer, 1974:36).

Level 8

Here one finds nouns denoting abstractions or other things which are only perceptible via their effects. E.g., hunger, thirst, emotions, ideas, old age, disease (or its symptoms), germs.

Traditionally, subject-object inversion has been regarded as a process similar to passivization. Creamer (1974:32) noted that the semantic effect of subject-object inversion is "quite similar" to passivization in syntactic dyads involving animates of equal ANIMACY such as

boy	girl	*yi*-chase	'the boy is chasing the girl'
girl	boy	*bi*-chase	'the girl is being chased by the boy'

However, Witherspoon (1980:10) pointed out that the inverted format is not always semantically analogous to a passive format. In particular, when animates act upon inanimates, the inverted form is not only unacceptable, but absurd and risible. (Witherspoon might have also pointed out that the peculiar character of such inverted forms is just like the peculiar character of active format reports of inanimates acting on animates.) Since on its surface the ANIMACY hierarchy shapes up as a hierarchy of potency and control between potential actors and acted-upons, Witherspoon suggested that the semantic flavor of the inverted format would be better captured by a

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translation using *let*.[111] One might also suggest a construction using *get oneself* or *let oneself get*. The virtue of such translations is that they convey something of the sense that the hierarchically superior entity is somehow more in control and responsible for events than the hierarchically inferior entity, and therefore ought always to retain something of the status of an agentive sentence subject. The idea is not so foreign as it might at first sound. For the most part, the sentence judgments below might be rendered by English speakers as easily as by Navajos.[112]

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[111]Witherspoon (1980:11) affirms that inversion is blocked when both agent and patient are Level 7 nouns precisely because one inanimate entity cannot 'let' another act upon it. Hale (1973:305) had previously noted that "no convincing examples have been found of inverted sentences in which both the logical subject and the logical object are inanimate [i.e., Level 7]." However, Hale demurred on the question of whether inversion was always blocked in such cases, since he felt that the apparent blockage might be only the artifact of an inadequate data set. In fact, there may not be any way at all to confirm or disconfirm Witherspoon's postulation of 'inanimate-inanimate inversion blocking,' since it is functionally equivalent to Creamer's scheme of contextually assigning a superior ranking to any motile Level 7 agent which acts upon a fixed Level 7 patient. In short, Witherspoon blocks the inversion of inanimate entities by saying that there is a special grammatical provision against it; Creamer achieves this blocking by saying that motile inanimate agents are contextually ranked higher than static inanimate patients, so that general provisions preclude their inversion.

Besides the fact that it may be more theoretically economical, Creamer's account is here preferred for two reasons. First, it makes intuitive sense that a motile inanimate cast as an agent should be more ANIMATE than a static inanimate cast as a patient. We have noted already that lightning and rain, when acting as the agents of the verbs *strike* and *wet*, resp., may contextually acquire as much ANIMACY as humans. Why shouldn't less noble inanimates also become elevated in ANIMACY when they function agentively? Second, Witherspoon's condition just fails to make intuitive sense because no reason can be imagined why being an inanimate should block inversion. Witherspoon is mistaken when he suggests that, in the view of Navajos, an inanimate cannot 'let' things happen. In fact, inanimate patients (e.g., tree) become inverted quite readily when acted upon by abstract entities (e.g., old age). If a tree *can* 'let' old age kill it (Creamer, 1974:37), then why *can't* a tree 'let' a rock roll against it (*ibid.*)? The answer has to be that the tree is more ANIMATE than old age, but less ANIMATE than a rolling rock.

[112]These examples are intended for general demonstration only: they are for the most part not actually attested in published Navajo data, though of course they are consistent with that data. Ill-formed Navajo sentences have been marked with an asterisk, as Navajo scholars have done; however, ill-formed English sentences are marked with an exclamation point to reflect the fact that the ill-formedness derives clearly from semantic/pragmatic considerations.

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man mule *bi*-kick	'the man got himself kicked by the mule'
cat mouse *bi*-bite	'the cat let the mouse bite him'
squirrel bee *bi*-sting	'the squirrel got himself stung by a bee'
girl sun *bi*-burn	'the girl let herself get burned by the sun'
* mule man *bi*-kick	! 'the mule let the man kick him'
* mouse cat *bi*-bite	! 'the mouse let the cat bite him'
* hammer worker *bi*-drop	! 'the hammer let the worker drop it'
* tree rock *bi*-roll	! 'the tree let the rock roll against it'
* water girl *bi*-drink	! 'the water let the girl drink it'

In fact, if one doesn't mind weird circumlocution, the use of *make* in conjunction with *let/get* translations presents Navajo intuitions regarding active sentences in a way that is much more comprehensible to English speakers.

man mule *yi*-kick	'the man made the mule let the man kick him'
cat mouse *yi*-bite	'the cat made the mouse let the cat bite him'
* mule man *yi*-kick	! 'the mule made the man let the mule kick him'
* mouse cat *yi*-bite	! 'the mouse made the cat let the mouse bite him'
* bee squirrel *yi*-sting	! 'the bee made the squirrel let the bee sting him'
* sun girl *yi*-burn	! 'the sun made the girl let herself get burned'
* old age tree *yi*-kill	! 'old age made the tree let old age kill it'

Unfortunately, the use of *make* and *let* and *get oneself* in translation is no panacea for the problems which here affect

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translation. The suitability of such English turns of phrase falls off rapidly in the cases where a nonanimal is the entity doing the making or letting or getting itself, since English speakers ordinarily expect these verbs to have sentient subjects.

girl	water	*yi*-drink	"the girl drank the water' but not ! 'the girl made the water let her drink it'
rock	tree	*yi*-roll	'the rock rolled against the tree' but not ! 'the rock made the tree let it roll against it'
tree	rock	*yi*-fall	'the tree fell on the rock' but not ! 'the tree made the rock let it fall on it'
tree	old age	*bi*-kill	! 'the tree let old age kill it'

Nevertheless, the proposed translations usually do succeed in conveying an essential aspect of the Navajo alternation of sentence formats, and in aligning the intuitions of English speakers with those of Navajo speakers. The Navajo ANIMACY hierarchy is certainly in part a hierarchy of agentive power. When two entities compete head to head, Navajo and English speakers agree on which is the typically more potent agent and, presumably, on the kinds of characteristics that enhance agentivity in general (e.g., intelligence, motility, capacity for speech). The transitive relation between unequally ANIMATE entities therefore always emerges as a relationship between one entity which is usually capable of making, and another entity which is usually only capable of letting. When a higher ranked entity is put in the nontypical position of being acted upon by a lower ranked entity, as when a mere flea bites a big dog, the Navajo inverted form serves a) to indicate that all is not normal in the agentive relations of the event, and b) to preserve as much as possible the normal agentive relations between these entities by focussing on the 'letting' of the more ANIMATE and typically more agentive patient. Witherspoon remarks that he does "not see anything similar to the English passive" (1980:7). The Navajo inverted form is indeed like the English passive in that it preferentially topicalizes around

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the more ANIMATE entity in the sentence by placing this entity in sentence-initial position, the position prototypically associated with superior agents. The net result, as in English (and other languages), is a preference for more ANIMATE — less ANIMATE ordering of nominals.

Is it the case, as Witherspoon (1980) has argued at length in neo-Whorfian and Kuhnian terms, that Navajo grammar codifies a Navajo world view? The issue has always been at least in the back of people's minds. Hale (1973:305) remarked that the hierarchical continuum might be important "in other aspects of Navajo thought." Frishberg (1972:261) identified her subject matter as "the native Navajo concept [of animacy]." Creamer (1974:29) stated explicitly that the hierarchical classification system for nouns was located "within a Navajo world view." Paradoxically, however, just as often as researchers identify these grammatical phenomena as uniquely Navajo, they affirm that these phenomena can be understood by common sense. Creamer's remarks are apposite.

> In a Navajo world view, the various beings or objects in the world each have certain inherent qualities or characteristics. These qualities are inferred from experience in terms of *what you would ordinarily expect* these beings to do, or how you would expect them to interact with each other. These qualities tend to lend status to some nouns and not to others. Qualities which tend to give higher status are: 1. capacity for having intent or purpose; 2. intelligence; 3. strength, vigor, aggressiveness, or special potency; 4. usefulness to man, or relatedness to man; and 5. animation or capacity for movement [cf. Frishberg, 1972:261; Hale, 1973:304f; Witherspoon, 1980:8f]. This world view is built upon *common sense inferences from ordinary experience*, and involves few abstractions, or abstract explanations of phenomena. (Creamer, 1974:29f, emphasis added)

Even Witherspoon allowed that

> The central points I discuss [regarding "the connection between Navajo world view and Navajo syntax"] are somewhat obvious and, at least at first glance, not very profound. (Witherspoon, 1980:1)

The similarity demonstrated above between the intuitions of Navajo and English speakers when problems of translation are min-

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imized indicates that one does not have to be Navajo, or be specially trained in Navajo thought, to feel an affinity for the Navajo hierarchy. In fact, Hale (1973:308) has observed a rule which is "strikingly similar" to subject-object inversion in Tewa and Jemez, two Tanoan languages, also of the Southwest, which are not demonstrably related to Navajo (cf. Allen and Frantz, 1978). More generally, we have shown in the preceding section of this work that the topicalization and sentence fronting of more ANIMATE nominals is a common discourse phenomenon in language.[113] Finally, and most important, the structure of the Navajo hierarchy and the semantic characteristics by which it is determined are entirely familiar as the same sorts of structure and characteristics that attend ANIMACY and animism phenomena worldwide. The principal structural features of the Navajo hierarchy, and the principal points of contact between Navajo ANIMACY and the ANIMACY of other languages, are these:

1) The hierarchy is anthropocentric in its ranking of animals.
2) Infants and at least certain disabled persons are accorded a lower rank than mature, intact adults.
3) Plants are categorized along with inanimates.
4) Inanimates capable of autonomous motion and of more agentive activity are ranked more highly than those which are more inert or patientlike.
5) The relative ranking of inanimates is not fixed, but dependent upon discourse context — an exemplification of how the ANIMACY of nominals may vary between grammatical occasions.
6) Concrete inanimates are ranked more highly than incorporeals (ie., emotions, states of being, etc.).

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[113]Witherspoon's (1980:7f) remarks about the lack of importance of being first in Navajo culture are in fact irrelevant to the question of whether or not Navajos might wish to present the more ANIMATE nominal of the sentence — i.e., the typical topic — in sentence-initial position. The bias favoring sentence-initial presentation of topics relates to culture-neutral principles of text organization and information processing. No one but Witherspoon has ever suggested that the preference to place more ANIMATE nominals sentence-initially reflects the cultural approbation accorded to entities which, in competition, come in first; in procession, lead the way; etc.

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The structural themes of this hierarchy match perfectly the structural themes of the crosslinguistic ANIMACY hierarchy, as well as the structural themes of crosscultural animistic appraisal. There is here a clear appreciation of embodiment considerations: entities which are concretely formed are valued over entities which are formless; intact, mature human form is valued most highly of all. There is as well a clear appreciation for activity considerations: newborns are devalued for their inability to get around; plants achieve no better ratings than objects, despite the wondrous biology of plants; and dynamic inanimates are favored over inanimates which are static. Finally, there is throughout the hierarchy a sense of the importance of purposiveness considerations, not only because intentional beings command it, and because inanimate agents prevail over inanimate patients, but because the hierarchy is in a whole way concerned with agentivity and with the control relations in accordance with which entities interact, whether they are sentient or not.

Given the major structural similarities between the Navajo system and other ANIMACY systems and animistic phenomena in general, there is no necessity to implicate Navajo cosmological beliefs as the organizing principle of the Navajo ANIMACY hierarchy. In fact, the existence of the cosmological views which Witherspoon links with this hierarchy is itself in some doubt. If Witherspoon (1980:6) is correct that, in all of the 200 ethnographic studies of Navajos, there is no mention of any traditional doctrine of hierarchical control relations between the entities of the world, then the only evidence for the cosmic hierarchy is evidence taken from the linguistic hierarchy. Witherspoon's delight in discovering the 'implicit' codification of a Navajo cosmology in the grammatical structure of Navajo speakers is neo-Whorfian through and through, since it rashly presupposes a one-to-one correspondence between linguistic structure and speakers' conceptual organization of the world. It has been amply demonstrated in suitably controlled contexts (viz., in connection with color term systems), that one cannot just assume that linguistic structure and conceptual structure are equivalent (Heider, 1971a, 1971b, 1972; Rosch, 1973, 1974). Therefore, one cannot just

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assume that Navajos' and, for example, English speakers' conceptualization of agentive relations differs just because Navajo grammar presents a phenomenon which is not found in precisely the same form in English.

Even if Navajos *do* have specially developed beliefs regarding the hierarchical control relations between entities, one need not regard these beliefs as the *cause* of the Navajo ANIMACY hierarchy. As argued in §2.2365 above, it is more likely that such beliefs are in large part the *result* of the perseverance in adults of animistic sensibilities and norms. It is animism which appears universally, rather than ANIMACY hierarchies or cosmologies of control. Where the structure of ANIMACY hierarchies or cosmologies of control match up with the norms of animistic behavior, then the only causal relationship that it is reasonable to infer is that persistent animistic tendencies have promoted the institution of these hierarchies in grammar and in cosmological thought.

The structural detail of the Navajo system has endeared it to many as a crown jewel among ANIMACY systems. The most remarkable thing about it is that, in all of its detail, it is entirely typical of general categorization tendencies exhibited in ANIMACY systems worldwide, and by animistic children and adults worldwide. One has to conclude that there is nothing particularly Navajo after all about this "hierarchical ordering of the universe" (Witherspoon, 1980:6), this "great chain of being" (Frishberg, 1972:259). In the next chapter, we will give very explicit experimental evidence that English speakers possess the same hierarchical animistic intuitions which are codified in the Navajo language.

3.32d Kanjobal (Acatec)

In Kanjobal, active transitive constructions may not be used to report on events in which nonhuman agents act on human patients (Anthony Moy, personal communication). A passive voice is used instead, even when a human patient is only minimally affected by a

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nonhuman agent. A speaker of Kanjobal would say that 'John was seen by the horse' rather than 'The horse saw John.' When a woman's actions affect a man, the passive is preferred, but not required. When both arguments are of decidedly equal ANIMACY, then passivization is optional.

This Western Mayan language of the Huehuetenango area of Guatemala has a system of noun classifiers; however, plant and inanimate nominals, with the exception of nominals referring to natural forces, are seldom overtly marked (Moonwomon, 1990). Numeral classifiers distinguish between humans, other animals, inanimates/plants/food, and instances/events (Jeanie Lerner, personal communication). We see in these classifier phenomena the common animistic themes of special treatment of humans relative to other animals, the ennoblement of natural forces over common inanimates, and the treatment of plants in the same way as inanimates.

3.32e Haida

The Alaskan language, Haida, appears to be a linguistic isolate. However, some have proposed that it should be classified as a Na-Dené language, in part because of its putative OSV basic word order. However, alternate constituent orders are actually observed:

S_{noun}	O_{noun}	Verb
O_{noun}	S_{noun}	Verb
S_{noun}	$O_{pronoun}$	Verb
O_{noun}	$S_{pronoun}$	Verb
$O_{pronoun}$	$S_{pronoun}$	Verb

Eastman (1979), refining the work of Swanton (1911), argues that neither OSV nor SOV ordering is basic in Haida. Rather, Haida should be considered a topic-prominent language: "[R]egardless of

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whether an element is a subject or object, noun or pronoun, if it is [overtly] marked as a topic, it is sentence initial" (1979:143).

Edwards (1985) cites textual evidence that suggests that, in normal practice, the ordering of Subject and Object elements is not absolutely free, as suggested above, but rather is influenced by an ANIMACY hierarchy in which [+ human] > [+ animate] > [+ concrete] > [+ intangible]. Where there is an ANIMACY differential between two nominals, the more highly rated nominal is likely to precede the less highly rated nominal. The ordering of more ANIMATE nominals before less ANIMATE ones obviously resonates with the Haida propensity to prepose topics, since more ANIMATE referents are by and large more suited as topics than less ANIMATE ones. The slice of language which Edwards offers in support of the Haida ANIMACY hierarchy is exceedingly thin; however, Edwards' claims are presumably fortified by her appreciable familiarity with Haida and her co-work with Eastman (see Eastman and Edwards, 1983).

3.32f Shona

Shona is a Bantu language spoken in Zimbabwe. As in other Bantu languages, there is a noun class system in Shona. There is one class devoted to humans, another in which animals are typical, another in which countable inanimates are typical, and another in which mass inanimates are typical. There is also an ANIMACY hierarchy which Hawkinson and Hyman (1974) specify as: human > animal > inanimate.

In a sentence, a subject agreement prefix is placed on the verb. The prefix changes shape depending on the noun class of the subject. When a conjunction of nouns of different classes acts as the subject of the sentence (e.g., *the man and the dog walked*), the subject agreement marker of the more ANIMATE noun is prefixed to the verb. Also, the more ANIMATE noun must be placed before the less ANIMATE noun in the conjunct. If the conjuncts are inanimate nouns of different classes, the verb is prefixed with the subject agreement marker

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of the class in which typical countable inanimate things are found. This might be taken to suggest that individuated inanimates with definite form (i.e., superior embodiment) are regarded as more ANIMATE than inanimates conceived of as a mass, or abstractions. There is some evidence then that the Shona ANIMACY hierarchy should be specified as human > animal > inanimate of discrete form > mass inanimate or abstraction.

In discussing the relationship between ANIMACY and the assignment of (underlying) case, Hawkinson and Hyman give evidence for a case hierarchy in which the superior cases (i.e., agent, benefactive, dative) are more likely to attach to more ANIMATE arguments than the inferior cases (i.e., accusative, instrumental). In addition, the team notes that grammatical strategies for case assignment can be dispensed with (or are overridden) in instances where the ANIMACY status of the different nouns involved is sufficient to allow utterances to be properly interpreted.

Hawkinson and Hyman finally argue for a 'hierarchy of natural topic' in discourse in which first and second person pronouns are regarded as superior topics to third person pronouns. Since topic is a discourse notion, what weighs heavily for Hawkinson and Hyman is that first and second person pronoun referents are defined as participants within the immediate context of discourse, while third person pronoun referents are understood by speakers to represent someone (or something) outside the locus of conversation. The research team cites some supporting phenomena from other languages.

> That a language would differentiate third person pronouns from first and second person pronouns is not an unknown phenomenon; it has been observed elsewhere, e.g., in Tlahuitoltepec Mixe [Lyon 1967], in Algonkian (Jean-Pierre Beland, personal comunication), and in French to some extent (cf. Hyman and Zimmer, in preparation). While Shona does not differentiate first and second person pronouns, other languages do. However, since both orders are found (e.g., first person pronouns precede second person pronouns in Italian, as pointed out to us by Francesco Antinucci, while the reverse is the case in Spanish; cf. Perlmutter [1970] for discussion), the only universal distinction appears to be between first and second person versus third person.* What is interesting is how these facts fit into a notion of natural topic in discourse. Sentences

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> are normally constructed with reference to earlier utterances; similarly, discourse is constructed with reference to who is actively involved in the discussion. Therefore, it is understandable that first and second person referents would occupy the highest rung of the hierarchy of "natural topic". (1974:163)
>
> *However, as pointed out to us by Bill Foley, this division is incomplete. A complete hierarchy would have to include the distinction between inclusive and exclusive as well as reflexive pronouns.

Reinforcing this discourse status is the obvious biological fact that first and second person pronouns always refer to human beings, while third person pronouns may refer to anything at all that a noun can refer to, including inanimates and incorporeal concepts. Thus, there is some evidence that, in a subhierarchy of the Shona ANIMACY *hierarchy, 1&2p pronouns > 3p pronouns.*

It is curious that Hawkinson and Hyman address the distinction between pronouns as a distinction of topic-worthiness *rather than* as an ANIMACY distinction. Referring to certain problems in the interpretation of a set of sentences, they note that

> since all of these pronouns represent human referents some criterion other than animacy must be involved in the interpretation of these sentences.
>
> We should like to propose that the notion of "natural topic" can account for this differentiation among the personal pronouns. (1974:162)

While biological animacy is certainly not the key to the Shona phenomena at issue, there is no reason to strictly link linguistic ANIMACY with biological animacy. Linguistic ANIMACY considerations could certainly be invoked to distinguish between the definite, necessarily human and discourse-local referents of 1p and 2p pronouns, and the discourse-remote (or nonparticipating), not necessarily definite and not necessarily human referents of 3p pronouns. In fact, when the notion of natural topic or topic-worthiness is developed, everything forceful that is said chimes with holistic considerations of ANIMACY such as have been explicated above.

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3.32g Chinook and Dyirbal

Silverstein (1976) provides data on a number of languages, but particularly Chinook (Columbia River, North America) and Dyirbal (Cairns Rain Forest, Australia). He notes that all known languages with ERGATIVE casemarking show some ACCUSATIVE casemarking as well, and argues that the distribution of ACCUSATIVE v. ERGATIVE case-marking within languages reveals a nominal hierarchy of agentivity.

> In this paper, I want to bring out the fact that 'split' of case-marking is not random. At its most dramatic, it defines a hierarchy of what might be called 'inherent lexical content' of noun phrases, first and second person as well as third person. This hierarchy expresses the semantic naturalness for a lexically-specified noun phrase to function as agent of a true transitive verb, and inversely the naturalness of functioning as patient of such. The noun phrases at the top of the hierarchy manifest nominative-accusative case-marking, while those at the bottom manifest ergative-absolutive case-marking. Sometimes there is a middle ground which is a three-way system of O-A-S case-markings. (1976:113)

The hierarchy Silverstein refers to is as follows: 1p or 2p > 3p > proper noun > human > animate > inanimate. Silverstein found that ACCUSATIVE marking is employed over a continuous portion of the higher part of the hierarchy, while ERGATIVE marking is employed over a continuous portion of the lower part of the hierarchy. In Dyirbal, for example, 1p and 2p pronouns show ACCUSATIVE marking while other nominals show ERGATIVE morphology. In Guugu Yimidhirr, all pronouns receive ACCUSATIVE marking. In some languages, there may be an overlap of marking conventions in the middle of the hierarchy so that O, A, and S are assigned unique cases. Silverstein emphasizes that it is not possible to predict exactly where the division will occur between ACCUSATIVE and ERGATIVE marking styles. But wherever the division occurs, the association of more agentive nominals with ACCUSATIVE marking and the association of more typically patientlike nominals with ERGATIVE marking presumably attests to the natural Actor orientation of ACCUSATIVE marking and the natural Acted-upon orientation of ERGATIVE marking conventions.

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Mallinson and Blake (1981:62-70,80-91) have argued that the Silverstein hierarchy is better conceived of as a topicality hierarchy than as an agentivity hierarchy. Their own count of the various kinds of nominals representing agents and patients in transitive sentences in plays, autobiographies, and Australian Aboriginal texts indicated only that humans are common agents while animals and inanimates are not. They suggested that the only really significant agentivity distinction is, therefore, human v. nonhuman. In addition, Mallinson and Blake noted that the Silverstein hierarchy appears in connection with other grammatical phenomena more easily associated with topicality than with agentivity. For example, hierarchically higher nominals may precede lower rated nominals in sentences (as in the ordering of bound A and O pronouns in the Australian language, Gunwinggu, and in the ordering of bound DO and IO pronouns in French). Hierarchically higher nominals may be more easily advanced along a scale of grammatical relations (as in Wakashan languages where promotion to subject via passivization is obligatory when the patient is first person and the agent is third person, or in English, where Dative Movement may advance an animate beneficiary IO to DO status, but may not advance an inanimate goal IO to DO status). Agreement facts may also be sensitive to the hierarchy standing of nominals (as in Sora, where object agreement is marked on the verb when the object is first or second person, but not when third person). Mallinson and Blake are rather adamant that "there is only one [semantic/pragmatic] principle underlying agreement and that is topicalization. Any syntactic hierarchy that determines agreement seems to reflect a topicalization hierarchy" (1981:88).

The position advanced here is that the Silverstein hierarchy is indeed a hierarchy of agentivity, and also a hierarchy of topicality: since agents make good topics, there is no reason to expect these hierarchies to be very distinct. It should be pointed out that Mallinson and Blake's textual research only addressed the frequency with which different kinds of nominals served as agents and patients in written works. The frequency of appearance question is in fact not quite the question which is most relevant here. The crucial

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question relates to how well different kinds of nominals serve as agents or patients when they are employed in transitive constructions. Put another way, the question is how well the selection of different nominals may intensify or de-intensify the transitive relation between agent and patient. Conceived of in these terms, the Silverstein hierarchy does emerge as a very credible hierarchy of agentivity. The anthropocentricity of the hierarchy may be thought of as commonsensical, and also as tinged with animism.

3.32h Southern Tiwa

Southern Tiwa is a Tanoan language spoken in the Isleta and Sandia pueblos in New Mexico. The language employs a system of three noun classes. Allen and Frantz (1978) affirm that one of these noun classes is restricted to all and only those nouns referring to "animate" entities. It is likely, but not entirely clear from the text, that this class excludes plants.

In Southern Tiwa, passivization (i.e., advancement of direct object to subject) is possible if and only if the initial ('deep') subject is 3p, and necessary if the direct object is higher than the subject on something like a "chain of being" hierarchy in which 1p and 2p outrank ANIMATE 3p, which outranks INANIMATE 3p. If the initial subject is 3p and the direct object does not outrank the subject, then passivization is possible but not necessary.

Southern Tiwa exemplifies the Silverstein hierarchy of nominals of different grammatical person; the tendency to employ passives or passive-like formats when the ANIMACY of direct objects exceeds that of subjects; and the tendency to exclude plants from ANIMATE noun classes.

3.32i Guugu Yimidhirr

Guugu Yimidhirr (which translates roughly as 'speaking this way; this kind of talk') is spoken across a wide area northeast of

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Cooktown in Northern Queensland, Australia. It has been described by Haviland (1987). The ANIMACY distinctions he notes are essentially two-way: (humans and other animals) v. (inanimates and plants). Note below that plants are treated as INANIMATE, and that thunder and, more curiously, fog are treated as ANIMATE.

Pronouns:

The use of the 3p SG NOM pronoun *nyulu* and the 3p SG ACC pronoun *nhangu* is restricted to animal referents (1987:174f, 193f):

Nhanu gudaa ganaa?
your dog be okay
Is your dog okay?

Nyulu gaari ganaa. Nyulu biini.
3p SG NOM not be okay 3p SG NOM die
S/he's not okay. S/he died.

Nhanu galga wanhdhaa?
your spear where
Where is your spear?

Gadabadhi.
(It) broke.

*Nyulu gadabadhi.
S/he broke.

Generally, Guugu Yimidhirr adjoins a 3p pronoun to an animal (especially a human) noun when it functions as the subject or direct object of a sentence. This is especially likely to happen in a sentence which introduces the noun as a new topic of conversation.

[Nyulu Billy] ganaa.
3p SG NOM Billy be okay
He-Billy is okay.

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[Nyulu	Billy-ngun]	nganhi	dhuurngay.
3p SG NOM	Billy ERG	1p SG ACC	pushed

He-Billy pushed me.

Ngayu	[nhangu	Billy]	gunday
1p SG NOM	3p SG ACC	Billy	hit

I hit him-Billy.

Pluralization:

The 3p DUAL form *bula* 'the two of them' may be used with a conjunctive sense with ANIMATE beings, but not with INANIMATE objects (1987:175). E.g., Thunder and Fog are mythical beings, and hence considered ANIMATE:

Dharramali	bula	Wurrbal
Thunder	and	Fog

INANIMATE things are conjoined without any overt conjunction:

yugu	nambal
stick(s)	stone(s)

stick(s) (and) stone(s)

Casemarking:

This language employs a split casemarking system in which personal pronouns follow the NOMINATIVE-ACCUSATIVE pattern while other nominals follow the ERGATIVE-ABSOLUTIVE pattern (1987:186ff). In consequence, the practice of adjoining 3p pronouns to ANIMATE nouns and the practice of replacing ANIMATE nouns with 3p pronouns each has the practical effect of insuring that ANIMATE nouns will be put forth with NOMINATIVE-ACCUSATIVE morphology while INANIMATE nouns will be put forth with ERGATIVE-ABSOLUTIVE morphology.

Haviland regards this system as pragmatically quite natural. The natural circumstance for an INANIMATE entity is for it to passively undergo whatever happens to it; hence, INANIMATE NPs are intrinsically suited to be acted-upons (e.g., patients, instruments) in

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both intransitive and transitive contexts. INANIMATE NPs are therefore intrinsically amenable to morphology which treats intransitive subjects and transitive objects alike. Conversely, ANIMATE entities are, by virtue of their sentience, intrinsically suited to be, not only the experiencers in intransitive contexts, but also the actors in transitive event scenarios. Hence, ANIMATE NPs are intrinsically amenable to NOMINATIVE-ACCUSATIVE morphology. In Guugu Yimidhirr, therefore, the typical transitive sentence presents an ANIMATE agent marked with NOMINATIVE case, and an INANIMATE patient marked with ABSOLUTIVE case.

3.32j Breton

Breton has at least a dozen common plural markers, including half a dozen weak forms. None of the strong forms are sensitive to ANIMACY; e.g.,

Singular	Plural
kador 'chair'	keder 'chairs' (*or* kadorioù 'chairs')
kazeg 'mare'	kezeg 'mares; horses' (*or* kezekenned 'mares')
kael 'barrier; grill'	kili 'barriers; grills' (*or* kaelioù 'barriers; grills')
karr 'car'	kirri 'cars'
bleiz 'wolf'	bleizi 'wolves'

However, ANIMACY is relevant to the selection of some of the weak forms (cf. Stump, 1989). For example, *-ien*, which is used in connection with agents, is mostly restricted to ANIMATES, since agents tend to be ANIMATE.

Singular	Plural
barner 'judge'	barnerien 'judges'
kadour 'warrior'	kadourien 'warriors'

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gwalc'her 'washer'	gwalc'herien 'washers'
gwasker 'printer'	gwaskerien 'printers'

In addition, one often finds a contrast between plurals formed by suffixing *-ed* to ANIMATE nouns, and plurals formed by suffixing *-où* to INANIMATE nouns. The ANIMATE class is primarily restricted to humans and other animals. A notable exception occurs when nouns referring to appliances are formed with the FEM agentive suffix *-ez*, which regularly triggers the use of the *-ed* plural. The INANIMATE class comprises manmade objects and nonliving features of nature, as well as plants and a few exceptional animates.

Singular	Plural
PREDOMINANTLY ANIMATES:	
Breton 'Breton'	Bretoned 'Bretons'
merc'h 'girl'	merc'hed 'girls'
gwalc'herez 'female washer; washing machine'	gwalc'herezed 'female washers; washing machines'
gwaskerez 'female printer; printing press'	gwaskerezed 'female printers; printing presses'
roñse 'horse'	roñsed 'horses'
evn 'bird'	evned 'birds'
pesk 'a fish'	pesked 'fish'
ran 'frog'	raned 'frogs'
preñv 'worm'	preñved 'worms'
PREDOMINANTLY INANIMATES:	
tad 'father'	tadoù 'fathers'
mamm 'mother'	mammoù 'mothers'
pried 'spouse'	priedoù 'spouses'
dervenn 'oak (singulative, from collective derv 'oaks')	dervennoù 'oaks'
bleunienn 'flower'	bleunioù 'flowers'
aval 'apple'	avaloù 'apples'
bag 'boat'	bagoù 'boats'

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kleuzeur 'lamp'	kleuzeurioù 'lamps'
gwin 'wine'	gwinoù '(varieties of) wines'
kouign 'cake'	kouignoù 'cakes'
gwisk 'garment'	gwiskoù 'garments'
tog 'hat'	togoù 'hats'
lenn 'lake'	lennoù 'lakes'
ma 'field'	maoù 'fields'
lec'h 'place'	lec'hioù 'places'
karantezh 'romantic love'	karantezhioù 'loves'
kuzul 'counsel; advice'	kuzulioù '(pieces of) advice'

Breton forms diminutives via the suffix *-ig*. When the stem is plural, *-où* is suffixed to *-ig* (yielding the so-called 'double plural' form), regardless of the ANIMACY of the noun. So here the ANIMACY distinction is neutralized.

labous	'bird'
laboused	'birds'
labousig	'birdie'
labousedigoù	'birdies'

bag	'boat'
bagoù	'boats'
bagig	'small boat'
bagoùigoù	'small boats'

This same neutralization occurs when double plurals are formed from the diminutive form of collective nouns.

basic collective	collective diminutive
tud '(group of) people'	tudig '(group of) people of small account
tud '(group of) people'	tudigoù 'peoples of small account'
chatal 'cattle'	chataligoù 'small cattle'
gwenan 'bees'	gwenanigoù 'small bees'
dilhad 'clothes'	dilhadigoù 'small clothes'

Breton exemplifies the fact that ANIMACY distinctions can be drawn along different lines within a language, not only between grammatical processes, but within a single process. In Breton, the

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-ed v. *-où* distinction is neutralized in the pluralization of diminutive forms. Breton also exemplifies the tendency to classify plants as INANIMATE.

3.32k Algonquian

Bloomfield (1933:272) observes that Algonquian languages classify persons and animals and a few objects as ANIMATE, while classifying plants, body parts, and objects generally as INANIMATE. (Bloomfield intrigues his readers by noting that, while strawberries, bowls, and elbows are INANIMATE, the semantically similar raspberries, kettles, and knees are ANIMATE.) The Algonquian system exemplifies the disparagement of plants in ANIMACY systems. The system is interesting in relation to the Breton system because, whereas a few exceptional humans and animals are classified with INANIMATES in Breton (see also Swahili), a few exceptional plant forms, body parts, and objects are classified with ANIMATES in Algonquian.

In a brief discussion of Menomini pronouns, Bloomfield (1933: 262) records a distinction between [enuh] 'that$_{\text{ANIMATE}}$' and [eneh] 'that$_{\text{INANIMATE}}$.'

3.321 Pawnee

In this language of the Caddoan tribe which traditionally lived along the great Platte River of Nebraska, the incorporation of nouns into the verb complex is ANIMACY sensitive (Parks, 1976:251f). In Pawnee, implicit ANIMACY distinctions correspond very closely to biological realities. Implicitly ANIMATE nouns which are typically not incorporated into the verb complex are personal names of individuals or tribes, and nouns referring to animals or to living species, including trees. In contrast, implicitly INANIMATE nouns referring to body parts, foods, natural phenomena and artifacts undergo incorporation processes regularly. We see exemplified here the robustness of the tendency to grammatically regard body parts in the same way that objects are regarded. The Pawnee data is impressive because it of-

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fers a case where, apparently, all nouns referring to biologically living entities except those referring to body parts are implicitly classified as ANIMATE.

Crosslinguistically, it is probably the case that, of all nouns referring to biologically living things, the nouns referring to body parts are the least likely to be classified as ANIMATE. In §3.32a, regarding Swahili, there was some discussion of the awkwardness which may arise when reference is made to body parts independently from reference to the whole beings they make up. This awkwardness is comprehensible to anyone: it just reflects the fact that body parts do not naturally occur in isolation from bodies. Hence, references to body parts are in one sense concrete and in another sense abstract. The parts are certainly physical enough; however, their delimitation from the rest of the body involves a particular kind of abstraction. This is dramatically attested by the numerous ways in which a body may be divided into parts, both within and between languages. In a sense, then, words such as *elbow* and *eye* are semantically more abstract and less concrete than, say, words such as *hinge* or *ball bearing*. Since words referring to abstractions are invariably classified as INANIMATE, one might speculate that the greater abstractness of body part nouns relative to nouns referring to whole organisms is the factor which increases the likelihood that these nouns will be classified as INANIMATE. To be sure, any and every word referring to a category has a certain abstract character. The point here is just that, in some reasonable sense, it can be maintained that nouns referring to body parts are more abstract than most concrete nouns, and hence may be more likely to be classified with abstract nouns as INANIMATES.

3.32m Ritharngu

In this Australian language of Arnhem Land, a special ACCUSATIVE pronominal affix is used for humans and higher animals (e.g., dogs and kangaroos), but not used for lower animals (e.g., insects and fish) or inanimates.

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3.32n Chukchi

Comrie (1981:183) notes that, in this language spoken on the Chukchi Peninsula at the northeastern tip of Asia, casemarking of agents in transitive sentences is ANIMACY sensitive. Personal pronouns receive a special ERGATIVE marker. The names of persons and reindeer, as well as kin terms used in reference to an older relative of the speaker, receive a LOCATIVE-like ERGATIVE marker. Other NPs receive an INSTRUMENTAL-like ERGATIVE marker.

3.32o ChiBemba

In ChiBemba, a Bantu language spoken in Zambia, noun classes are more cohesive than in Swahili. Nouns referring to humans and nouns referring to animals are assigned to separate classes. In accordance with the crosslinguistic ANIMACY hierarchy, insects are not assigned to the animal class, but to the class that is principally associated with inanimates (Spitulnik, 1987).

3.32p Chinantec

In Chinantec, an Otomanguean language spoken in Oaxaca, México, all nouns are classified as either ANIMATE or INANIMATE. The ANIMATE class includes persons, animals, celestial phenomena (sun, moon, stars, meteors, rainbows, lightning), and psychedelic mushrooms. These assignments have some magicoreligious cultural correlates: heavenly bodies and atmospheric phenomena have a common mythological origin with people and animals (Rupp, 1989), and hallucinogenic mushrooms are observed to have spiritual properties. There is, nevertheless, no denying the universal animistic flavor of the whole affair. The INANIMATE class includes plants, body parts, and inanimate objects. Clearly, both sides of the Chinantec ANIMATE-INANIMATE distinction run afoul of the biological living-nonliving distinction. However, the violations are utterly in keeping with what we have observed of animistic phenomena in general.

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As in many languages, the Chinantec pronoun system distinguishes between human and nonhuman referents. This distinction is carried through demonstrative, interrogative, focus, and indefinite forms (Robbins, 1968:53).

Merrifield (1968:29,47; cf. Robbins, 1968:51f) states categorically that transitive verbs require ANIMATE agents, though he does not elaborate on alternatives to the active voice. Ditransitive verbs are also said to require ANIMATE agents, as well as INANIMATE second objects.

3.32q Hopi

Dennis (1943), a scholar principally associated with animism research, notes that there are two verbs in Hopi which express the idea of being alive. The verb *kata* has the following senses:

1. (in connection with inanimates, humans, and other animals) to *sit* or be *resting on the ground.*
2. (in connection with humans, other animals, and plants) to be alive.

The verb *tayta* has the following senses:

1. to look or to peer intently.
2. (in connection with watches, automobiles, batteries, windmills, etc.) to move autonomously in a mechanical sense; to be in working condition; to be capable of normal activity.
3. (in connection with humans, other animals, plants, supernatural beings, sun, moon, stars, wind, clouds, fire, permanent springs and rivers) to be alive.

Entities which are regarded as *katayta* 'not alive' include

> naturally motile entities which are 'not living' by reason of their transient nature:
>
> a rainstorm
> a flash of lightning

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an arroyo which carries water only after a rain
a temporary or intermittent spring;

and entities incapable of natural autonomous activity:

mechanical devices
sand
stone
bare earth.

Dennis affirmed that the life-related senses of both *kayta* and *tayta* meant 'really alive in the way that people are alive,' and that Hopi speakers had no difficulty distinguishing between the sense (2) of *tayta* that relates to motion or activity, and the sense (3) of *tayta* that relates to life. On the other hand, it is clear that Hopi speakers did distinguish between the way in which, e.g., permanent springs were alive and the way in which, e.g., horses were alive, since the verb *kata* was only used in connection with entities which were biologically living. Thus it cannot logically be the case, as Dennis suggested, that sense (2) of *kata* was equivalent to sense (3) of *tayta*.

It is probably more felicitous to say that what we have in view here is a set of selectional restrictions put forth in terms of a three-way ANIMACY distinction. The first level of ANIMATES comprises only biologically living entities. These entities may act as the subject of *kata*. The second level of ANIMATES comprises, in addition, supernatural entities and temporally enduring entities which, for the most part, possess natural powers of motility. These entities may act as the subject of *tayta*. Manmade artifacts and natural entities of an inert or temporally transient nature are regarded as INANIMATES. These entities are *katayta*. This analysis highlights the animistic favor which is garnered by entities which have superior embodiment by virtue of their temporal endurance, and superior activity by virtue of their natural powers of motion.

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3.32r Onondaga

Onondaga is a Northern Iroquoian language, one of the languages of the original Five Nations of the Iroquois, centered in New York. In a work influenced by the Generative Semantics movement, Chafe (1970: see esp. 24-35,50f,53-57,68) provides a sketch of Onondaga in which nouns are semantically decomposed. Featurally, nouns may be specified as +/- ANIMATE and as +/- HUMAN, and these semantic features have structural consequences in the grammar. For example, Chafe demonstrates that INANIMATE nouns functioning as patients (e.g., *house* in *The house is old* or *corn* in *Harry plants corn*) may be incorporated into the verb, while ANIMATE nouns (e.g., *dog* in *The dog is old*) are by and large not incorporated. Note that plants are treated as INANIMATE. Chafe also gives evidence that lower animals such as fish and houseflies are treated as INANIMATE, at least on some grammatical occasions.

The +/- HUMAN distinction is signalled in part by prefixes attached to the verb: where the patient of sentences like *Harry/the dog is old* is NONHUMAN, the prefix is *o-*; where the subject is HUMAN, the prefix is *ho* or *ko*. Human nouns may be further specified as either MASCULINE (e.g., chief, brave) or FEMININE (e.g., clan mother). However, despite the matrilineal character of the society, it is difficult, outside of kinship terms, to find noun roots that must be FEMININE. Also, Chafe notes that it is possible for a NONHUMAN ANIMATE noun to be furtherspecified as MASCULINE (e.g., male dog), but it is not clear that such nouns can be further specified as FEMININE. Onondaga vocabulary acknowledges the specialization of male social roles, and a need to specify male gender, but it does not acknowledge an equal necessity to take account of female roles and gender.

Chafe further notes a grammaticalized style of depersonalized reference to women that is without corollary in reference to men. In connection with FEMININE subjects (e.g., in such sentences as *Alice is old*), verbs may be prefixed with the NONHUMAN prefix *o-* rather than the HUMAN prefixes *ho* or *ko*. The semantic effect is to render the

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reference "rough, unpleasant, distant, cold, or impersonal" (1970: 34).

Another inequity shows up in the GENDER-sensitive morphology of verb prefixes. These prefixes change in shape to reflect, among other distinctions, a three-way GENDER distinction: MASCULINE, FEMININE, and NEUTER (1970:53-57). In this connection, singular masculine animals are classified along with male persons and a MASCULINE verb prefix is used. In contrast, singular feminine or gender-unspecified animals are classified along with inanimates and a NEUTER verb prefix is used. If nouns representing animals are DUAL or PLURAL, then masculine animals are classified with male persons and feminine animals are classified with female persons.

3.32s Russian

In Russian, as in many Slavic languages, the ACCUSATIVE case of SINGULAR ANIMATE MASCULINE nouns has the form of the GENITIVE (Klenin, 1983). In the PLURAL, in Russian and in some other Slavic languages, all ANIMATE nouns behave this way, regardless of GENDER. Plants (and, one may note, viruses) are classified as INANIMATE. Otherwise, ANIMACY follows biological guidelines.

	SG	PL	SG	PL
NOM	mal'čik	mal'čiki	devuška	devuški
GEN	mal'čik*a*	mal'čik*ov*	devuški	devuš*ek*
ACC	mal'čik*a*	mal'čik*ov*	devušku	devuš*ek*
	'boy' MASC	ANIMATE	'girl' FEM	ANIMATE
NOM	gad	gady	voš'	vši
GEN	gad*a*	gad*ov*	vši	vš*ej*
ACC	gad*a*	gad*ov*	voš'	vš*ej*

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	'reptile' MASC ANIMATE		'louse' FEM ANIMATE	
NOM	ditja	deti	okno	okna
GEN	ditjati	det*ej*	okna	okon
ACC	ditja	det*ej*	okno	okna
	'infant' NEUT ANIMATE		'window' NEUT INANIMATE	
NOM	virus	virusy	dub	duby
GEN	virusa	virusov	duba	dubov
ACC	virus	virusy	dub	duby
	'virus' MASC INANIMATE		'oak' MASC INANIMATE	

The effective hierarchy observed here is MASCULINE ANIMATE nouns > ANIMATE nouns > INANIMATE nouns. The themes reflecting the crosslinguistic ANIMACY hierarchy include the superiority of MASCULINE GENDER over FEMININE GENDER, and the superiority of (animal) ANIMATES over (plant and nonliving) INANIMATES. Historically, the Old Church Slavic special ACCUSATIVE was decidedly chauvinistic: it was once restricted to nouns referring to male, adult, freeborn, ablebodied persons, and was not used in connection with women, children, slaves, or the disabled (Meillet, 1897; Klenin, 1987).

3.32t Polish

A second expression of Slavic language chauvinism may be found in the so-called 'virile form' of Polish. Here, a special NOMINATIVE case marks the PLURAL forms of MASCULINE adult human nouns. The virile form triggers agreement phenomena with associated adjectives and past tense verbs. Because the virile suffix on nouns may be orthographically identical to a nonvirile form, the surest test for virile morphology in texts is to look at the adjective or verb.

adult	human	MASC NOM SG	dobry	mężczyzna 'good man'
adult	human	MASC NOM PL	dobrz*y*	mężczyzni 'good men'

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adult	human	FEM NOM SG	dobra	kobieta	'good	woman'
adult	human	FEM NOM PL	dobr*e*	kobiety	'good	women'
nonadult	human	MASC NOM SG	dobry	osesek	'good	infant'
nonadult	human	MASC NOM PL	dobr*e*	oseseki	'good	infants'
adult	nonhuman	MASC NOM SG	dobry	koń	'good	horse'
adult	nonhuman	MASC NOM PL	dobr*e*	konie	'good	horses'

Above, the virile suffix *-i* is evident only in 'good men.' (In the form *dobrzy*, the suffix *-i* changes the *r* to *rz*, but the combination *rz* + *i* is written *rzy*, so the presence of the virile suffix is shown only by the consonant mutation).

The virile form derives from a Common Slavic MASCULINE NOMINATIVE PLURAL marker which in turn derives from an I.E. MASCULINE PLURAL pronominal inflection (Meillet, 1934:408). Virile forms are best preserved in literary (i.e., conservative) usages, and in the western dialects. In one north central dialect, the verbal agreement phenomena are preserved but the adjectival agreement phenomena are not. In the north and east, it is much the same, but the virile suffix is being extended over other classes of nouns, so that it is losing its unique semantic force. In central dialects, there are no virile forms being preserved in speech (Dejna, 1973:232-234, Map 70).

3.32u Chiquita

In the male genderlect of this Bolivian language, names of males and supernatural beings belong to one noun class, and names of females belong to another (Bodine, 1975:142).

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3.4 Summary

This chapter has argued that perseverant animism in adults gives rise to two broad classes of linguistic effects in languages around the world. There is first the animistic coloring of nonliteral uses of words relating to life and death. Examination of a large sample of English roots, derived forms, collocations, idioms and compounds has shown that a sizeable proportion of all of the nonbiological uses of life- and death-related words appears prompted by EPA considerations — i.e., by animistic sensibilities. Via nonliteral word use, adult speakers create opportunities for themselves to animistically highlight the embodiment, purposiveness, and activity of entities which stand out for them in the world. The case of English is taken to demonstrate a semantic pattern which is general across languages. In a clear expression of the universal prestige of criterially defined concepts, it is everywhere the case that the biological senses of words such as *alive* and *dead* are taken to be the 'literal' or primary senses of the words. In the senses which are regarded as 'nonliteral,' however, one may perceive the action of animistic intuitions of precisely the kind that have been so well documented in investigations of animism in children and adults.

Secondly, it can be crosslinguistically observed that formal ANIMACY distinctions in languages tend to distribute the entities of the world into just the same groups and hierarchies that children and adults form when they animistically assess the life status of the things around them. These ANIMACY phenomena may be found in virtually any precinct of a grammar. In some cases, as in selectional restrictions and topicalization tendencies, the phenomena may be relatively diffuse and inexplicit. More explicit ANIMACY phenomena include cases in which clear cut categorization facts are reflected in overt morphology; e.g., in the assignment of nouns to ANIMACY sensitive noun classes, or in the selection of ANIMACY sensitive pronouns.

It is not uncommon for ANIMACY distinctions to be drawn along different lines in different parts of a grammar. Even within a single

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grammatical process, ANIMACY distinctions may not hold constant, but appear to some degree ephemeral. The ANIMACY distinction reflected in English *who* v. *which* is neutralized in the possessive form *whose.* The ANIMACY sensitive Breton plural suiffix *-oú* loses its sensitivity to ANIMACY when diminutive forms are inflected for plurality. Analogously, a single lexical root may have forms whose ANIMACY sensitive selectional restrictions are inconsistent. In Swahili, It turns out to be quite acceptable to refer to the 'lifetime' of a plant using *maisha,* but of doubtful acceptability to affirm that a plant is 'alive' using *ishi.* The variable or ephemeral character of ANIMACY distinctions within languages may be regarded as structurally analogous to the contextual mutability of animistic thought within research subjects. The analogy is problematic in several respects, and the argument that it provides for continuity between animism and ANIMACY is certainly the weakest which is advanced in this work. However, it is more interesting and informative to formulate the argument, despite its weaknesses, than to refrain from doing so because of them.

The consistency of the various ANIMACY distinctions is to be found in the overall structure of the crosslinguistic ANIMACY hierarchy. It is consistently the case that humans outrank animals, that higher animals outrank lower animals, that animals in general outrank plants, that inanimates outrank incorporeals, that individuated entities outrank entities in a mass, and that powers of intention enhance ANIMACY, as do motility in general and natural motility in particular. Hence, the overall structure of the crosslinguistic ANIMACY hierarchy is dramatically isomorphic with that of the crosscultural animism hierarchy and, with both, the overall pattern of divergence from biology is consistent and clear. In place of biological formalism, we find in ANIMACY systems the gradability, the anthropocentricity, the mammalocentricity, the zoocentricity, and the EPA sensitivity of animistic modes of appraisal.

The crosslinguistic ANIMACY hierarchy differs from the crosscultural animism hierarchy only in the gradations of ANIMACY which are accorded to humans. Here, two points need to made. First, while

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research shows that animists are virtually certain to accord life to all humans, this does not constitute a demonstration that animists regard all humans as being equally alive. In fact, the matter has not received any research attention of note. It may well be, for example, that animists in some sense regard people they know to be more alive than strangers, in a way that is analogous to the fact that Chukchi treats proper names as more ANIMATE than common human nouns. Second, it is obvious that ANIMACY differences between humans reflect the same EPA themes which underlie the rest of the ANIMACY hierarchy. The ANIMACY of human nouns is augmented when their referents have characteristics which enhance their ability to act purposively (they are adult, they are present in the discourse context, etc.). Alternately, ANIMACY is diminished when the embodiment, purposiveness or activity of these referents is compromised (they are disabled, lack powers of speech, etc.). In short, there is prima facie evidence that the gradations of ANIMACY accorded to humans are under the principal control of the same animistic sensibilities which are evident in the rest of the ANIMACY hierarchy.

To be sure, the ANIMACY of nouns referring to the disabled, women, the young, and nonkin may be devalued as an expression of prejudices that are not entirely animistic in character. Universally, family members are among the most affectively prominent individuals in one's life. But whether nouns referring to kin are of higher ANIMACY may covary with the importance of family or clan in the culture at hand. Further, it is not just animistic sensibilities, however broadly understood, that account for sexism and ageism. It is likely that the whole culture has to support an ethos of sexism and ageism before the ANIMACY of nouns referring to women and the young is devalued. Likewise, it is largely the culture which determines the affective weight given to physical disabilities. If a culture possesses advanced technologies which can aid disabled persons, and directs social services to assist them to integrate into the social mainstream, then the status of the disabled can only increase. Under such circumstances, it would seem less likely that the culture would in-

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stitute or perpetuate ANIMACY distinctions between the disabled and the ablebodied.

Clearly, culture and biology may interact in complex ways. There are instances in which biology gives rise to social values more or less directly, as when young people, with their lesser capacity for purposive action, are devalued relative to adults. But there are also cases in which culture acts upon biology, as when technology is used to correct or compensate for biological disabilities, or when being female in a culture is linked with disabling biological modifications such as feet-binding. In establishing the worth of individuals, and in instituting and perpetuating ANIMACY distinctions between individuals, a society attends to matters of both biology and culture, and assesses matters in sometimes more animistic and sometimes less animistic ways.

Hence, it has never been maintained here that ANIMACY systems were exclusively an expression of animistic thought. Nor has it been maintained that the nonbiological use of life- and death-related words was exclusively an expression of animistic thought. Rather, it has been asserted that perseverant animistic sensibilities in adults act as one principal universal factor among an unspecified number of universal or culture-specific factors which foster the development of nonliteral life- and death-related word use, and the divergence of linguistic ANIMACY systems from biological models.

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Chapter Four
Empirical Investigations of Animistic Intuitions in Children and Adults

4.1 Introduction

It has been maintained that the categorization and aliveness ranking norms observed in animistic children are preserved into adulthood, where they are given new expression in nonliteral speech and ANIMACY phenomena. It has also been maintained that the intuitive conception of life which urges animistic appraisals of life status can be largely unpacked as a holistic regard for the embodiment, purposiveness, and activity of the entities being appraised (presuming that these three dimensions of animistic sensitivity are appropriately conceptualized). In this chapter, these theses will be empirically supported by a report on original experimental research using somewhat new techniques of inquiry to uncover the animistic motivations and animistic norms of English speaking adults. Conventional statistical methods will demonstrate the agreement between these norms, the norms of high school students, the norms of animistic preschool children, and the norms of the crosslinguistic ANIMACY hierarchy, as exemplified by the Navajo ANIMACY hierarchy.

It is very easy to be drawn into pointless disputes about what constitutes legitimate animism, about whether the so-called animism of adults is the same as the animism of children, and so on. Given the fact that adults possess biological knowledge which children do not, it is axiomatic that adult conceptions of life will diverge in specific ways from those of children. The question of interest is whether animistic conceptions and modes of appraisal persevere in adults in spite of their mature awareness of biological realities. This can be empirically posed as the question of whether animistic norms and the EPA sensitivities which underlie them can be consistently evoked from an adult population. Since biological conceptions and the prestige which attaches to them act to generally inhibit the expression of animistic conceptions, a full view of ani-

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mistic conceptions in adults can only be obtained under circumstances where biological views are set aside or, at least, denied the primacy which is typically accorded to them. If biology can be set aside in large measure, then, if animistic conceptions yet endure in adults, they may emerge with a minimum of conceptual interference. If animistic conceptions do not persevere into adulthood, then setting aside biology will not help to bring them out.

Imagine, by way of analogy, that we wished to determine whether Mary, now grown, still loves her uncle, who is a criminal. If asked, "What do you think of your uncle?" she may reply, "He lies and he steals and, as anyone can tell you, he is a notorious criminal. There is no getting around it." But then, with perfect legitimacy, we might ask, "Putting all that aside, how do you feel about him personally? Do you still love him?" Here Mary might reply, "I have to confess that, against all reason, I do." In this not so improbable scenario, Mary gives evidence that she can regard her uncle in terms of criterially defined and socially sanctioned categories, and also in terms which are affective and personal. Hence, in spite of the fact that her uncle is a criminal, mention of him may yet elicit her affection. Pointedly we note that her affective appraisal of her uncle is best elicited when she is assured that she may set aside socially sanctioned modes of appraisal. To complete the analogy, we note further that it would almost certainly be the case, but not the central point, that her love for her uncle would not be the same today as it was in the naivete of her youth.

The interview with Mary takes the form of a thought experiment in which Mary is instructed, or allowed, to set certain facts regarding her uncle aside. In accordance with one of the requirements of experiments, it could have had a different outcome. Mary might have told us in no uncertain terms that it was impossible to set aside her uncle's criminality. Alternately, she might have affirmed that, even when she set aside the nefarious facts regarding her uncle, she simply could not find any love for him left within her.

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In the research to be reported, adults were presented with thought experiments in which they too were instructed, or allowed, to set certain facts aside in the process of rendering affective judgments. Instructions were crafted to implicitly urge subjects to set aside or downplay biological facts, in order that animistic sensibilities might emerge with greater clarity than could otherwise be expected. In the central experiment, subjects were presented with pairs of entities and asked to intuitively choose the one which was *in a manner of speaking* 'more alive.' In ancillary experiments using the same entity pairs, different subjects were asked to intuitively determine which entity in each pair was *in a manner of speaking* more embodied, or more purposive, or more active.

This research too could have had various outcomes. A pattern of biology-based response might have emerged, affirming that adults cannot disencumber themselves from biological conceptions, even when invited to regard matters intuitively. Alternately, a nonpattern of noisy response might have emerged, if for example biological norms were set aside but no other norms then came to the fore. Instead, however, the norms which dominated the responses of adults were entirely consonant with the behavioral norms of animistic children and animistic adults. In addition, it was possible to statistically relate intuitive judgments of relative 'aliveness' to intuitive judgments of embodiment, purposiveness, and activity, and also to relate the hierarchical ranking of entities said to be differentially 'alive' to the hierarchical ranks found in the Navajo ANIMACY hierarchy — which is to say, to patterns of hierarchical ANIMACY found worldwide.

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4.2 Study 1 — College Students' Animistic Intuitions

In this study, using a paired comparison technique, adult Ss acting on special instructions were called on to intuitively determine the relative aliveness, embodiment, purposiveness, and activity of various entities that were living and nonliving (including both concrete and abstract entities). The relationship between appraisals of aliveness and EPA appraisals was statistically assessed. A less formal assessment was made of the congruency between the relative aliveness hierarchy established by these adults, the crosscultural animism hierarchy, and the crosslinguistic ANIMACY hierarchy.

4.21 Method

Subjects

Subjects were 720 undergraduate and graduate students at public and private colleges and universities in Billings, Montana and Berkeley, San Francisco, Stockton, Monterey, and Fremont, California. Collectively they reported over 100 different academic majors; however, the fields represented most often were psychology and business. Subjects ranged in age from 18 to 30, but tended to be under 25, since the great majority were undergraduates. To help insure that subjects would be familiar with the vocabulary of the test forms, and draw from a consistent set of associations when responding to words such as *alive* or *embodied*, and be sensitive to the linguistic nuances of the instructions, subjects were required to be native speakers of English: they were eliminated if they had not regularly used English for communication when they were 7 years old. No subjects reported difficulties relating to vocabulary. Subjects were otherwise as diverse in their linguistic and cultural experience as they were diverse in their academic interests. Very great numbers reported using other languages in addition to English when they were 7 years old, and very great numbers reported living outside of the United States for more than two years. Many had lived a majority of their life abroad. In addition, large numbers of sub-

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jects showed a keen sensitivity to diverse social affiliations when asked to state what ethnic or cultural groups they most strongly identified with. Subjects made note of gender, nationality, race, ethnicity, sexual orientation, religion, political views, academic interests, and mass cultural interests. The international and intercultural experience of the subjects was considered to be an advantage, since this would tend to neutralize response biases that were culture specific in nature. The characteristics of the subjects assigned to different questionnaires were essentially matched, although the majority of the graduate business students were to be found among the respondents to the purposiveness questionnaires. Permission to conduct the survey was obtained from UC Berkeley's Committee for the Protection of Human Subjects.

Stimuli

The stimuli consisted of 576 paired comparisons in four semantic dimensions: aliveness, embodiment, purposiveness, and activity. Each S was presented with 96 pairs (1/6 of the entire list) in only one of the four dimensions. Hence, the 720 Ss yielded 30 complete protocols in each of the four dimensions (i.e., 6 Ss needed for one complete protocol in one semantic dimension X 30 protocols X 4 dimensions = 720 Ss). The order in which the pairs were presented, and the order of the two pairmembers within each pair, were randomized. The 576 paired comparisons were constituted as follows:

THE EXPERIMENTAL MICROCOSM (496 pairs):

Here, 32 entities were exhaustively compared against each other, yielding 496 paired comparisons. Each entity appeared, as nearly as possible, an equal number of times in each of the six forms associated with each of the four semantic dimensions. The 32 entities selected were intended as a microcosm of the world of entities which can be judged as biologically living or not living, and which speech communities must classify as relatively ANIMATE or INANIMATE.

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The relative standings of the 32 entities in the microcosm were determined in each of the four semantic dimensions by counting the total number of times that each entity had won in paired comparisons in each dimension. For example, out of 930 possibilities to win in the aliveness dimension (i.e., 31 comparisons x 30 protocols = 930), the gnat was able to win 443 times.

To the degree possible, the entities were balanced with respect to their embodiment (E), purposiveness (P), and activity (A). The entities of the microcosm are presented below in their broad ontological categories; viz., humans, animals, plants, inanimates, and incorporeals. The entities chosen were believed typical of their categories, and this was confirmed for the mammals, birds, bugs, tree and flower by category norms provided by Battig and Montague (1969).

Animals which typically interacted in a predator-prey relationship with each other were avoided. Further, domestic animals were excluded from the category of animals, and manmade artifacts were excluded from the category of inanimates, in order to exclude to the degree possible any cases of an entity's having a special relationship with people.[114] Since the embodiment of mammals, birds, and bugs was essentially a given, it was only possible to balance representatives of these categories with respect to their purposiveness and activity. However, in acknowledgment that size might influence judgments of embodiment, mammals were represented by four larger exemplars and three smaller exemplars.

In connection with the inanimates, it was particularly difficult to balance along the purposiveness dimension, since the criteria for determining the purposiveness of inanimates are ever speculative and subject to rethinking. At any rate, it turned out that Ss agreed 13 out of 16 times with the judgments below regarding

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[114]The sometime circus status of tigers and elephants, and the sometime quasidomestic status of elephants and bees was not considered problematic.

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which entities were relatively more purposive and which were relatively less so. Overall, Ss agreed 44 out of 48 times regarding the relative EPA status of the inanimate entities presented, so that the attempt to present an EPA balanced set of entities appears to have been successful. The eight inanimates were also balanced with respect to whether, roughly, they would be likely to be judged alive by animistic children — a distinction which on the face of it seemed to correlate with whether they were relatively more or less active. For convenience, the four inanimates more likely to be animistically appraised by children will be referred to as 'high inanimates'; the remaining four inanimates will be referred to as 'low inanimates.' One may note further that the ANIMACY of the high inanimates (sun, waterfall, wind, thunder) is also likely to be superior to the ANIMACY of the low inanimates (glacier, daylight, air, stone).

In connection with the incorporeals, an effort was made to exclude abstract entities having a special or 'parasitic' relationship to people (e.g., love, wisdom, monarchy). Instead, abstract entities representing forces, objective qualities, and objective relationships were presented.

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The Entities of the Microcosm

(32 Entities Yielded 496 Paired Comparisons)

Humans:

an adult human

Animals (Mammals; Birds; Bugs):

+P +A	-P +A	+P -A	-P -A
a tiger	a kangaroo	an elephant	a hippopotamus
a beaver	a raccoon		a possum
a hawk	a sparrow	an owl	a swan
a honeybee	a gnat	a spider	a beetle

The raccoon was regarded as intermediate in purposiveness and activity relative to the comparably sized beaver and possum.

Plants (Tree; Flower):

a redwood tree
a daisy

Natural Inanimates:	E P A	Child might judge alive?	
the sun	+ + +	+	'a high inanimate'
a waterfall	+ - +	+	'a high inanimate'
wind	- + +	+	'a high inanimate'
thunder	- - +	+	'a high inanimate'
a glacier	+ + -	-	'a low inanimate'
daylight	- + -	-	'a low inanimate'
air	- - -	-	'a low inanimate'
a stone	+ - -	-	'a low inanimate'

The four inanimates likely to be animistically appraised by children were referred to as 'high inanimates'; the remaining four inanimates were referred to as 'low inanimates.'

Incorporeals (Forces; Qualities; Relationships):

gravity	a force
electromagnetism	a force
largeness	a quality
thickness	a quality
distance	a relationship
equivalence	a relationship

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SUPPLEMENTARY COMPARISONS (80 pairs):

Additional paired comparisons were included to provide information on various points of interest. For the most part, these were not analyzed statistically, but only informally reviewed.

One set of supplementary comparisons was designed to produce data on the relative aliveness and EPA of additional inanimates; viz., lightning, hail, fire, smoke, a bay, heat, fog, a puddle.[115] These additional inanimates were each compared to two entities in the microcosm in order to obtain some idea of how they would fit into the microcosm's aliveness hierarchy.

lightning v. the sun
lightning v. a waterfall
hail v. a waterfall
hail v. wind
fire v. wind
fire v. the sun
smoke v. thunder
smoke v. air
a bay v. glacier
a bay v. wind
heat v. thunder
heat v. air
fog v. air
fog v. thunder
a puddle v. a stone
a puddle v. daylight

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[115]Three of these entities are problematic as research entities. First, one must grant that heat is not a 'thing'; nevertheless, it can be physically perceived. (And, to complicate matters, that physical perception can be called 'heat' or 'warmth.') It is only informally that heat was regarded here as a variety of inanimate.

Second, as discussed in Chapter Two, entities such as a bay are always problematic, since it is not clear whether the aliveness of a bay is intended by Ss to address the aliveness of living things which might live in or on a bay.

Third, it can be problematic to ask Ss to assess the aliveness of hail because hail can be conceptualized as a driving phenomenon like rain, or as an inert ground cover like snow. Rain seems to be less subject to this problem since, roughly, rain seems to remain rain only so long as it is falling. One can say that after it stopped hailing there was hail everywhere, but one does not say that after it stopped raining there was rain everywhere. Neither can jumping in puddles after the sun has come out constitute playing in the rain.

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A number of supplementary comparisons were designed to investigate the limits or far reaches of categories — particularly, the degree to which hierarchical aliveness relations between ontological categories could be disturbed by altering the exemplariness of the entities representing the categories. It was anticipated, for example, that humans would be rated superior to other mammals; hence, the robustness of this relationship was tested by pitting unexemplary persons (an elderly person, a baby) against a super-mammal (a dolphin). Some of these comparisons also gave information about how additional entities might fit into the microcosm's aliveness hierarchy.

an elderly person v. a dolphin	['poor' human v. 'good' mammal]
a human baby v. a dolphin	['poor' human v. 'good' mammal]
a barnacle v. lightning	['poor' animal v. 'good' inanimate]
a barnacle v. hail	['poor' animal v. 'good' inanimate]
a barnacle v. fire	['poor' animal v. 'good' inanimate]
a clam v. a redwood tree	['poor' animal v. 'good' plant]
a turtle v. a redwood tree	['poor' animal v. 'good' plant]
a barnacle v. a redwood tree	['poor' animal v. 'good' plant]
a barnacle v. a stone	['poor' animal v. 'poor' inanimate]
a barnacle v. a glacier	['poor' animal v. 'poor' inanimate]
a barnacle v. daylight	['poor' animal v. 'poor' inanimate]
moss v. lightning	['poor' plant v. 'good' inanimate]
moss v. hail	['poor' plant v. 'good' inanimate]
moss v. fire	['poor' plant v. 'good' inanimate]
moss v. a stone	['poor' plant v. 'poor' inanimate]
moss v. a glacier	['poor' plant v. 'poor' inanimate]
moss v. daylight	['poor' plant v. 'poor' inanimate]
moss v. a barnacle	['poor' plant v. 'poor' animal]
a redwood tree v. moss	['good' plant v. 'poor' plant]

In another set of supplementary comparisons, an automobile (an artifact highly regarded by animists) was pitted against the sun and moon (two natural inanimates highly regarded by animists), and against persons in various kinds of relationship to automobiles; viz., an automobile's creator, operator, servicer, or potential victim.

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an automobile v. the sun
an automobile v. a waterfall
an automobile v. an automobile designer
an automobile v. a person driving an automobile
an automobile v. an automobile mechanic
an automobile v. a pedestrian

Certain supplementary comparisons were intended as EPA minimal pairs. That is, pairs were constructed in which the entities were believed to differ along primarily just one of the EPA dimensions. Such pairs were intended to test whether an isolated superiority in just one EPA dimension would translate into a judgment of superior aliveness. That is, these pairs were designed to determine whether the role of E, P, and A considerations in promoting judgments of aliveness could be individually validated. As one might reasonably expect, Ss did not always judge that the pairs below constituted minimal pairs. However, of the 576 total paired comparisons, 31 minimal pairs did emerge in which E, P, and A ratings only differed substantially in one dimension.

Intended Embodiment Minimal Pairs:

a cloud v. fog
a person who just arrived v. a person who just left
a tower v. a blueprint for a tower
a sphere v. a circle
a 100 MPH cyclone v. a 100 MPH wind
a whirlpool v. a river current

Intended Purposiveness Minimal Pairs:

speech v. noise
a brick v. a stone
a man fishing to eat v. a man fishing for fun
a good worker who understands the whole operation v. a good worker who understands just his own job
a person with a project v. a person who is idle
a productive person v. an unproductive person
a carpenter v. an adventurer

Intended Activity Minimal Pairs:

Active v. Inactive

an untraveled river v. an untraveled road
a lightning bolt v. a ray of light
a restless sea v. a quiet sea

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a layer of mist v. a layer of dust
a balloon v. a bowling ball
a daydream v. a mental plan

Self Locomoting v. Non Self locomoting

a moped v. a bicycle
a toy car that winds up v. a toy car that you push
roller skates v. basketball shoes

Finally, a set of comparisons were presented reflecting certain crosslinguistic ANIMACY distinctions. For example, corresponding to the fact that disabled persons are sometimes 'demoted' in ANIMACY, some comparisons asked for judgments of relative aliveness vis-à-vis ablebodied and disabled persons. In most cases, however, these comparisons were intended to reflect the general character rather than the specific facts of ANIMACY distinctions.

Whole Animal v. Body Part

you v. your head
a cat v. a cat's ear

Kin/Named v. Nonkin/Nonnamed

someone you know very well v. someone you know only slightly
a relative you only met once v. a nonrelative you only met once

Free v. Nonfree

a person with options v. a person without options
a free man v. a slave

Adult v. Nonadult

an adult v. an elderly person
an adult v. a teenager
an adult v. a baby

Ablebodied v. Disabled

a sighted person v. a blind person
a hearing person v. a deaf person
a hearing artist v. a deaf artist

Linguistic v. Nonlinguistic

a 2-year-old who can talk v. a 2-year-old who can't yet talk

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a talkative person v. a quiet person
a person speaking out loud v. a person thinking to himself

Motile Inanimate v. Nonmotile Inanimate

(pairs appear above as Intended Activity Minimal Pairs)

Inanimate v. Incorporeal

snowflake v. symmetry
flag pole v. perpendicularity

Instructions and Procedure

Ss were introduced to the study in regular class sessions. Each class was exposed to only one of the four kinds of questionnaires. Questionnaires were passed out and the written instructions which accompanied them were read aloud. In some cases, Ss then filled out the questionnaires on the spot; in other cases, they were allowed to complete them at home and return them at the next class session. Participation was voluntary, and without compensation or class credit. Ss were allowed to discontinue their participation at any time, and a few of the hundreds tested elected to do so, with some evidence of exasperation. Almost all Ss were able to complete the questionnaire in 10 minutes, and no Ss reported fatigue. The instructions prepared for all four questionnaires began with the following announcement.

> You have been asked to participate in a study of intuitive feelings which will be published as part of a doctoral dissertation at the University of California at Berkeley. The survey takes only 10 minutes to complete. The questions are easy to answer, and most people find the survey interesting and kind of fun.

Separate instructions then followed for each of the four types of questionnaire, as shown below. Instructions were similar across questionnaire types, with the notable exception of the instructions accompanying the purposiveness questionnaire.

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Aliveness

In each question below, two things are named for you to consider. Sometimes both of the things are biologically alive — for example, a lion and a moth. Sometimes neither of the things are biologically alive — for example, a sewing machine and a rock formation. Sometimes one of the things is biologically alive and the other is not — for example, a sunflower and a hurricane. Your task is to decide which of the things named is in a manner of speaking 'more alive.' Don't worry about why you feel that one thing is 'more alive' than another thing. Just mark it the way you see it, responding intuitively. Move right along without puzzling over individual questions. Answer every question in the order it appears. Don't go back and change your answers. Don't discuss the survey with others until you have finished it.

Embodiment

In each question below, you are given a pair of things to consider. Sometimes both of the things are entities which we normally regard as having a body — for example, a giraffe and a moth. Sometimes neither of the things are entities which we normally regard as having a body — for example, a rock formation and a daydream. Sometimes one of the things is an entity which we normally regard as having a body and the other is not — for example, a clam and a cloud. Your task is to decide for each pair which of the things named is in a sense 'more embodied' than the other. Don't worry about why you feel that one thing is 'more embodied' than another thing. Just mark it the way you see it, responding intuitively. Move right along without puzzling over individual questions. Answer every question in the order it appears. Don't go back and change your answers. Don't discuss the survey with others until you have finished it.

Purposiveness

This is a study which will ask you to use your imagination. In each question below, two things are named for you to consider. Sometimes both of the things are alive — for example, a giraffe and a moth. Sometimes neither of the things are alive —

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for example, a wristwatch and a nail. Sometimes one of the things is alive and the other is not — for example, a weed and a tidal wave. In this study, you are asked to imagine that *all* the things named are alive, or have somehow been brought to life.

After you imagine that *everything* named is alive, the next thing is to decide which of the things named in each pair would have a greater internal sense of purpose. Take the wristwatch and the nail, for example. If both of these things were alive, which do you feel would have a greater sense of purpose? Or imagine that a tidal wave, like a weed, was alive. If a tidal wave was brought to life, would it have a greater or a lesser sense of purpose than a weed? Don't worry about why you feel that one thing would have a greater or lesser sense of purpose than another thing. Just mark it the way you see it, responding intuitively. Move right along without puzzling over individual questions. Answer every question in the order it appears. Don't go back and change your answers. Don't discuss the survey with others until you have finished it.

Activity

In each question below, you are given a pair of things to consider. For each pair, your task is to decide which thing you associate more strongly with movement or activity. Don't worry about why you associate one thing more strongly with movement or activity than another thing. Just mark it the way you see it, responding intuitively. Move right along without puzzling over individual questions. Answer every question in the order it appears. Don't go back and change your answers. Don't discuss the survey with others until you have finished it.

A Comment on Method

Evidence has already been presented (§ 2.233) which argues that judgments of relative aliveness are as legitimate an index of animistic sentiment as binary judgments of aliveness. First, in classical investigations of animism, the rationales offered for calling an entity alive or for calling one entity more alive than another have

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been of like kind (Piaget, 1926b:196f; Honkavaara, 1958; Laurendeau and Pinard, 1962:68,152f,266; Nurcombe, 1970:76; DelVal, 1975: 194-200). Secondly, it has been observed that the likelihood that an entity will be regarded as living covaries with the likelihood that the entity will be regarded as more living than other entities (Del-Val, 1975:194-200). Thus, the sun is not only regarded as being alive more frequently than most other inanimate entities; it is generally also regarded as being more alive than most other inanimates. Finally, there is some evidence that judgments of relative aliveness offer the most sensitive access to the animistic sensibilities of subjects. Laurendeau and Pinard (1962:152f) found that animistic views could be elicited from subjects judging relative aliveness even when they had not taken up animistic positions when asked whether various entities categorically were or were not alive.

In the present context, speaking carefully, figurative judgments of relative 'aliveness' were elicited, rather than literal judgments of relative aliveness. However, since it was believed that the intuitive norms which would direct the figurative judgments were isomorphic with, and ontogenetically continuous with, the norms of classical animistic behavior, it was naturally desirable to employ a method which had proved itself in more classical research. Asking for figurative judgments of relative 'aliveness' represented, one the one hand, a method with proven capacity to give shape to norms of animistic origin and, on the other hand, an adaptation which would minimize the biology-based suppression of animistic intuitions.

There are a couple of reasons why pairwise comparisons were used rather than ratings on a Likert-like scale. First of all, it was desirable to present Ss with a task which they could perform easily and reliably. With a large number of entities, it becomes very difficult to assign scalar ratings. One must repeatedly scan through the list of entities to ensure that they have been assigned the proper relative ratings. The danger, of course, is that Ss will not perform a difficult task carefully or reliably. With pairwise comparisons, the task is greatly simplified and, hence, reliability is maximized.

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The second problem with scalar ratings is that they lose detail. Their resolution power is often too low to register the subtle distinctions that Ss are capable of making. A 7-point scale can only yield a seven-level hierarchy of rankings. However, with pairwise comparisons, the number of potential ranks in a hierarchy is always equal to the number of entities being compared against each other.

The third problem with Likert-like scales is that the semantic distance between all adjacent ranks is assumed to be equal. This assumption is probably not valid in the present connection. We have already encountered evidence of unequally spaced ranks on both animism and ANIMACY hierarchies. With pairwise comparisons, the naturally rated distance between clusters of entities on semantic hierarchies can emerge with complete freedom. The method of pairwise comparison imposes no spacing of its own: any spacing which emerges is a direct representation of entities' differential capacities to win in one-to-one comparisons. Hence, pairwise comparison is the method yielding the most reliable and detailed data regarding the natural clustering of entities along a semantic gradient, and the natural spacing between these clusters.

In connection with paired comparison, Ss may be presented with either a forced choice, or a multiple choice. That is, Ss may be forced to choose the pairmember which is more X, or to stipulate that either the first pairmember is more X, or the second pairmember is more X, or the pairmembers are equally X, or neither pairmember can be properly said to be X, etc. Since the entire experiment was designed to liberate Ss as much as possible from the primacy of biological considerations, the forced choice format was selected. First of all, it should be noted that forced choice is the preferred format in many testing instruments which seek to give maximal definition to naturally elusive dimensions of affect (e.g., MMPI, CPI). Secondly, it became clear in pretesting that Ss were strongly disposed to take a purely biological perspective when they were allowed to say, for example, that both pairmembers were equally alive (e.g., in the case of two animates), or that neither pairmember was

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more alive than the other (e.g., in the case of two inanimates). The imposition of a forced choice precluded Ss from retreating to biological axioms when pairmembers were both animate or both inanimate. It was hoped that subjects would continue to entertain intuitions of a nonbiological nature alongside biological considerations when assessing pairs in which animates contrasted with inanimates.

The principal means of disinhibiting animistic response was through the carefully worded instructions given to subjects. Following, something of an exegesis of these instructions.

In the introductory announcement, Ss are told that the study is about "intuitive feelings," and assured that the questions are easy, interesting, and fun, and that the questionnaire only takes 10 minutes. They are subsequently told not to worry about "why you feel that one thing is more [X] than another," but to "just mark it the way you see it, responding intuitively." They are encouraged to "move right along without puzzling." All of these elements convey the sense that the task is to be undertaken in a casual and relaxed manner and, in particular, that it is *not* intended as an assessment of formal knowledge. Rather than a test of knowledge, it is a survey of intuitions. Their own intuitive feelings are valid, regardless of their relationship to the views of others or to formal knowledge. Of course, their good faith in reporting their intuitions is desired, since the study "will be published as part of a doctoral dissertation."

In the instructions accompanying aliveness questionnaires, the previewing of pairs in which both entities are biologically alive or both biologically nonliving makes it clear that a biological definition of life will not serve as a general guide for determining which pairmember is 'more alive' than the other. Indeed, as discussed above (§ 2.31), the request to pick the pairmember that is *more* alive encourages or presupposes the conceptualization of life as a gradient attribute which is present to some degree in all of the entities presented for comparison. The use of single scare quotes on the

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phrase *'more alive'* further emphasizes to Ss that life may be regarded in an aberrant or nonliteral manner. The scare quotes are as much a hedging device as the phrase *in a manner of speaking*. Both of these hedges grant license to the hearer to set aside the usual or technical criteria of life, or to weight facts of biology differently than usual. The message of the hedges is not that biology is irrelevant and should not be considered at all, but that biology will have to be weighted in whatever way seems appropriate in connection with other unspecified criteria for judgment.

The instructions accompanying embodiment questionnaires possess many of the same characteristics. Here, it is made plain to Ss that the ordinary notion of having a body will not serve as a general guide for determining which pairmember is 'more embodied' than the other. In particular, the examples given of entities which we normally regard as not having a body (a rock formation, a daydream, a cloud) orient the subject from the outset to regard embodiment as more complex than just a covert reformulation of the distinction between animals and nonanimals. As in the instructions for the aliveness questionnaire, two prominent hedging devices are used: scare quotes and the phrase *in a sense*, which has virtually the same semantic force as *in a manner of speaking*.

The hedges *in a manner of speaking* and *in a sense* may further encourage Ss to look for conventionalized alternatives to the usual meanings of the words *alive* and *embodied*, rather than just any aberrant or novel meanings. It does not do much good to say "In a sense, X is Y" if the hearer cannot figure out *how* X can be Y: the predications which follow these hedges tend toward the conventional. As an illustration, note the somewhat different acceptability of the following sentence variations.

> In a manner of speaking, she's the
> drive wheel / ?on-switch / lynch pin / ?set screw
> of the organization.

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In metaphorical representations of organizations as machines, references to drive wheels and lynch pins are conventionalized. References to on-switches (which, like drive wheels, set a machine in motion) or to set screws (which, like lynch pins, hold mechanical parts together) are not conventionalized, and acceptability in connection with *in a manner of speaking* thereby suffers, since interpretability in general suffers. The upshot is that, even while Ss are encouraged to respond intuitively and personally, they are at the same time guided toward the normative features of their intuitions. The use of these hedges is appropriate and useful here because the conventionality of preserved animistic norms in adults is precisely the point at issue.

The instructions accompanying the purposiveness questionnaires set forth the terms of a special thought experiment designed to address a special problem. The problem with rating purposiveness is that there are qualitatively different, and incommensurable, scales along which purposiveness might be rated. The normal polysemy of the word *purposive* points to these incommensurabilities. The word may mean 'serving a purpose,' or it may mean 'having an internal sense of purpose.' The distinction is clear: humans and animals have intentionalistic, sentient, first person purposes; other entities do not. The first person purposes of a carpenter are different in kind from the third person purposes of a hammer, and cannot be rated on the same scale.

Even among animal life, the sense in which a sheep dog has a purpose is different from the sense in which a rancher has a purpose: a full specification of the purpose of the sheep dog must acknowledge that the dog has been enlisted by the rancher as an accomplice in a way that is somewhat analogous to the hammer's being used as a tool. In both cases, purposiveness may be judged from a human perspective.

The human perspective also prevails in connection with certain kinds of entities whose purposes are 'parasitic' on human purposes

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in different, funny ways. It is easy enough to speak of the purpose of bronchial cilia in a way that does not make reference to sentient purposes but, in general, the purposes of body parts are related to the sentient purposes of the whole person. A hand is for reaching, for grasping, for catching, etc. Similarly, abstract concepts such as {symmetry} can only be conceived of as purposive in connection with the whole purposive mental life which provides the context in which they are entertained. They are in one sense 'tools' which have a user, but they are in another sense just as 'built-in' as one's hand, so that they are rather more a component of the user's own purposive activities than an object manipulated by him.

What of natural objects in the world? Does the river bank have a purpose? Does the moon? Or gravity? Certainly they have a role in the maintenance of natural patterns of order: the river bank constrains the river, the moon raises the tides, gravity holds it all together. But it is not altogether clear what qualifies as a purpose when speaking of natural objects and natural forces, since it is not clear what perspective, *if any*, ought to be taken up in order to judge the purposes of these things. Certainly it is not a human purpose that gravity do what gravity does, etc., even if humans are the ecological beneficiaries of gravity. The hammer is said to have a purpose because it was fabricated to function in a particular way: a hammer has its purpose designed into it. It is not demonstrable that there is any comparable teleological character to the purposiveness of natural objects. Hence, even when one regards both artifacts and features of the natural world in terms of their usefulness to people, it is not clear that both kinds of entities may be judged according to a single scale of purposiveness.

Given all this, how can the purposiveness of different entities be compared? How unified a notion is 'purposiveness' anyhow? One suspects that the notion is more unified for the deeply animistic child than it is for adults, since the animistic child may not necessarily distinguish between the first person purposes of sentient beings and the third person purposes of artifacts, natural materials,

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etc. In order to recreate for adults something like the conditions of high animism, in which purposiveness might show up on a single scale, Ss were asked to imagine that *all* the entities presented for judgment were biologically alive, or had somehow been brought to life. Ss were then asked to determine which pairmember would have the greater *internal* sense of purpose. Under these imagined conditions, every kind of purposiveness may be conceived of in first person terms — that is, in terms of the kind of purposiveness which is common to animals. In short, the thought experiment introduces a single scale for the assessment of the purposiveness of all the entities presented for comparison.

At the same time, the relative purposiveness of entities need not be altered by the thought experiment, and herein lies its real beauty. Merely supposing that an entity is alive does not grant the entity the deep internal sense of purpose that is entertained by humans or higher animals. Trees and bacteria are alive, and yet no one would rate their internal sense of purpose on a par with that of mammals. Thus, when Ss imagine that nonliving entities are alive, they remain free to determine according to their own intuitions whether these entities would have a highly developed internal sense of purpose, or no internal sense of purpose at all: they remain free to rank each entity along a continuum of inner purpose ranging, presumably, from that of plants to that of humans. A sewing machine, for example, might be regarded as an industrious being, or as internally purposeless as fluttering leaves. The point of interest is whether, under these conditions of imaginative license, the high inanimates favored by animistic children (and ANIMACY systems) will reemerge as purposive favorites.

Admittedly, certain conceptual problems remain when one tries to take a first person point of view in connection with body parts and incorporeal entities. For example, it is very difficult to imagine the concept {symmetry} to be alive, or to imagine the internal sense of purpose it would have if it were alive. It is just as difficult to contemplate the internal sense of purpose of body parts —

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unless one detaches the body part from its host in the manner of B horror movies. In all, it is just not clear that this method will allow the rating of the purposiveness of abstractions, as isolated from the thinking being who entertains them, or of body parts, as isolated from the whole being constituted by them. However, this might be regarded as more of an immediate experimental finding than a methodological deficiency. The difficulties in assessing the purposiveness of incorporeals and body parts are not brought about *by* the thought experiment so much as they persist *in spite of* the thought experiment. It can still be reasonably maintained that the only effect of this thought experiment is to merge first person and third person aspects of purposiveness so that, to the degree that purposiveness *can* be assessed at all, it can be assessed on a single scale. In connection with incorporeals and body parts, the thought experiment merely brings into high relief the fact that we cannot well conceptualize the purposes of these entities as existing independently.

The instructions accompanying the activity questionnaires were the most straightforward of all. It might be mentioned that the notion of 'activity' was meant to encompass the notion of 'interactivity.' It was not felt that any special instructions were required on this point. In pretesting, for example, 'someone you know very well' was rated very substantially more active (and 'alive') than 'someone you know only slightly.' Really, the difference seems to be one of interactivity rather than activity per se, but Ss showed a propensity to gloss over this small distinction. That is, it seemed that Ss' intuitions about what constituted 'activity' naturally included consideration of interactivity.

The instructions very deliberately asked Ss to report which entity they *associated* more strongly with movement or activity, rather than to judge which entity was more moving or more active. Posing the question as an association task mitigated against the possibility that Ss would overanalyze the notion of activity. For example, the overanalyzing S might have decided that sustained activ-

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ity should 'count more' than intermittent activity. By this reasoning, a dripping faucet would be thought more active than a wild teenager (since a wild teenager sleeps some of the time), or a hailstone (since a hailstone comes to rest). To take another example, an over-analyzing S might have held that it didn't make any sense to ask about the relative activity of a plan and a fantasy, because incorporeal things are not, by definition, *really* moving or active at all. The more intuitive positions are presumably that fantasies are more active than plans, and that wild teenagers and hailstones are more active than dripping faucets. The association question liberated Ss from any requirement to set out determinate criteria for what constituted 'real' activity, and so liberated Ss from the onus of rationally avoiding incorrect answers. Since it would be infelicitous to speak of a person's *associations* being right or wrong, Ss had no need to define the notion of activity at all, except by intuitive means.

4.22 Findings and Analysis

Aliveness and EPA Wins

The frequency and statistical significance of wins for each entity in each semantic dimension in each of the 576 paired comparisons is given in Appendix B.

The total number of times that each entity in the microcosm won in pairwise comparison with the other entities in the microcosm is given below in Table 9 for each semantic dimension. In each dimension, the total possible number of times that an entity might win a comparison was 930 (i.e., 30 protocols x 31 comparisons). No ceiling or floor effects were observed. The number of wins which an entity achieved in a particular dimension will be referred to as that entity's 'rating' or 'score' in that dimension.

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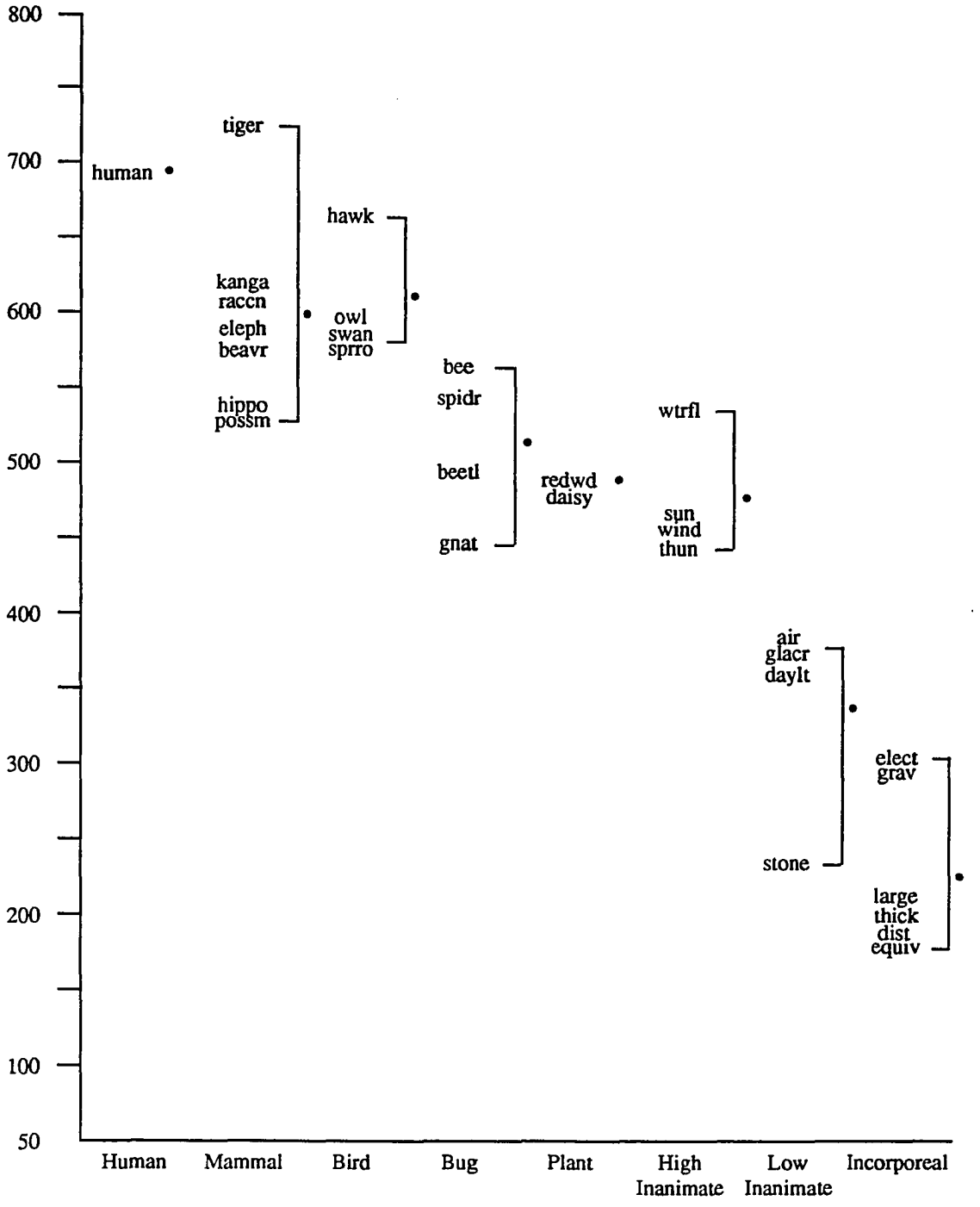
	Aliveness		Embodiment (E)		Purposiveness (P)		Activity (A)	
	no. raw wins	on 1000 pt. scale	no. raw wins	on 1000 pt. scale	no. raw wins	on 1000 pt. scale	no. raw wins	on 1000 pt. scale
human	696	958	733	992	681	817	613	772
tiger	719	1000	733	992	502	521	701	902
kanga	614	807	663	875	444	426	691	888
eleph	583	750	738	1000	427	398	429	500
hippo	531	654	692	924	293	177	358	395
beavr	573	731	596	764	499	517	644	818
racen	607	794	610	787	365	295	581	725
possm	527	647	568	718	273	144	472	564
hawk	662	895	608	784	509	533	738	957
sparr	586	756	530	654	384	327	706	909
owl	594	770	590	754	438	416	494	596
swan	587	757	620	804	365	295	495	598
bee	565	717	461	540	547	596	719	929
gnat	443	493	317	301	186	0	574	714
spider	540	671	457	533	427	398	605	760
beetle	490	579	432	492	299	186	537	660
redwd	484	568	613	792	582	653	220	191
daisy	482	564	382	409	301	190	266	259
sun	457	518	531	656	792	1000	384	433
watrfall	533	658	468	551	592	670	767	1000
wind	457	518	303	277	633	738	687	882
thunder	442	491	367	384	461	454	524	641
glacier	369	357	528	651	536	578	358	395
daylight	359	338	292	259	672	802	317	334
air	375	368	265	214	644	756	446	525
stone	236	112	386	415	250	106	128	55
gravity	293	217	306	282	690	832	405	464
electro	300	230	237	168	566	627	462	549
large	213	7	249	188	345	262	136	67
thick	197	4	286	249	300	188	91	0
dist	191	3	183	78	433	408	226	200
equiv	175	0	136	0	444	426	106	22

Table 9. Study 1: Total Wins of Microcosm Entities in Each Semantic Dimension

Following, Figures 1, 2, 3 and 4 present, for each semantic dimension, spatialized distributions of the group ratings of these entities.

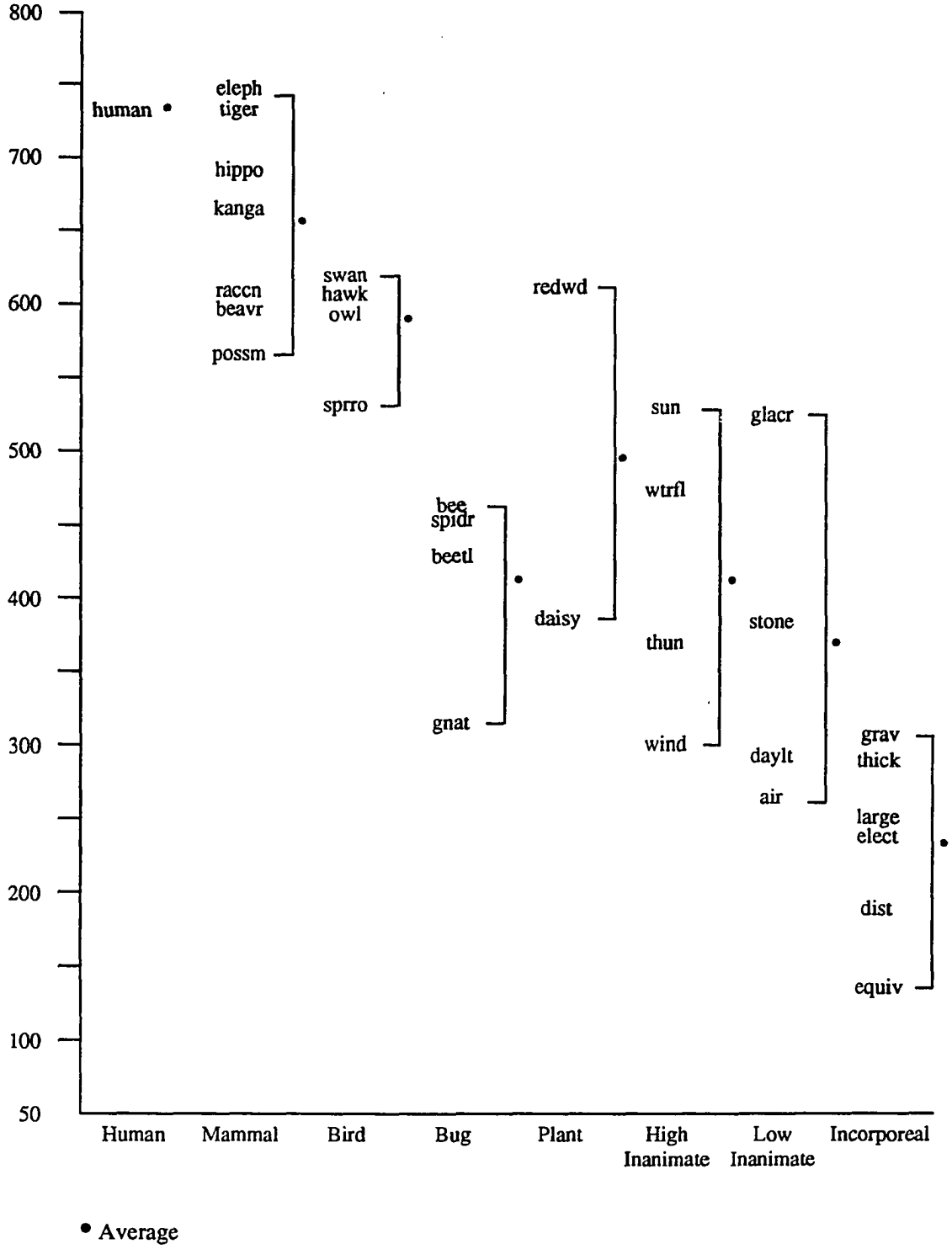
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Figure 3. Study 1: Aliveness Wins of Grouped Entities



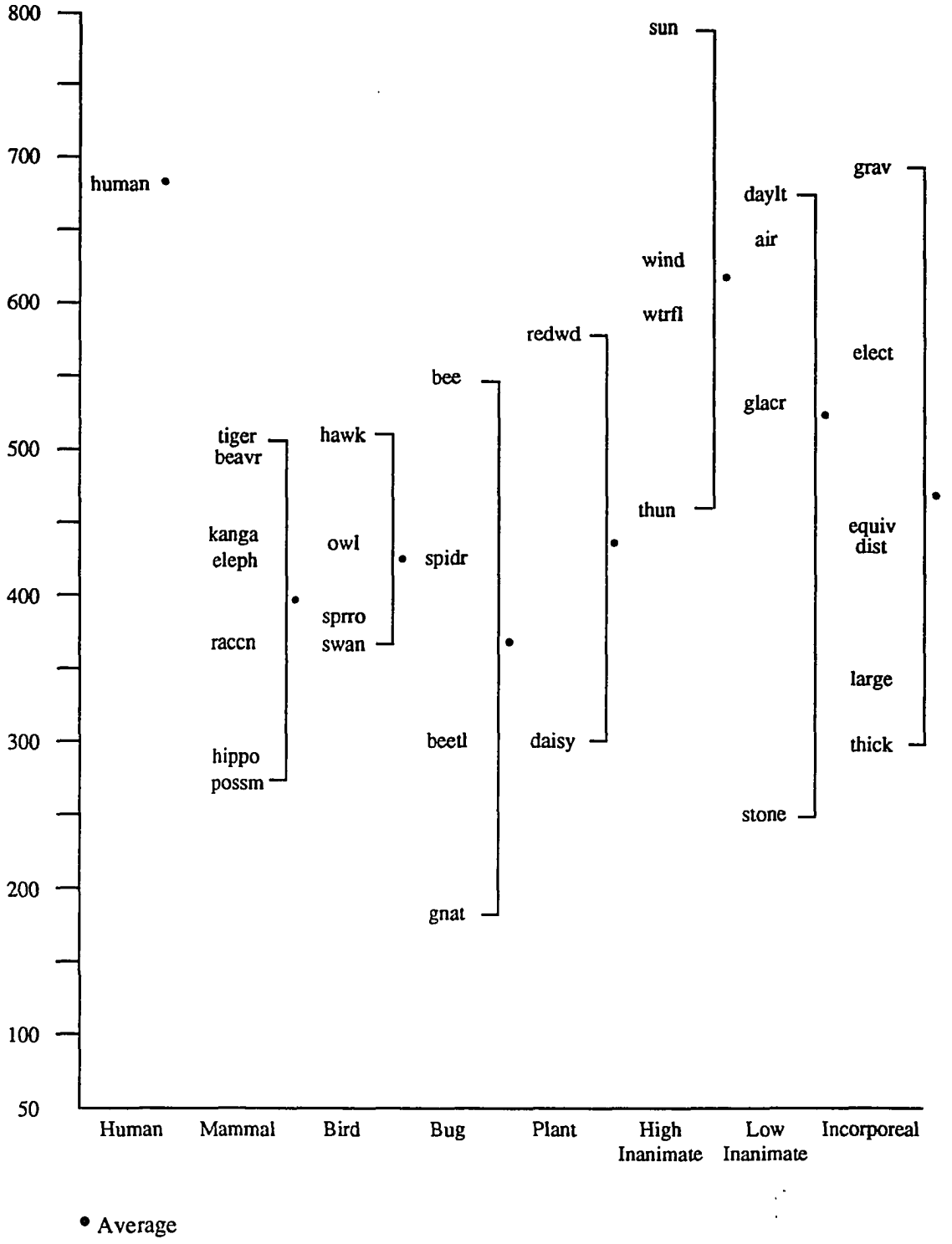
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Figure 2. Study 1: Embodiment Wins of Grouped Entities



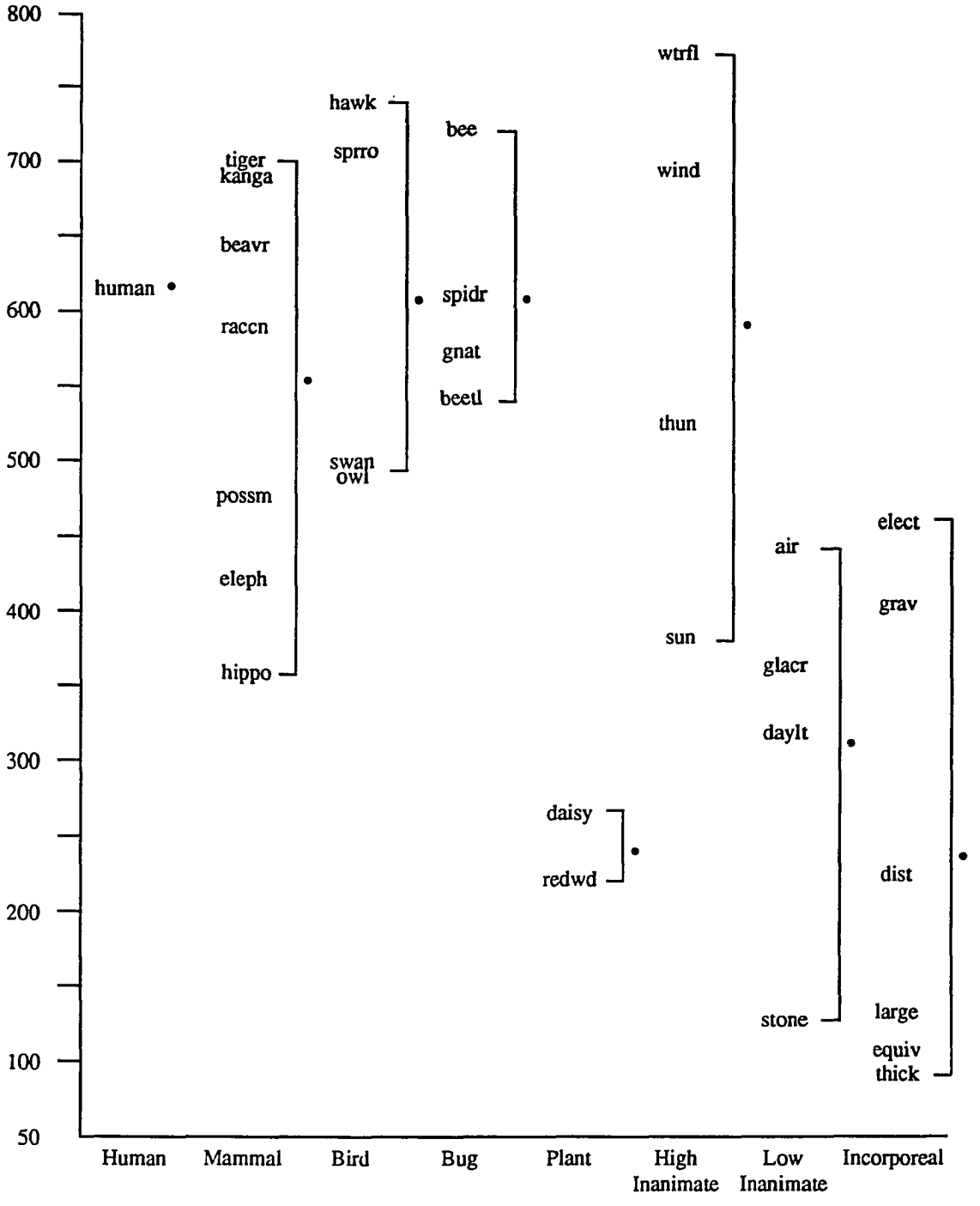
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Figure 3. Study 1: Purposiveness Wins of Grouped Entities



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Figure 4. Study 1: Activity Wins of Grouped Entites



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The individual scores of entities offer some insight into how Ss interpreted the special instructions they were given. From the smooth gradient of aliveness scores, it is evident that Ss were able, as intended, to consider points of view outside of biology when rendering their judgments of relative aliveness. If biology were their only consideration, then the scores of all biologically alive entities would be superior to those of all nonliving entities. Further, there would be no significant gradation between the scores of living entities, nor any significant gradation between the scores of nonliving entities. While living entities outscored all nonliving entities except for the high inanimates, it is clear on the face of the distribution of aliveness scores, and shall become more clear with subsequent analysis, that Ss did not rely exclusively on biological rationales when rendering their judgments.

The instructions accompanying activity questionnaires were perhaps the easiest to follow, and most of the resultant ratings here are likely to accord with readers' own intuitions. It should be noted that the activity scores of entities demonstrate that Ss did not interpret activity to mean just a capacity for movement or autonomous motion. Were this the case, electromagnetism and gravity would not have achieved their victory over a hippo. Neither would the ratings of a waterfall, wind, and thunder have been superior to those of a hippo, a possum and an elephant. Such findings indicated that intuitions regarding activity were much richer than would be predicted by consideration of movement per se, or by a zoologized focus on autonomous motion. Unfortunately, the tendencies of thought giving rise to many of these intuitions (e.g., that distance is more active than thickness) are beyond our purview.

The instructions accompanying embodiment questionnaires were considerably more vague than those regarding activity, since 'being embodied' is a far less defined notion in ordinary speech than 'being active.' It was less obvious in advance just what associations would predominate when subjects attempted to determine which entities were 'more embodied.' Since, in English, one may only say that

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an entity 'has a body' if the entity is an animal, it was possible that all animals would be thought more embodied than all nonanimals. Since, in English, one may say that an entity 'has body' to the degree that it is firm or of stable form, it was possible that Ss would confer embodiment in proportion to physical stability of form, to the detriment of entities such as incorporeals, or inanimates such as daylight and air. Finally, in something of a paradox, embodiment might be associated with being imprisoned within a body, or embodiment might be associated with being empowered by the physical wherewithal imparted by a body. The safest expectation was probably that humans would be anthropocentrically accorded a high embodiment rating, as would athletic and anatomically similar animals such as tigers.

To some degree, all of these expectations were borne out. The human received an exemplary embodiment rating, and the ratings of mammals exceeded those of birds, which exceeded those of bugs, as anthropocentric considerations would predict. With the exception of insects, animals almost always scored higher than nonanimals. The physically real inanimates did much better than the abstract incorporeals, and the more concretely realized inanimates did better than thunder, daylight, wind, and air. Embodiment may have been sometimes regarded as a dimension of captivity (the blind person was regarded as more embodied than a sighted person) and sometimes regarded as a dimension of empowerment (a free man was more embodied than a slave).[116] In addition, physical size appeared to be an important consideration, as demonstrated by the able performance of large mammals over smaller ones; by the elevated ratings of a redwood tree, the sun, and a glacier; and by the relative disfavoring of puny bugs. Overall, as in the case of activity

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[116]The imprisonment and empowerment associable with being 'embodied' are not necessarily complementary notions. A hearing person and a deaf person were basically rated as equally embodied (16-14). However, a deaf artist was rated as much more embodied than a hearing artist (22-8). Potentially, in the context of creative work, the deaf artist was regarded as more intent, more within himself, more captivated by his own artistic vision. If so, then captivity and empowerment were as one.

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ratings, it was clear that the biologized notion of embodiment as a property of animals was joined by other intuitive notions of what embodiment might be.

The instructions accompanying purposiveness questionnaires were certainly the most demanding of all and, unfortunately, there is some evidence that Ss did not as a group perform the experimental task exactly as it was intended to be performed. Within ontological categories, results were very much as anticipated. It seems intuitively apt that Ss should judge tigers and beavers to be far more purposive than hippos and possums; that hawks and owls should be judged more purposive than sparrows and swans; that bees and spiders should be judged more purposive than beetles and gnats; and even that redwood trees should be judged more purposive than daisies; that the sun and daylight should be judged more purposive than thunder and stones; and that gravity and electromagnetism should be judged more purposive than largeness and thickness.

The problem arises in the judgments of relative purposiveness across ontological categories. Recall that a thought experiment was contrived to set all considerations of purposiveness on a single scale: viz., on that first person scale of purposiveness according to which all living things can be rated. Ss were asked to imagine that all of the nonliving entities presented for comparison had been somehow brought to life, and to judge which entity in each pair would then have the greater *internal* sense of purpose. Obviously, there is nothing in the terms of this thought experiment which would alter the relative purposiveness ratings of animal and plant entities, since animals and plants are already alive, and since the degree to which they have an internal sense of purpose is already conventionally well known.

Unfortunately, it can be argued from some exceedingly peculiar positions regarding the relative purposiveness of animals and plants that Ss did not follow these instructions as intended. Among living entities, the redwood tree received a purposiveness rating that was

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second only to that of the human. The daisy received a rating which was superior to that of a gnat, a beetle, a hippo, and a possum. An additional anomaly appeared in the form of elevated purposiveness ratings for bees and spiders. The honeybee was regarded as more purposive than all animals except for humans; the spider was rated more highly than sparrows and raccoons, among others. It is just not credible that Ss would affirm, if asked straight out, that a redwood tree had a greater internal sense of purpose than a tiger, or that a daisy had a greater internal sense of purpose than a hippo, etc. Neither is it credible, except as the most hyperbolic paean to slavish industry, that the honeybee should be judged the second most internally purposive animal in the microcosm. It seems much more likely that such positions arose because Ss misinterpreted the thought experiment in some way.

There seem to be two possibilities. First, it may be that Ss did not take to heart the instruction to judge the *internal* sense of purpose of the compared entities. That is, Ss may have continued to regard purposiveness as a mixed bag of first person purposes related to volition, and of third person purposes related to utility. In this scenario, humans might receive especially high scores as an acknowledgement of their special capacity for volition, and features of the natural order might receive especially high scores by virtue of their cosmological or ecological necessity. This pattern of ratings was in fact observed. Inanimates and natural forces did exceedingly well: the sun, a waterfall, wind, daylight, air, gravity, and electromagnetism received ratings superior to those of any nonhuman animals.[117] The extraordinarily elevated rating of the redwood tree relative to the daisy may have reflected a sense that redwood

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[117]The ratings of the high inanimates were significantly elevated above the ratings of other nonhuman entities at the .0228 level (.0251 if corrected for ties), and the value of p would be even lower if natural forces were included with the high inanimates. The rating of the human was significantly higher than the ratings of nonhuman entities (excluding high inanimates) at the .0001 level, and again the value of p would be even lower if natural forces were included with the high inanimates. In short, the upper reaches of the purposiveness hierarchy were powerfully dominated by humans, inanimates, and natural forces.

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trees, but not daisies, are important ecological players. Relative to the sun and gravity and so forth, the ecological stature of nonhuman animals might well have been judged to be of a lesser order, as shown by their generally mediocre scores.

There is a second scenario which might account for how Ss misinterpreted their instructions. It is possible that Ss went beyond the instructions given and not only imagined all entities to be alive, but also imagined them all to be persons, or animals. That is, Ss may have hearkened to the zoological focus of the category of living things by zoologizing the sun and gravity and so on, and performed comparisons as if a sun-person or a redwood tree-animal, etc. were facing off against a bee, a hawk, a tiger, and so forth. In this way plants, as nouveau animals, might have acquired the capacity to entertain an internal sense of purpose superior to that of some other animals. In both this scenario and the one above, one probably does have to conclude that, in an affront to more liberal conceptions of purpose, the honeybee and the spider received their inflated ratings of internal purposiveness as an acknowledgement of their brutish work spirit.

While it seems clear that Ss did not interpret their instructions in exactly the manner intended, it is difficult to assess the effects of their misinterpretations. Certainly, if the instructions had been followed as intended, plant scores would not have exceeded the scores of animals. Otherwise, it is hard to say how ratings would have been different. One should note that animistic children have long shown a propensity to regard purposiveness in terms of utility as well as volition, and also a tendency to anthropomorphize or zoologize inanimates and plants. Therefore, the response strategies that the college students appear to have used were grossly similar to the assessment strategies used by animistic children. In particular, the high regard shown by the college students for the purposiveness of the grander features of the natural order was consistent with the high regard shown for these entities by animistic children. Hence, it appears that the subjects who did not follow the in-

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structions as intended nevertheless responded in a fashion which resulted in the reemergence of some animistic rating patterns.

Cluster Analysis

The ratings of the individual entities in the four dimensions provided the input to an analysis of how ontological groups of entities hierachically clustered in the four dimensions. Since the animism and ANIMACY hierarchies are hierarchies of ontological categories, focusing on the performance of ontological groups rather than individual entities faciliated a comparison between the ranking tendencies of English speakers and the ranking tendencies of animists and ANIMACY systems. Hence, the first research questions were: what ontological categories clustered together, differing insignificantly in their ratings, and how were these clusters hierarchically arranged? A minor note: the so-called high and low inanimates were always assessed separately to see if they were hierarchically distinguished here in the same way that they are by animists and in ANIMACY systems.

In the presentation of the aliveness and EPA hierarchies below, the significance of the difference in ratings between groups of entities was assessed using Mann-Whitney rank sum tests and, in the case where the solitary human was compared to groups of entities, sign tests. Values of p were accepted up to the .0750 level.

The ranking of the eight categories of entities vis-à-vis aliveness ratings is given below (cf. Figure 1).

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Human

Significance of difference between group above and group below: $p = .0625$.

Birds

Significance of difference between group above and group below: $p = .5273$.

Mammals

Significance of difference between group above and group below: $p = .0727$.

Bugs

Significance of difference between group above and group below: $p = .5333$.

Plants

Significance of difference between group above and group below: $p = .5333$.

High Inanimates

Significance of difference between group above and group below: $p = .0286$.

Low Inanimates

Significance of difference between group above and group below: $p = .0381$.

Incorporeals

Combining adjacent groups which were not rated differently at a .0750 level of significance yielded a hierarchy of five levels.

Study 1 Aliveness Hierarchy

Human

Significance of difference between group above and group below: $p = .0059$.

(Mammals + Birds)

Significance of difference between group above and group below: $p = .0176$.

(Bugs + Plants + High Inanimates)

Significance of difference between group above and group below: $p = .0202$.

Low Inanimates

Significance of difference between group above and group below: $p = .0381$.

Incorporeals

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The aliveness hierarchy here is striking in its consistencies with the crosscultural animism hierarchy and the crosslinguistic ANIMACY hierarchy. Humans were, as expected, the clear winners over other classes of entities. Humans are also clear winners among animists and in ANIMACY systems, where it is common to find ANIMACY distinguished along human v. nonhuman lines. At the next level, the aliveness ratings of birds were competitive with those of mammals — a point reflected in the fact that birds and mammals are equally likely to be accorded life by animists, and in the fact that avian and mammalian species are not typically distinguished in ANIMACY hierarchies.

The low end of the hierarchy comprised low inanimates and incorporeals. In fact, the clearest division in the aliveness hierarchy occurred between (living things + high inanimates) and (low inanimates + incorporeals) (p = .0001). This corresponds to the fact that low inanimates and incorporeals are virtually never regarded by animists as alive, or classified as ANIMATE in ANIMACY systems. The superiority of physically real inanimates over abstract incorporeals is consonant with children's occasional attributions of life in accordance with a real-nonreal distinction, and with the occasional observance in languages of a concrete-abstract ANIMACY distinction (e.g., Navajo; English, cf. Clark and Begun, 1971).

It might be noted that, among incorporeals, the two forces (gravity and electromagnetism) received substantially higher aliveness ratings than the qualities (largeness, thickness) and relationships (distance, equivalence). The difference in ratings between the forces and the other incorporeals was not significant ($p = .1333$); however, it was clear that the forces tended to cluster with the low inanimates much more comfortably (p = .5333) than with other incorporeals. It may well be that forces such as gravity and electromagnetism are conceptualized in something like the way that quiet inanimates such as air and daylight, or quasi-inanimates such

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as heat, are conceptualized. Certainly gravity, like heat, is in some way much more thinglike and less abstract than equivalence.[118]

In the middle stratum of the hierarchy here, Ss showed only a modest regard for the aliveness of bugs, plants, and high inanimates, which corresponds neatly to the fact that it is this ontologically mixed bag of entities which is treated ambivalently by animists and ANIMACY systems.

The ratings of bugs are of particular interest, since they differed from the ratings of mammals at only a modest level of significance (p = .0727). They might have been included with the cluster of mammals. (And it is true that bugs are perhaps *most* often regarded as living by animists and as ANIMATE in language.) However, when the ratings of bugs were compared with those of (mammals + birds), the inferiority of the bugs' ratings was certainly significant (p = .0176). In contrast, the ratings of bugs were not at all significantly different from those of (plants + high inanimates) (p = .2571, or .1995 if corrected for ties). Hence they were included along with plants and high inanimates in that middle stratum of entities which are so often ambivalently assessed by animists and ANIMACY systems. The precarious status of bugs is brought home by the observation that if they are considered in terms of their exemplars (bees and spiders) they scored well enough to be included with mammals and birds, but if considered in terms of their more average members (beetles and gnats) they scored no better than plants.

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[118]Gentner and Gentner (1981) argue that electricity is conceptualized via mental models associated with flowing waters or teeming crowds. If electromagnetism is conceptualized in a like manner, it would have to be noted that the flowing and the teeming are rather quiet.

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Study 1 Embodiment Hierarchy

Combining hierarchically adjacent groups which were not rated differently at a .0750 level of significance would yield a hierarchy of two levels: incorporeals v. all other entities. However, a more differentiated hierarchy of 'best clusters' may be obtained. Best clusters may be regarded as those clusters which best balance the desirability of maximizing between cluster differences in ratings while also minimizing within cluster differences in ratings.

Human

Significance of difference between group above and group below: p = .0327 conservative; .0059 liberal; .0498 tie eliminated.[119]

(Mammals + Birds)

Significance of difference between group above and group below: p = .0003.

(Insects + Plants + Inanimates)

Significance of difference between group above and group below: p = .0006.

Incorporeals

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[119]The human and the tiger tied in total embodiment wins. Since a sign test was used to compare the lone human against the group with the tiger in it, three assessments of significance were calculated. The conservative assessment counted the tie as a loss; the liberal assessment counted the tie as a win; in the third assessment, the tie was eliminated from the data.

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Study 1 Purposiveness Hierarchy

Combining hierarchically adjacent groups which were not rated differently at a .0750 level of significance would here yield a single distribution rather than a multilevel hierarchy. However, it should be noted that the ratings of humans and the ratings of high inanimates were significantly higher than the ratings of all other groups, which clustered at a clearly lower level.

Human

Significance of difference between group above and group below: $p < .0001$.

All Other Entities Except High Inanimates

High Inanimates

Significance of difference between group above and group below: $p = .0228$, or .0251 if corrected for ties.

All Other Entities Except Human

One might wish to propose a two-level hierarchy of best clusters; viz., (human + high inanimates) v. all other entities. Alternately, one might simply observe that the upper reaches of the purposiveness scale were powerfully dominated by the human, by the two forces, and by large scale features of the inanimate worldscape.

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Study 1 Activity Hierarchy

Combining hierarchically adjacent groups which were not rated differently at a .0750 level of significance yielded a sharply distinguished hierarchy of two levels.

(Human + Other Animals + High Inanimates)

Significance of difference between group above and group below: p = .0001, or .0006 if corrected for ties.

(Plants + Low Inanimates + Incorporeals)

Upon first examination, it is clear that the hierarchy of aliveness ratings for individual entities and for groups of entities was not entirely congruent with the hierarchical relations found in the embodiment, purposiveness, and activity dimensions. It was never presumed that the aliveness hierarchy and the EPA hierarchies would all be identical. The assumption was rather that EPA considerations would in some collective way determine the strength of entitys' aliveness ratings. Hence, an entity X ought to be rated as more alive than an entity Y if in some amalgamated way the EPA ratings of X are more impressive than those of Y. The same can be said in connection with ontological groups of entities. However, the particular ways in which E, P and A ratings contributed to a sense of aliveness, and the relative strength of E, P and A considerations, have yet to be worked out.

An analysis of the breaks between clusters formed along the four semantic hierarchies offers a first insight into the relationship between aliveness ratings and EPA ratings. Briefly, the divisions between clusters in the aliveness hierarchy could be directly related to divisions between clusters in the embodiment, purposiveness, and activity hierarchies. To be a little more pointed about this, it can be said that *every* significant division between levels in the aliveness hierarchy corresponded to an analogous significant division in one or more of the EPA hierarchies. This tends from the outset to support

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the view that EPA considerations were, as expected, in a causative relationship to judgments of relative aliveness.

At the top of the aliveness hierarchy, the division between humans and (mammals + birds) corresponded to significant differences between these groups in embodiment (p = .0327, conservatively) and purposiveness (p = .0005) ratings. The step between (mammals + birds) and (bugs + plants + high inanimates) corresponded to a significant step between (mammals + birds) and (bugs + plants + inanimates) in embodiment (p = .0003). The step which separated high inanimates and low inanimates in aliveness corresponded to a step separating high and low inanimates in activity (p = .0571). Finally, the aliveness hierarchy division between low inanimates and incorporeals corresponds to a significant division in embodiment ratings between these groups (p = .0667).

These findings suggest that EPA considerations contributed in specific and unique ways to the establishment of the overall aliveness hierarchy. Apparently, it was an embodiment consideration which came to the fore when physically real and physically nonreal entities were being compared. It was an activity consideration which principally enhanced the aliveness ratings of the high inanimates over the low inanimates. It was consideration of purposiveness, as well as embodiment, which elevated humans above all other animals on the aliveness hierarchy. Finally, it was an embodiment consideration which secured the superiority of mammals and birds over bug life, nonanimals, and inanimates.

The most recurrent theme of appraisal here was embodiment. This finding contrasts somewhat with the classical literature on animism, since activity and autonomous movement are the themes there given the greatest prominence. The reason for this prominence has surely been that classical studies have concentrated on animists' assertions that dynamic inanimates were alive, and animists' assertions that plants were not alive. In connection with these animistic phenomena, activity considerations are likely to figure de-

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terminatively. In this study, activity considerations did foster one powerful division in group ratings, and this was indeed the division between (humans + animals + high inanimates) and (plants + low inanimates + incorporeals) (p = .0001). Thus, by itself, the activity hierarchy presented a faithful picture postcard of the most arresting, and classically attended, features of animistic categorization. However, a more panoramic look at animistic phenomena makes the narrow limitations of activity perspectives quite apparent. Activity considerations will not determine the anthropocentricity of animistic scales of aliveness; neither will a lone reference to activity provide a rationale for the animistic superiority of physically real but inert entities vis-à-vis incorporeal entities. A whole view of animistic phenomena requires reference to all of the EPA modes of appraisal. And in this whole view, embodiment considerations emerge as the considerations with greatest breadth.

In a preceding section (§2.33), it was proposed that embodiment considerations were the most phenomenologically fundamental considerations related to judgments of aliveness, followed by activity considerations, and then by purposiveness considerations. It was argued that our understanding of purposiveness depended on our understanding of activities, and that our notion of activity prerequired that we monitor the status of the entities (i.e., embodied forms) which we isolate from the background of the presentational world. It was also observed that we are biologically equipped with specific apparatuses for the detection of discrete forms and for the detection of activity or change in the perceptual field, but that we do not possess specific low-level neuronal apparatuses for the detection of purpose. To put the matter another way, the embodiment and activity of entities can be directly perceived as a concrete matter of fact, but the purposiveness of entities can only be inferred via higher-level processes of cognitive integration. The present discussion of how EPA considerations influence the clustering of entities along an aliveness hierarchy begins to afford some experimental confirmation to the view that E-considerations are more fundamental than A-considerations, and that these are more

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fundamental than P-considerations. More powerful confirmation emerges from the patterns of correlation between aliveness ratings and EPA ratings.

Correlation Analysis

In order to assess the relationship between aliveness ratings and ratings in the EPA dimensions, both simple and multiple Pearson correlation coefficients (*R*) were calculated. In the stepwise regression procedure used to compute the multiple correlation coefficients, the first EPA variable entered was the variable which accounted for the greatest amount of the variance in aliveness wins. The next EPA variable entered was the remaining variable which independently accounted for the greatest additional amount of variance in aliveness wins. If consideration of the third variable could then account for additional variance, it too was entered as a third step in the regression. Table 10 below presents these calculations for the group of 496 comparisons in which the entities of the microcosm were exhaustively pitted against each other.[120]

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[120]I.e., the raw data entered for analysis consisted of 496 cases in which the number of aliveness wins obtained by the first entity in the pair was contrasted with the number of E, P, and A wins obtained by the first entity in the pair. The number of wins obtained by the second entity in the pair was of course complementary to the number obtained by the first entity, and so did not have to be separately considered.

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Table 10. Correlations Involving Comparisons among All Entities (N = 496)

	E	P	A
Alive	.7498 $p < .001$	.1204 $p = .004$	.6648 $p < .001$
E		.0506[121] $p = .130$	.3709 $p < .001$
P			.2108 $p < .001$

Step No.	Variable Entered	Mult. *R*	*R* sq	*R* sq Change	Signif. of Change
1	Embodiment	.7498	.5621	.5621	$p < .001$
2	Activity	.8576	.7355	.1734	$p < .001$

Overall, embodiment wins correlated substantially with aliveness wins ($R = .7498$), and accounted for 56.21% of the variance of aliveness wins. As the most powerful single predictor of aliveness, embodiment was entered first in the stepwise regression. Activity wins correlated with aliveness wins at a slightly lower level ($R = .6648$). When activity was taken into account along with embodiment, the correlation with aliveness increased to .8576, accounting for 73.55% of the total variance. Thus, after embodiment had been considered, consideration of activity was able to independently account for an additional 17.34% of the variance. This increase was highly significant ($p < .001$).

Purposiveness wins also correlated significantly with aliveness wins ($p = .004$), but at a very low level ($R = .1204$). In stepwise regression, consideration of purposiveness after embodiment and

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[121]This virtual noncorrelation reflects the fact that the embodiment of inanimates and forces was judged to be low relative to that of animals, while in purposiveness these relative standings were reversed.

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activity had been considered brought no independent increase in the amount of variance accounted for, and hence is not shown. In short, overall, intuitions of purposiveness did not align well with intuitions of aliveness and, to the degree that intuitions did align, the independent predictive power of purposiveness intuitions was nil after embodiment and activity intuitions had been considered. The low level of correlation between purposiveness and aliveness when all entities are compared surely arose because incorporeals and inanimates and redwood trees were much more highly rated relative to animals in purposiveness than they were in aliveness. Even the purposiveness rating of the human was challenged or exceeded by those of several inanimates and the force of gravity. Hence, there is good evidence that consideration of purposiveness was not used by Ss as a global strategy for appraising aliveness.

These correlations argue that embodiment and activity considerations formed a powerful influence on appraisals of relative aliveness, accounting for virtually three-quarters of the variance of aliveness wins — a very impressive measure for research of a social science nature. There is also general support here for the view that embodiment considerations are more basic or determinative than activity considerations, which are more determinative than considerations of purposiveness (cf. §2.33 and the conclusion of the Cluster Analysis section above). In fact, whether consideration of purposiveness had any significant influence upon judgments of relative aliveness has yet to be established.

In order to identify more fully how EPA considerations interacted with appraisals of aliveness, additional correlations were obtained using data from comparisons involving particular ontological types of entities. It will be recalled that, in the analysis of clusters above, it was apparent that E, P, and A considerations could be more or less prominent depending on the types of ontological contrasts being posed. Similarly, it was thought possible that E, P, and A wins would correlate differently with aliveness wins when different ontological kinds of entities were considered. Below, Table

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11 presents correlation data for comparisons involving only living things.

Table 11. Correlations Involving Comparisons among Living Entities (N = 153)

	E	P	A
Alive	.6420 $p < .001$	.5464 $p < .001$	.4733 $p < .001$
E		.4525 $p < .001$	.0083[122] $p = .459$
P			.3305 $p < .001$

Step No.	Variable Entered	Mult. *R*	*R* sq	*R* sq Change	Signif. of Change
1	Embodiment	.6420	.4122	.4122	$p < .001$
2	Activity	.7945	.6312	.2190	$p < .001$
3	Purposiveness	.8041	.6466	.0154	$p = .012$

Here again, embodiment was the EPA dimension most powerfully correlated with aliveness. In this group, however, purposiveness was much more highly correlated with aliveness ($R = .5464$) than was the case when all of the microcosm entities were compared against each other. Indeed, purposiveness correlated with aliveness better than activity did. At the same time, it should be pointed out that the efficacy of purposiveness as an *independent* consideration in determining aliveness remained in doubt. In stepwise regression, embodiment independently accounted for 41.22% of

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[122]This noncorrelation was the net result of various conflicting patterns of appraisal. First, the redwood did very well in embodiment comparisons but very poorly in activity comparisons, while insects were much more competitive in activity than they were in embodiment. Further, within groups of living things, size was to some degree correlated with embodiment and inversely correlated with activity. Hence, a daisy was more active but less embodied than a redwood; a sparrow was more active but less embodied than a swan, etc. The overall effect was to undermine the relationship between embodiment and activity in this sample.

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the variance in aliveness, and activity independently accounted for an additional 21.90% of the variance, but purposiveness accounted for only 1.54% of the variance that could not already be accounted for by consideration of embodiment and activity.

The first reason why purposiveness did poorly in stepwise regression was that intuitions of purposiveness tended to run in the same tracks as intuitions of embodiment (R = .4525). In contrast, intuitions of activity were exceedingly independent from intuitions of embodiment (R = .0083). Hence, while activity was less aligned with intuitions of aliveness than purposiveness was, activity was able to independently account for more variance than purposiveness when entered as a second variable after embodiment in stepwise regression. And since purposiveness also tended to correlate with activity (R = .3305), it appears that, by the time that purposiveness was entered in step 3, virtually all of its capacity to account for variance in aliveness had been co-opted by prior consideration of embodiment and activity. While purposiveness did not succeed in *uniquely* accounting for any large measure of the total variance in aliveness, its relevance to intuitions of aliveness should not be discounted given the fact that, taken as a single variable, it correlated with aliveness at roughly the same level as embodiment and activity. In connection with living things, all three of the EPA considerations showed a clear relevance to appraisals of aliveness.

Structurally similar results were obtained when correlations were calculated for data from comparisons between animals (including the human). These are presented in Table 12.

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Table 12. Correlations Involving Comparisons among Animals (including human, N = 120)

	E	P	A
Alive	.6404 $p < .001$	.6379 $p < .001$	.3355 $p < .001$
E		.4237 $p < .001$	-.1621[123] $p = .038$
P			.5011 $p < .001$

Step No.	Variable Entered	Mult. *R*	*R* sq	*R* sq Change	Signif. of Change
1	Embodiment	.6404	.4101	.4101	$p < .001$
2	Activity	.7799	.6083	.1982	$p < .001$
3	Purposiveness	.7956	.6330	.0247	$p = .006$

Here, the degrees to which embodiment and purposiveness correlated with aliveness were virtually identical (R = .6404 and .6379, resp.), with activity correlating at a much lower level (R = .3355). However, after embodiment was entered as the first variable in stepwise regression, it was once more the case that activity could independently account for more of the remaining variance than purposiveness (an additional 19.82%). After the contributions made by embodiment and activity, consideration of purposiveness only accounted for an additional 2.47% of the variance. Here again, consideration of purposiveness seemed to be very relevant to judgments of relative aliveness, but not in a way that was separable from considerations of embodiment and activity.

Whereas embodiment was the most powerful of the EPA variables in comparisons involving only living entities, activity was the

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[123]This low level negative correlation reflects the fact that very large animals (e.g., elephant, hippo) were judged to be very embodied but also very inactive.

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most powerful of the EPA variables in comparisons involving only nonliving entities. *Correlation data from comparisons between all of* the nonliving entities of the microscosm are presented below in Table 13.

Table 13. Correlations Involving Comparisons among Nonliving Entities (N = 91)

	E	P	A
Alive	.5972 $p < .001$	.5763 $p < .001$	.8043 $p < .001$
E		.3047 $p = .002$	.4150 $p < .001$
P			.5644 $p < .001$

Step No.	Variable Entered	Mult. *R*	*R* sq	*R* sq Change	Signif. of Change
1	Activity	.8043	.6429	.6469	$p < .001$
2	Embodiment	.8548	.7246	.0838	$p < .001$
3	Purposiveness	.8634	.7367	.0148	$p = .027$

Activity wins correlated with aliveness wins at a high level (*R* = .8043), and accounted for 64.29% of the variance in aliveness wins. Embodiment and purposiveness correlated with aliveness at lower, but substantial, and virtually equivalent levels (*R* = .5972 and .5763, resp.). In stepwise regression, consideration of embodiment after activity accounted for an additional 8.38% of the variance, with purposiveness contributing a final 1.48% of the variance.

Here, the relationship between embodiment and activity which was observed in connection with living things was reversed. Here, it was activity which emerged as the best predictor of aliveness wins, and embodiment which then accounted for some modest amount of additional variance in aliveness wins. As a second variable, embodiment was less effective here (contributing 8.38% of the variance ac-

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counted for) than activity was in comparisons among living things (where it contributed 19.82-21.90%).

Once again, purposiveness intuitions correlated with aliveness intuitions at a level that made it competitive with other variables; however, consideration of purposiveness in stepwise regression did not account for much variance. It appears that intuitions of purposiveness were aligned with intuitions of embodiment and, to a greater degree, activity, in such a way that consideration of purposiveness did little to independently advance the prediction of aliveness wins.

A structurally similar pattern of correlations emerged from comparisons in which inanimates were pitted against incorporeals, as presented below in Table 14.

Table 14. Correlations Involving Comparisons between an Inanimate and an Incorporeal (N = 48)

	E	P	A
Alive	.7787 $p < .001$	.5966 $p < .001$	.8490 $p < .001$
E		.4275 $p = .001$	.6566 $p < .001$
P			.6365 $p < .001$

Step No.	Variable Entered	Mult. *R*	*R* sq	*R* sq Change	Signif. of Change
1	Activity	.8490	.7209	.7209	$p < .001$
2	Embodiment	.8983	.8069	.0860	$p < .001$

Here again, activity was the variable most closely correlated with aliveness. Here again, embodiment independently accounted for

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8+% additional variance in aliveness wins when entered as a second variable in stepwise regression, with purposiveness failing to account for any additional variance when entered as a third variable. The most noteworthy difference between this set of correlations and the immediately previous set is the substantial boost in the correlation factor between embodiment wins and aliveness wins; viz., from .5972 to .7787. One might speculate that, in connection with nonliving entities, embodiment considerations became maximally influential when physically real things were contrasted with abstract things. In the previous group, in which all of the nonliving entities were compared, 53% of the comparisons were of this type. In the present group, of course, all of the comparisons were of this type. It may be that the embodiment-aliveness correlation factor was boosted in the present group because the proportion of inanimate v. incorporeal comparisons was roughly doubled. The obvious way to investigate this speculation is to see how well embodiment performed in groups of comparisons involving only physically real inanimates, or only abstract incorporeals. Correlation data for these groups is presented below in Tables 15 and 16.

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Table 15. Correlations Involving Comparisons among Inanimates (N = 28)

	E	P	A
Alive	.1637[124] p = .203	.5745 p = .001	.7605 p < .001
E		.0456[125] p = .409	.0325[126] p = .435
P			.3640 p = .028

Step No.	Variable Entered	Mult. *R*	*R* sq	*R* sq Change	Signif. of Change
1	Activity	.7605	.5784	.5784	p < .001
2	Purposiveness	.8249	.6805	.1021	p = .009

[124]This low correlation reflected the fact that most protean or ephemeral entities (viz., air, wind, waterfall, thunder) were more highly regarded in aliveness than they were in embodiment, while the converse was true for entities of stable form (viz., glacier, stone, sun).

[125]This noncorrelation reflects the fact that the embodiment of the stone and the glacier were much more highly regarded than their purposiveness, and that the converse was true for wind, daylight and air.

[126]This noncorrelation reflects the fact that the embodiment of the stone, glacier and sun were much more highly regarded than their activity, while the converse was true for air and wind, and to a lesser degree for a waterfall and thunder.

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Table 16. Correlations Involving Comparisons among Incorporeals (N = 15)

	E	P	A
Alive	.5522 p = .016	.5582 p = .015	.7661 p < .001
E		.3501 p = .100	.3147 p = .127
P			.7419 p = .001

Step No.	Variable Entered	Mult. R	R sq	R sq Change	Signif. of Change
1	Activity	.7661	.5869	.5869	p = .001

Indeed, it does appear that the relationship between embodiment intuitions and aliveness intuitions was diminished when no pairs contrasting concrete and abstract entities were presented. The embodiment-aliveness correlation in connection with inanimates was very low (R = .1637), and embodiment failed to account for any significant amount of aliveness variance in stepwise regression. The embodiment-aliveness correlation in connection with incorporeals was substantial enough (R = .5522); however, embodiment here again failed to function effectively as a variable in stepwise regression.

In contrast, activity continued to correlate well with aliveness, and to lay claim to a preeminent status in the stepwise regression process. In connection with both of the data sets above, the correlation factor between activity and aliveness was about .76, so that consideration of activity accounted for about 58% of the variance in aliveness.

With the severe falling off of the relevance of embodiment in the comparisons involving inanimates, purposiveness for once emerged as a significant second variable in stepwise regression, in-

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dependently accounting for 10.21% additional variance in aliveness wins. In connection with incorporeals, the correlation factor between purposiveness and activity was .7419, the highest observed between EPA variables in the study. Because of this, in part, purposiveness failed to independently account for any variance in aliveness after activity was considered in stepwise regression.

Since embodiment was the major predictor of aliveness when living things were compared, while activity was the major predictor of aliveness when nonliving things were compared, one might well wonder what happened when a living and a nonliving thing were compared. The correlation data relevant to this group of comparisons is presented below in Table 17.

Table 17. Correlations Involving Comparisons between a Living Entity and a Nonliving Entity (N = 252)

	E	P	A
Alive	.8621 $p < .001$	-.2893 $p = .004$	.7027 $p < .001$
E		-.3318[127] $p = .130$	.5713 $p < .001$
P			-.0199[128] $p = .376$

[127]This negative correlation reflects the fact that that animals and the redwood won consistently against nonliving entities in embodiment, while these living things were very frequently beaten by nonliving entities when purposiveness was judged.

[128]This noncorrelation reflects the fact that, in both the activity and purposiveness hierarchies, there was considerable overlap in the distribution of living and nonliving entities, even though animals were more generally more likely to win in activity than in purposiveness.

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Table 17, continued.

Step No.	Variable Entered	Mult. *R*	*R* sq	*R* sq Change	Signif. of Change
1	Embodiment	.8621	.7432	.7432	$p < .001$
2	Activity	.8993	.8088	.0655	$p < .001$
3	Purposiveness	.9014	.8125	.0037	$p = .027$

In connection with this kind of comparison, the preeminence of embodiment reemerged. It was observed that embodiment wins correlated at a very high level with aliveness wins (R = .8621), and that activity also correlated with aliveness at a substantial level (R = .7027). The correlation between purposiveness and aliveness was actually negative (R = -.2893).[129]

In stepwise regression, embodiment accounted for the lion's share (74.32%) of the variance in aliveness wins. Consideration of activity accounted for an additional 6.55% of variance. Consideration of purposiveness as a third variable was essentially without effect.

The role of EPA considerations in appraisals of relative aliveness can now be succinctly summarized. First, it is clear that, when living things were involved in comparisons, either as competitors against other living things or as competitors against nonliving things, the force of embodiment considerations was preeminent in determining relative aliveness. It was embodiment which, in these kinds of comparisons, correlated best with aliveness (R = .6404 - .8621) and so accounted for the major share of the variance in aliveness wins. The dominance of embodiment considerations in appraising the aliveness of living things suggests that the embodiment dimension was the channel through which residual biological biases were primarily expressed. However, embodiment intuitions were by no means wholly explicable as biology in guise: these intuitions

[129]This probably reflected two facts. First, the purposiveness of animals was depressed relative to that of inanimates and forces, while the opposite relationship held when the aliveness of these groups was considered. Second, relative to nonliving things, plants were regarded very highly in aliveness but only moderately (redwood) or poorly (daisy) in purposiveness.

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were also a force in the anthropocentric ranking of life forms, and in the concrete-abstract distinction between inanimates and incorporeals.

Consideration of activity also played a definite role in assessing the relative aliveness of living entities, but a secondary one, correlating with aliveness at a lower level (R = .3355 - .7027), and accounting for a lesser measure of the variance in aliveness wins in stepwise regression (6.55 - 21.90%). The roles played by embodiment and activity were at times substantially independent, particularly in comparisons involving just living things: here the correlation factor between embodiment and activity was only .0083.

When comparisons involved only nonliving entities, activity became the better predictor of aliveness wins, with embodiment considerations playing a secondary or tertiary role. Activity wins correlated with aliveness wins at a high level (R = .7605 - .8490), and independently accounted for the greatest measure of variance in aliveness wins.

It should be noted that, in comparisons between nonliving entities, embodiment wins were substantially more correlated with aliveness wins when the sample included pairs in which inanimates were pitted against incorporeals. Further, in connection with these data sets, embodiment functioned with some effectiveness as an independent variable in stepwise regression, accounting for 8.38-8.60% of the variance in aliveness wins. This finding suggests that the primary function of embodiment considerations in assessing the aliveness of nonliving entities was to boost the aliveness ratings of physically real entities over the ratings of abstract entities. Recall that cluster analysis indicated that a significant division between embodiment clusters corresponded to a significant step in the aliveness hierarchy separating inanimates and incorporeals.

The role of purposiveness was more elusive. When comparisons involved only living things, purposiveness correlated with aliveness

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at a substantial level (R = .5464 - .6379), though it did not independently account for more than 2.47% of aliveness variance in stepwise regression. When comparisons involved only nonliving things, purposiveness again correlated with aliveness at a substantial level (R = .5582 - .5966), though it only accounted for an appreciable amount of variance when inanimates were compared (10.21%). In both all-living and all-nonliving comparisons, the role of purposiveness in accounting for aliveness variance tended to be co-opted by the roles of embodiment and, particularly, activity, since purposiveness tended to correlate moderately well or very well with one or both of these variables. When comparisons contrasted living and nonliving entities, purposiveness did not correlate well with aliveness (or with embodiment or activity). The most likely interpretation of the ineffectiveness of purposiveness considerations in these cases is that purposiveness considerations became conflictual and inconclusive when the first person purposiveness of humans and animals was pitted against the third person purposiveness of inanimates and incorporeals.

Speaking in general terms, it appears that embodiment intuitions bore the closest resemblance to aliveness intuitions when comparisons involved only living entities, or living entities pitted against nonliving entities. In these cases, activity considerations played a secondary role. Activity intuitions bore the closest resemblance to aliveness intuitions when comparisons involved only nonliving entities. In these cases, if inanimates were paired against incorporeals, embodiment considerations played a secondary role; otherwise, embodiment considerations were not independently effective. Purposiveness intuitions acted to confirm embodiment intuitions when living entities were compared, and acted to confirm activity intuitions when nonliving entities were compared. However, purposiveness intuitions ceased to contribute in a systematic way to appraisals of aliveness when a living entity was pitted against a nonliving entity.

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The preceding correlation analysis has sketched out the roles and strengths of embodiment, activity, and purposiveness considerations in appraisals of aliveness. There was evidence that all three of these EPA considerations could contribute to intuitions of aliveness, though their strengths came forth in different contexts and to different degrees. In line with the phenomenological analysis of §2.33 and the cluster analysis above, it appeared that embodiment was in some sense a more primary consideration than activity, since embodiment intuitions dominated over activity intuitions in comparisons pitting living entities against nonliving entities. That is, activity was never the preeminent EPA variable when comparisons involved living things, while embodiment was sometimes the preeminent EPA variable when comparisons involved nonliving things. The role of purposiveness was clearly tertiary.

Pattern Analysis

The individual relevance and the relative efficacy of E, P, and A considerations in judgments of relative aliveness was further confirmed by an analysis of the patterns of wins, ties, and losses between pairmembers in all of the 576 paired comparisons presented to subjects. Recall that each pair was judged by 30 subjects in each semantic dimension. For a given pair in a given dimension, a win or a loss for one of the paired entities was defined as a result whose probability of occurrence by chance was less than .50. Results whose probability of occurrence were greater than .50 were regarded as ties.

Distribution of Judgments	Probability of Occurrence by Chance	
15 — 15	1.000	Tie (T)
16 — 14	.8551	Tie (T)
17 — 13	.5839	Tie (T)
18 — 12	.3613	Win (W) or Loss (L)

Hence, in each of the 576 comparisons, one pairmember was said to have won against the other pairmember if it was selected as the winner in at least 18 of the 30 judgments making up the re-

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search sample. It was said to have lost if it was judged to be the winner 12 or fewer times out of the 30 total judgments.

3-0 Patterns

Now consider the pattern of wins and losses in the following pair:

5.	Aliveness	Embodiment	Purposiveness	Activity
gravity	23	24	28	20
distance	7	6	2	10
$p \leq$	.0062	.0019	.0001	.1003

Here, gravity won in all three of the EPA dimensions and also, as one might therefore expect, in the aliveness dimension. Indeed, the task of pattern analysis is to statistically relate patterns of EPA wins to patterns of aliveness wins.

The pattern of EPA results demonstrated in the comparison between gravity and distance will be referred to as a '3-0 pattern.' In this pattern, one pairmember achieved wins in all three of the EPA dimensions. In the pair shown, gravity's win in aliveness was 'expected,' since the research hypothesis was that favorable EPA judgments would translate into favorable aliveness judgments. Hence, an analysis of 3-0 patterns constituted, within this analytical paradigm, the lowest hurdle that this hypothesis had to meet. If entities which won in all three EPA dimensions then failed to win in the aliveness dimension, there would be little hope of relating intuitions of relative EPA to intuitions of relative aliveness.

Of the 576 comparisons posed to subjects, it turned out that 135 resulted in 3-0 patterns of EPA wins. Of these, 128 of the wins were expected; i.e., the pairmember with the three EPA wins was the pairmember judged to be more alive.[130] The significance of this

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[130]Following, the pairmember with the EPA advantage is marked with an asterisk. Five of the unpredicted results were unpredicted ties: *raccoon v. possum (Pair no.

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result, and of results below, was calculated using binomial tests with a correction for continuity to mitigate against estimation problems caused by the small size of some of the samples. Below, the relevant calculations for 3-0 patterns.

3-0 Patterns (N=135)
128 expected wins
random probability of expected wins: .4194 (i.e., 13/31)
observed frequency of expected wins: .9481 (i.e., 128/135)
$z =$ 12.36
$p <$ .001

The random probability of expected wins was .4194, since 13 of the 31 possible outcomes in the aliveness dimension would result in the expected win, while 13 would result in an unexpected loss, and 5 would result in an unexpected tie. In fact, the number of expected wins observed very much outstripped the number which one would anticipate by the operation of chance alone. The hypothesis that favorable EPA judgments would correlate with favorable aliveness judgments had no difficulty meeting its first, minimal challenge.

2-0 Patterns

In the 2-0 pattern, one pairmember secured a win in two of the EPA dimensions while tying in the third dimension, as below:

255.	Aliveness	Embodiment	Purposiveness	Activity
beaver	25	25	21	15
spider	5	5	9	15
p ≤	.0005	.0005	.0446	1.0000

472), *sun v. daylight (399), *man fishing to eat v. man fishing for fun (285), *you v. your head (395), and *gnat v. waterfall (118). Generally, these are not too remarkable, though it is interesting that the lowly gnat was only barely able to tie the noble waterfall in aliveness (13-17, resp.). Two of the unpredicted results were unpredicted wins: hail* v. moss, and glacier* v. moss. Presumably, the moss was the winner in aliveness on the basis of biological considerations.

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Here, the prediction that wins in two of the EPA dimensions would promote wins in the aliveness dimension was easily borne out, regardless of the EPA dimensions in which the two wins occurred.

2-0 Patterns (N=111)

EP Patterns (N=25)
20 expected wins
random probability of expected wins: .4194
observed frequency of expected wins: .8000
z = 3.64
p < .01

EA Patterns (N=65)
58 expected wins
random probability of expected wins: .4194
observed frequency of expected wins: .8923
z = 8.04
p < .001

PA Patterns (N=21)
14 expected wins
random probability of expected wins: .4194
observed frequency of expected wins: .6667
z = 2.07
p < .02

These results also begin to say something about the relative potency of the individual EPA dimensions. When the frequency of expected wins in the three subsamples is compared, the results suggested that, as maintained in the correlation analysis, the most powerful overall predictor of aliveness was embodiment, followed by activity and then purposiveness.

EA Patterns	.8923	expected wins
EP Patterns	.8000	expected wins
AP Patterns	.6667	expected wins

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1-0 Patterns

In the 1-0 pattern, or minimal pair, one pairmember won in one EPA dimension while tying in the other two EPA dimensions, as below.

288.	Aliveness	Embodiment	Purposiveness	Activity
waterfall	22	13	16	29
glacier	8	17	14	1
p ≤	.0176	.5839	.8551	.0001

In 1-0 patterns, the EPA contrast between the two pairmembers is minimal in that it is effectively restricted to just one EPA dimension. These minimal pairs are one means of assessing the individual ability of E, P, and A intuitions to influence judgments of relative aliveness. The relevant calculations are presented below.[131]

1-0 Patterns (N=31)

E Patterns (N=12)
8 expected wins
random probability of expected wins: .4194
observed frequency of expected wins: .6667
$z =$ 1.46
$p <$ .073

P Patterns (N=7)
3 expected wins
random probability of expected wins: .4194
observed frequency of expected wins: .4286
p cannot be computed on so few cases.

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[131]It will be recalled that an effort was made to include likely minimal pairs in the research survey. Some of these did turn out to be regarded by subjects as minimal pairs, while others did not. Since minimal pairs make for some of the best browsing, their question numbers are provided: predicted E pattern wins: 2, 51, 67, 160, 221, 293, 303, 401; predicted P pattern wins: 251, 403, 476; predicted A pattern wins: 15, 48, 89, 243, 249, 288, 331, 343, 405, 445; unpredicted E pattern ties: 18, 80, 164, 572; unpredicted P pattern ties: 323, 557; unpredicted A pattern ties: 233; unpredicted E pattern losses: none; unpredicted P pattern losses: 50, 94; unpredicted A pattern losses: 189.

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A Patterns (N=12)
10 expected wins
random probability of expected wins: .4194
observed frequency of expected wins: .8333
z = 2.63
p < .01

The small size of the cells here really only allowed for tentative interpretation. The correspondence between activity wins and aliveness wins seemed clearly enough demonstrated, but the correspondence between embodiment wins and aliveness wins was only marginally significant, and the few P patterns seemed to have only a chance relationship to patterns of judged aliveness. However, among E patterns, it is very noteworthy that there were no unexpected losses: all of the unexpected outcomes were ties (see above note). This bolsters the case for the influence of embodiment intuitions considerably, since it was a very significant event that no entity that was an embodiment winner was ever an aliveness loser. In connection with purposiveness, it should be noted that EP patterns were much better predictors of aliveness wins than E patterns. Thus, while purposiveness considerations may not function very powerfully in isolation, their ability to contribute to intuitions of aliveness in concert with other considerations seems demonstrable enough.

1-1 Patterns

In the 76 1-1 patterns, or face-offs, each pairmember won in one EPA dimension while tying in the third EPA dimension, as below.

575.	Aliveness	Embodiment	Purposiveness	Activity
one thinking to himself	10	16	24	4
one speaking out loud	20	14	6	26
p ≤	.1003	.8551	.0019	.0001

Since an advantage in one dimension is pitted against an advantage in another dimension, face-offs speak in the most direct way possible to the relative animistic potency of E, P, and A sensibilities. Let us first consider face-offs between embodiment and activity.

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E-A Patterns (N=23)

a. 8 aliveness ties
   random probability of ties: .1612
   observed frequency of ties: .3478
   $z =$ 2.15
   $p <$ .02

b. 9 aliveness wins favoring the more embodied entity
   random probability of wins: .4194
   observed frequency of wins: .3913
   $z =$ -.04
   $p <$ .49

c. 6 aliveness wins favoring the more active entity
   random probability of wins: .4194
   observed frequency of wins: .2609
   $z =$ -1.30
   $p <$ .10

There was a significant tendency for E-A patterns to correspond to an aliveness tie ($p < .02$). This might be taken to suggest that embodiment and activity advantages were roughly equal in their ability to influence judgments of relative aliveness. To a first approximation, this is probably correct. However, it is important to remember that the relative strength of embodiment and activity considerations was believed to vary depending on the ontological kind of entities which were being compared. Of the 15 cases in which there were aliveness wins rather than ties, 9 presented pairs which included a living entity (a condition thought to favor the influence of embodiment), while 6 of these cases presented pairs which included only nonliving entities (a condition thought to favor the influence of activity). True to expectations, the embodiment advantage was decisive (i.e., corresponded to an aliveness win) in 8/9 of the cases in which a living entity was involved, while the activity advantage was decisive in 5/6 of the cases in which no living entity was involved.[132]

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[132]None of these nonliving v. nonliving pairs, incidentally, were incorporeal v. inanimate pairs — the one type of comparison between inanimates that was thought to enhance the influence of embodiment considerations.

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Let us now consider the face-offs between embodiment and purposiveness, and between activity and purposiveness.

E-P Patterns (N=28)
a. 7 aliveness ties
random probability of ties: .1612
observed frequency of ties: .2500
z = 1.03
p < .16
b. 18 aliveness wins favoring the more embodied entity
random probability of wins: .4194
observed frequency of wins: .6429
z = 2.21
p < .02
c. 3 aliveness wins favoring the more purposive entity
random probability of wins: .4194
observed frequency of wins: .1071
z = -3.15
p < .001

A-P Patterns (N=25)
a. 4 aliveness ties
random probability of ties: .1612
observed frequency of ties: .1600
z = -.139
p < .45
b. 20 aliveness wins favoring the more active entity
random probability of wins: .4194
observed frequency of wins: .8000
z = 3.66
p < .001
c. 1 aliveness win favoring the more purposiveness entity
random probability of wins: .4194
observed frequency of wins: .0400
z = -3.65
p < .001

In connection with E-P and A-P patterns, the question of relative potency was much easier to infer. In both samples, there was a very signicant tendency for aliveness wins to favor the more embodied or active entity, while disfavoring the more purposive entity.

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There is no doubt that embodiment and activity were both much more powerful influences than purposiveness when relative aliveness was judged.

Review of Supplementary Comparisons

This review will be very terse. Relative aliveness will be discussed, but not relative EPA. Here, one entity will be said to have won if it was rated more alive at least 16 out of 30 times.

The first group of supplementary comparisons was designed to produce data on additional inanimates. The relative aliveness of lightning, fire, and a bay was appraised at about the level of the high inanimates. A puddle, smoke, and fog were appraised at about the level of low inanimates. Of hail it could only be said that it was not appraised as highly as wind. The aliveness of heat was regarded as being about the same as that of either thunder or air — i.e, as being midway between the high and low inanimate groups. Setting aside the entities which have previously been identified as problematic — a bay, hail, and heat (see note above) — the high regard shown to lightning and fire, and the low regard shown to a puddle, smoke, and fog tended to reflect patterns of favor and disfavor observed among animistic children and in the crosslinguistic ANIMACY hierarchy.

In the appraisals of relative aliveness involving an automobile, the automobile was significantly devalued relative to the sun, a waterfall, a driver, a mechanic, a pedestrian, and an automobile designer ($p \leq .0001$-$.0176$). Even among young animists, it is true that natural inanimates tend to be regarded more animistically than artifacts. This appears to have a corollary in the linguistic sphere, since ANIMACY systems are also much more likely to grant ANIMATE status to objects of nature than to manufactured products. Here, Ss' low appraisals of the automobile's relative aliveness were entirely consistent with the treatment generally accorded to machines in ANIMACY systems and by animists with rudimentary understanding of the causal mechanisms supporting mechanical movement.

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A third set of supplementary comparisons addressed the boundaries of categories. For example, it was investigated how well unexemplary humans (an elderly person, a baby) would fare in comparison with an exemplary nonhuman mammal, a dolphin. By a 2-1 margin in both cases, the dolphin won. In other comparisons it was determined that, while a turtle might beat a redwood tree, a clam or a barnacle would not: the aliveness of these unexemplary animals did not match the aliveness of a noble tree. The barnacle, an unexemplary animal, was still able to beat moss, an unexemplary plant. Both were rated at the roughly the level of gnats or air.

A fourth set of supplementary comparisons was designed to reflect certain crosslinguistic ANIMACY distinctions. Below, the prevailing pairmember is marked with an asterisk, and the distribution of aliveness wins is indicated in parentheses. In each comparison, the pairmember that was predicted to win is listed first.

Whole Animal v. Body Part

*you v. your head (17-13)
*a cat v. a cat's ear (21-9)

Kin/Named v. Nonkin/Nonnamed

*someone you know very well v. someone you know only slightly (24-6)
*a relative you only met once v. a nonrelative you only met once (25-5)

Free v. Nonfree

*a person with options v. a person without options (27-3)
*a free man v. a slave (23-7)

Adult v. Nonadult

*an adult v. an elderly person (18-12)
an adult v. *a teenager (7-23)
an adult v. *a baby (11-19)

Ablebodied v. Disabled

a sighted person v. *a blind person (14-16)
*a hearing person v. a deaf person (24-6)
*a hearing artist v. a deaf artist (17-13)

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Linguistic v. Nonlinguistic

*a 2-year-old who can talk v. a 2-year-old who can't yet talk (19-11)
*a talkative person v. a quiet person (18-12)
*a person speaking out loud v. a person thinking to himself (20-10)

Motile Inanimate v. Nonmotile Inanimate

Active v. Inactive

*an untraveled river v. an untraveled road (28-2)
*a lightning bolt v. a ray of light (24-6)
*a restless sea v. a quiet sea (19-11)
*a layer of mist v. a layer of dust (27-3)
*a balloon v. a bowling ball (19-11)
*a daydream v. a mental plan (21-9)

Self Locomoting v. Non Self locomoting

*a moped v. a bicycle (18-12)
*a toy car that winds up v. a toy car that you push (23-7)
*roller skates v. basketball shoes (19-11)

Inanimate v. Incorporeal

*snowflake v. symmetry (28-2)
flag pole v. *perpendicularity (13-17)

The agreement between the predicted results and the observed results could hardly have been more pronounced. This suggests that the hierachical intuitions underlying crosslinguistic ANIMACY phenomena were broadly recapitulated as English speakers' intuitions regarding relative aliveness.

In all candor it should be noted that languages do not actually distinguish the ANIMACY of roller skates v. basketball shoes, or balloons v. bowling balls, etc.: these comparisons were intended in most cases to reflect the general character rather than the specific facts of ANIMACY distinctions. As such, their interpretation must remain tentative, even though 22 of the 26 aliveness judgments were skewed in the predicted direction.

It might be noted in passing that, while nonquiet entities (a restless sea, a talkative person, a person speaking out loud) were

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regarded as markedly more active, their quiet counterparts (a quiet sea, a quiet person, a person thinking to himself) were regarded as markedly more purposive. Since the embodiment of the pairmembers was tied, each of these three comparisons constituted 1-1 patterns, or 'face-offs.' In each case, it was the more active entity which was judged to be more alive.

Discussion

The aliveness hierarchy elicited from the Ss here was in striking ways isomorphic with the crosscultural animism hierarchy and also the crosslinguistic ANIMACY hierarchy. The common features of these hierarchies: anthropocentric ranking of animal life; a marked disparagement of insects and plants relative to mammalian or avian life forms; the grouping of insects and plants along with high inanimates; the superiority of high inanimates to low inanimates; and the superiority of concrete inanimates to abstract incorporeals. In addition, it was demonstrated that, when Ss judged the relative aliveness of entities in pairs designed to represent contrasts found crosslinguistically in ANIMACY systems, Ss' intuitions ran in the same direction as the hierarchical distinctions observed in language by a margin of 5-1. There is only one way to economically account for these structural similarities across generations and between languages: one must assume that, universally, animistic sentiment and animistic norms are preserved from childhood into adulthood, where they are given new forms of expression in the ANIMACY systems constructed by adults.

Throughout this work, the notion of animistic sensibilities has been unpacked as a complex of EPA sensibilities. By sharpening the notion of what causes and constitutes an animistic appraisal, it has been possible to specify with conviction just how and where animism operates in childhood and in later life. The force of EPA considerations in the animistic judgments of children has been previously established (§2.32), as has the force of EPA considerations in the proliferation of animistically colored life- and death-related

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tropes in English (§3.2). Here, EPA considerations have been shown to play an analogous causal and constitutive role in adults' intuitive appraisals of relative aliveness.

The causal relationship between EPA intuitions and intuitions of aliveness was established in three ways. First, it was observed that significant breaks or steps in the aliveness hierarchy corresponded in every case to significant breaks in the E, P, and A hierarchies. Second, it was observed that intuitions of relative E, P, and A correlated impressively with intuitions of relative aliveness (R = .8621, .6379, and .8490, resp., in their best performances in subgroups). The multiple correlation factor between EPA wins and aliveness wins when all entities in the microcosm were compared was .8576 — a relationship that was very strong, accounting for 73.55% of the total variance in aliveness wins. In some subgroups, this relationship was even stronger. Finally, it was observed in 1-0, 2-0, and 3-0 paired comparisons that when an entity had a unique advantage in one, two, or three EPA dimensions, it was increasingly likely to be rated more alive than the entity it was being compared against.

There is one additional indication that EPA sensibilities were operating in this study in the same way that they operate in overtly animistic populations. In addressing phenomenological aspects of overt animism (§2.33), a simple case was made that embodiment considerations were more fundamental than activity considerations, and that activity considerations were more fundamental than considerations of purposiveness. These hierarchical predictions are borne out in the present study.

The evidence of 1-0 and 1-1 paired comparisons indicated that purposiveness was not as robust a factor in judgments of relative aliveness as were embodiment and activity. The correlation data indicated that, while embodiment and activity considerations could influence appraisals of relative aliveness regardless of the life status of the entities being compared, purposiveness did not play a coherent role in assessments of relative aliveness in groups where

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living entities were compared to nonliving entities: the effectiveness of purposiveness considerations was limited to all-living comparisons and all-nonliving comparisons. Hence, the role of purposiveness considerations in promoting intuitions of aliveness was clearly tertiary.

The evidence of the correlation data and of the 1-1 paired comparisons further indicated that embodiment considerations tended to prevail when either or both of the entities compared were living, while activity considerations tended to prevail when the entities compared were both nonliving. Given the dominance of embodiment when living entities were compared to nonliving entities, embodiment considerations can in one sense be taken to be more primary than considerations of activity. Thus, the empirical facts of this study both reflect and reinforce the E > A > P hierarchy that was proposed in the phenomenological commentary of §2.33. This, too, helps to bind the view that the causal underpinnings and semantic structure of these experimental Ss' intuitions of relative aliveness were much the same as the causal underpinnings and semantic structure of classical animistic appraisals.

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4.3 Study 2 — High Schooler's Animistic Intuitions Compared with College Students' Animistic Intuitions

In this study, judgments of relative aliveness were elicited from high school students for the 32 microcosm entities which had been previously judged by adults in Study 1. The study was expected to show that the same hierarchical aliveness intuitions which emerged in Study 1 could be demonstrated in an adolescent population.

4.31 Method

Subjects and Materials

Ss were 60 male and female, predominantly White middle class students at Benicia High School in Benicia, California. They ranged in age from 15 to 18, and were all native speakers of English, having used English regularly for communication when they were 7 years old. Subjects were far less culturally and linguistically diverse than the college students of Study 1. The materials used in this study were the same as those used in Study 1 to elicit judgments of relative aliveness.

Instructions and Procedure

Permission to conduct the study was obtained from UC Berkeley's Committee for the Protection of Human Subjects, and from the Benicia School District. Written consent for each subject's participation was obtained from a parent or guardian, and also from the subject. All CPHS guidelines were strictly adhered to.

Ss were introduced to the study in regular class sessions. Questionnaires were passed out and the written instructions which accompanied them were read aloud. Participation was voluntary, and Ss were allowed to discontinue their participation at any time, though none elected to do so. No Ss reported fatigue.

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4.32 Findings and Analysis

Since each subject answered 1/6 of the questions needed for one complete protocol, the 60 Ss produced 10 complete protocols.The total number of aliveness wins for each entity in the microcosm is given below in Table 18. The maximum number of times that an individual entity might have won is 310 (i.e., 31 possible wins per protocol x 10 complete protocols).

	Aliveness	
	no. raw wins	on 1000 pt. scale
human	235	904
tiger	255	1000
kanga	230	880
eleph	198	726
hippo	163	558
beavr	206	764
racen	222	841
possm	179	635
hawk	236	909
sparr	202	745
owl	190	688
swan	185	663
bee	172	601
gnat	124	370
spider	175	615
beetle	136	428
redwd	173	606
daisy	133	413
sun	173	606
watrfall	180	639
wind	160	543
thunder	172	601
glacier	111	308
daylight	120	351
air	109	298
stone	57	48
gravity	123	365
electro	114	322
large	64	81
thick	47	0
dist	58	53
equiv	58	53

Table 18. Study 2: Total Wins of Microcosm Entities in Aliveness Dimension

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Kendall coefficients of concordance were calculated to assess the concordance between the college students' judgments of relative aliveness and the high school students' judgments. Two methods of calculation were employed. In the first method, the input data for each sample consisted of 32 cases: viz., the total aliveness wins secured by each of the 32 entities of the microcosm. Using this method, the coefficient of concordance was calculated to be .9774.

	High School Students
College Students	.9774 p = .0011

Table 19. Concordance between College Students' and High School Students' Judgments of Relative Aliveness (Method 1)

In the second method, the input data for each sample consisted of 496 cases: viz., the total wins of the first pairmember in each of the 496 paired comparisons which exhaustively compared the 32 entities of the microcosm. Using this method, the coefficient of concordance was calculated to be .8530.

	High School Students
College Students	.8530 p < .0001

Table 20. Concordance between College Students' and High School Students' Judgments of Relative Aliveness (Method 2)

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Discussion

One might argue that the first method of calculating a coefficient of concordance — the method based on the total aliveness wins of the microcosm entities — is the method which draws most directly from Ss' overall hierarchical intuitions of relative aliveness. However, the second method brings many more data points into consideration. Regardless of the method preferred, the relationship between college students' judgments and high schoolers' judgments was demonstrated to be very pronounced. This study with high school subjects provided a small replication of Study 1 in a population which was developmentally slightly less mature. The study is particularly interesting because, it will be recalled, previous research (Russell, 1942) has suggested that older high school students are the population least given to animistic thought.

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4.4 Study 3 — Preschoolers' Animistic Intuitions Compared with College Students' Animistic Intuitions

In this study, judgments of relative aliveness were elicited from preschoolers for 7 of the 32 microcosm entities which had previously been judged by adults in Study 1. The present study was expected to show that the same hierarchical aliveness intuitions which emerged in Study 1 could be demonstrated in an animistic preschool population.

4.41 Method

Subjects

Subjests were 41 young children attending the preschool or daycare programs at the Harold E. Jones Child Study Center in Berkeley, California. Final analyses were performed in connection with 30 of these subjects.

The Child Study Center is administered by the Institute of Human Development at the University of California. It serves the community by providing an enriched environment and enlightened care for children, and serves the University by providing faculty and sponsored students with special facilities and opportunities for child research. Preference for admission to the child care program is given to the children of University faculty, students, and staff, but others are welcome to apply to both the child care program and the nursery school program. Both programs offer many opportunities for creative and educational play in a setting which emphasizes active, child-centered learning. In seeking out the Center, and in persisting through the application process, the parents of the children at the Center demonstrate an active concern for the quality of their child's early life: one suspects that the homelife of these children was also more enriched than that of the community norm.

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The administrators of the Child Study Center screen all studies to assure that the children will enjoy their participation, and to provide technical advice to researchers. Strict controls are maintained so that the childrens' programs are not disrupted and the children are not burdened by too frequent participation in special projects. In addition, permission to conduct the present study was obtained from UC Berkeley's Committee for the Protection of Human Subjects. Written consent for each child's participation was obtained from a parent or guardian. All CPHS guidelines were carefully adhered to.

The 30 male and female Ss were mostly Caucasian, of middle class families. They were smoothly distributed in age from 3:5-5:4. They were all speakers of English.

Materials, Instructions and Procedure

Ss were interviewed individually, with the exception that a few shy children were accompanied by a friend. Interviews were conducted in small, familiar, pleasant rooms in which children are read stories when research is not being undertaken. All interviews were taperecorded. While these interludes were not represented to the child as a 'game,' they were almost certainly interpreted that way. In fact, a couple of children made suggestions about how the game could be improved.

The interviews had two contiguous phases. In the first phase, the child was shown 12 mounted color photographs of familiar items and asked whether or not the item depicted was alive and, intermittently, how the child knew that the item was or was not alive. Some children were asked what they thought it meant to be alive. The children's 12 concept of life test entities are presented below in Table 19.

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Entity	Biologically Alive?	Child Might Think Alive?	Typically Moves?	Self-Locomotes?	Manmade?
a butterfly	+	+	+	+	-
a bird	+	+	+	+	-
rain	-	+	+	+	-
clouds	-	+	+	-	-
a tricycle	-	+	+	-	+
a car	-	+	+	-	+
flowers	+	-	-	-	-
grass	+	-	-	-	-
a spoon	-	-	-	-	+
a crayon	-	-	-	-	+
a puddle	-	-	-	-	-
sand	-	-	-	-	-

Table 21. Study 3: Stimuli for Testing Preschoolers' Concept of Life

These test entities were selected to balance various considerations in testing young childrens' conceptions of life. Classically, ardently animistic young children would be likely to think that half of the 12 were alive, principally on the basis of movement. Of the 6 that typically moved, half could move 'autonomously' while half required some external agent in order to move. Of the 4 nonliving entities that the classical animist might think were alive, 2 were manmade and 2 were natural. Of the 4 nonliving entities which the classical animist might think were not alive, 2 were again manmade while 2 were natural.

The querry used to elicit rationales for judgments of life status always took a form that confirmed the child's judgment: "And how do we know that the X is/is not alive." On the basis of these judgments and justifications, each child was classified according to a modified version of Laurendeau and Pinard's (1962) stage system for concept of life. Children were assigned to stages on the following bases:

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0: No restricted concept of life; incomprehension.
1: Entities said to be alive on the basis of usefulness, anthropomorphism, movement, etc.
2: Entities said to be alive only if they were capable of autonomous movement.
3: Only animals, or animals and some plants, were said to be alive.
4: All animals and all plants were said to be alive, though at least some animistic rationales were offered as reasons.
5: Adult concept; biological understanding; cessation of animistic rationales.

In some cases, some additional questions were asked of the child to aid in classification. Some of these questions regarded things which were in view from the windowed room: bushes, buildings, etc. Other questions involved physical props: a marble which could roll; a ticking watch; a tooting whistle which, when blown, caused a miniature train to move on a circular track. A child might be asked, for example, what made the train move and, of course, whether the train was alive. If the child was classified as Stage 1-4, he was immediately advanced to the second phase of the research interview.

In the second phase, each child was shown pairs of professionally produced, mounted, ink and colored pencil drawings depicting 7 entities which had been included in the microcosm of entities presented to college students in Study 1.[133] The entities presented are listed below, and the drawings are xerographically reproduced in Appendix C.

a lady	a spider	the sun	a stone
a tiger	a tree	wind	

[133]Two small differences: humankind was represented to the college students by 'an adult human,' and to the preschoolers by a picture of 'a lady' (or 'a woman' if that was how the child chose to identify the picture); also, trees were represented to the college students by 'a redwood tree,' and to the preschoolers by a more generic picture of a tree.

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In connection with these entities, the child was not only asked to judge their individual life status, but was also encouraged to judge one of the entities as "more alive" than the other when they were presented in pairs. The procedure was to select two of the drawings and to set them side by side on the interview table in front of the child. The child was then asked one of the following questions.

Q1: Is one of these *more* alive?
Q2: Which of these is *more* alive?
Q3: Which of these is more *like* a living thing? (Q3 was used only in connection with pairs in which both entities were regarded as nonliving.)
Q4: If you had to choose, which would you choose as more alive?
Q5: What about between the X and the Y? (Similar abbreviated questions corresponding to Q1 or Q2 were also coded as Q5.)

Q1, the only question which might be said to be neutral, was always the question used in connection with the first comparison, in order to get some minimal insight into whether the child was naturally disposed to make judgments of relative aliveness. In connection with subsequent pairs, any of the questions might have been used. This test, like the adult test, was designed as a forced choice task, and Q2-Q4 used more pointed language to prompt children to choose one entity over the another.[134]

Since Q3 did not request a literal judgment of relative aliveness, but only requested the child to choose the entity that was more *like* a living thing, it should be emphasized that the purpose of the interviews was not to determine whether children *really* believed that some entities were more alive than others (although

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[134]In fact, it was felt that even the continued use of the neutral Q1 would have constituted a de facto prompt to choose one entity over the other. One cannot repeatedly ask a cooperative child, "Is one of these more alive?" without him intuiting that the investigator would like to find cases in which an affirmative response can be given. With repeated use, Q1 would cease to be a neutral question and become a request of mild force.

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there was certainly evidence that this was often the case). Rather, the purpose was to elicit data regarding the strength of association between the word *alive* and various familiar entities in the natural world. The research hypothesis was that the varying strengths of these young animists' associations would describe a hierarchy of 'aliveness' which would accord with both the crosscultural animism hierarchy, and the hierarchy of 'aliveness' elicited from adults in Study 1.

If, in spite of all encouragement to chose one entity over another, the child maintained that both entities were "about the same," or that they were both alive or that neither one was alive, then this answer was coded as a tie. As in the first phase of the interview, the child was sometimes asked to comment on the reasoning behind his decision.

Since 21 paired comparisons would have been required to exhaustively compare each of the 7 entities against each other, a procedure was developed to mitigate against subject boredom by curtailing the total number of comparisons presented. It was expected that the top scoring entities would be the lady and the tiger, and that the lowest scoring entities would be the stone and the tree. These pairs were always presented first or second. The winner of the lady v. tiger comparison was then held out from the series and not presented again if the loser of the comparison succeeded in beating all of the other entities in the series. That is, if the tiger beat the lady, and the lady beat all the other entities, then the tiger was assumed to have beaten all the other entities as well. Analogously, the loser of the stone v. tree comparison was held out from the series and not presented again if the winner of the comparison lost to all of the other entities in the series. That is, if the stone lost to the tree, and the tree lost to all the other entities, then the stone was assumed to have lost to all the other entities as well. By this method, it was possible to complete an interview with as few as 12 paired comparisons. Often enough, however, additional comparisons were required to establish the child's hierarchical intui-

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tions. With the exceptions noted, the sequence of pairs and the right-left positioning of pairs was determined by 10 random orders. The research sessions lasted from 15-20 minutes, and were judged to be within, but toward the limit, of the children's interest span.

4.42 Findings and Analysis

In all, 41 children were interviewed. Below, the number of Ss classified into each stage, and the average age of these Ss.

Stage 0:	7 Ss	3.90 (≈ 3:11)
Stage 1:	5 Ss	4.32 (≈ 4:4)
Stage 2:	4 Ss	4.33 (≈ 4:4)
Stage 3:	15 Ss	4.66 (≈ 4:8)
Stage 4:	10 Ss	4.77 (≈ 4:9)
Stage 5:	0 Ss	

Of the 41 interviews, 30 were selected for final analysis. The 7 interviews of the children with no restricted concept of life were rejected. Two interviews were rejected for being incomplete. One interview was rejected because the S had been accompanied by a friend who had interfered in the examination process. One interview was rejected because the child behaved facetiously. The age range of the Ss in the selected sample was from 3:10 to 5:4. Below, the number of selected Ss classified into each stage, and the average age of these Ss.

Stage 1:	5 Ss	4.32 (≈ 4:4)
Stage 2:	4 Ss	4.33 (≈ 4:4)
Stage 3:	13 Ss	4.67 (≈ 4:8)
Stage 4:	8 Ss	4.97 (≈ 5:0)

In the first phase of the interview, almost all Ss at all stages offered a variety of rationales for their judgments of life status. These rationales are fully exemplified and explicated in Appendix D. Here it is sufficient to note that some of these rationales were classically animistic in tenor while others showed an inchoate appreciation of biological realities. There is no doubt that, relative to

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Stage 1&2 children, the children with higher stage classifications gave more biologically sophisticated responses, and also were more inclined to define the set of living things via a class inclusion formula specifying that only animals, or only animals and plants, were alive. However, even as these generally older children became somewhat more conversant about matters of biology, their understanding of biology remained exceedingly rudimentary and subject to interference from more animistic tendencies of thought. Therefore, recognizing that animism is *never* completely independent from biological sensibilities (cf. §2.234 & §2.2362), one may aptly characterize this entire sample as a sample of animists, regardless of the fact that some children did succeed, by diverse methods, in restricting the attribution of life to biologically living entities.

The justifications that Ss gave for their judgments of relative aliveness were highly similar overall to those offered in connection with simple judgments of life status. Looking at individual responses makes the point more forcefully: in 20 of the 30 protocols, it was recorded that children used essentially the same rationales in both kinds of judgments. Evidently, the same animistic sensibilities were operative in both tasks.

When presented with pairs in which one entity was thought to be alive while the other entity was not, a few Ss were sensitive to the awkwardness of asking which in the pair was 'more alive.' These Ss behaved as adults would by systematically favoring the living entity. They may have decided as an adult would that it made more sense to say that the living entity was 'more alive,' or they may have reinterpreted the question as, "Which entity *is* alive?"

When presented with pairs of entities in which both were thought to be alive, all of the 30 Ss except for one were willing to judge their relative aliveness. However, of the 28 Ss who were presented pairs of entities thought to be nonliving (2 Ss regarded only a single entity in the set to be nonliving), only 21 were willing to judge one entity as more alive, or as more like a living thing, than

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the other. The one subject (3:11, Stage 1) who was not willing to grade the aliveness of living things was also not willing to grade the aliveness of nonliving things. Hence, an implicational finding arose: If a S was willing to grade the aliveness of nonliving things, then he was also willing to grade the aliveness of living things. In developmental terms, one might propose that the category of {nonliving things} is conceptualized as nongraded with respect to aliveness before the category of {living things} is conceptualized as nongraded with respect to aliveness. However, the willingness to make graded judgments did not bear any relationship to age or stage across the sample.

In eliciting judgments of relative aliveness in connection with nonliving-nonliving pairs, the form of the question asked did not have any apparent effect on Ss' willingness to respond. If Ss were willing to offer graded judgments of aliveness in response to Q1 and Q2, they were also willing to offer judgments in response to Q3. The converse was also true: if Q1 and Q2 struck the child as awkward or nonsensical, then Q3 was not regarded as any improvement. Consider the following interview excerpt.

JC: Which do you think is more like a living thing: the sun or the wind?
S3: Not sun and not wind.
JC: Uh huh. Is one of them more *like* a living thing?
S3: Both of them are not [a living thing], alike.
- - -
JC: Is one of these [sun & stone] more *like* a living thing?
S3: Not exactly.
- - -
JC: Do you think one of these [stone & wind] is more *like* a living thing?
S3: Not the wind, or the sun, or the stone.

The message from this subject was clear: entities were alive or they weren't, and if they weren't alive, then they weren't like living things at all. This behavior contrasted with the behavior that

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one would expect from adults. If adults were asked Q1 or Q2 in connection with nonliving-nonliving pairs, they would regard these questions as unanswerable. How could it be said of two nonliving things that one was more alive than another? However, almost all adults would regard it as an interpretable question (albeit silly) if they were asked which of two nonliving things was more *like* a living thing. It appears that these young subjects did not much distinguish between the kind of inquiry represented by Q1 & Q2 and the kind of inquiry represented by Q3.[135] For Ss who *did* offer graded judgments, the distinction between being a living thing and being *like* a living thing may have also just dissolved to some degree.

In that case, did the Ss who did render graded judgments really believe that some things were more alive than other things (in whatever way they believed things to be alive)? Some Ss said that they did when asked, "Is the X *really* more alive than the Y?" Further, all Ss responded naturally and easily enough when asked the neutral question, Q1, in connection with the first paired comparison presented. Many of these Ss did offer graded judgments of aliveness in this maximally uncoerced moment. In these cases, one is inclined to take the Ss at their word.

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[135]If so, the failure to distinguish between these types of inquiries was not a problem of competence with constructions using the word *like*. The Ss who found Q3 awkward showed in follow-ups that they were perfectly capable of answering the questions, "Which is more like a tiger: a cat or a dog?" and "Which is more like blue: red or green?"

Since 6 out of 7 of these Ss were willing to grade the aliveness of entities thought to be living, it is hard to say why judgments of similarity to living things were not forthcoming. One suspects that the living-nonliving distinction was conceptualized with some sensitivity to its deep ontological force so that the entertainment of similarities between living and nonliving entities was inhibited, even if similarities were observed. Analogously, few adults would suffer the question, "Which is more like a tiger: a hammer or a screwdriver?" One is inclined to reply that neither of them *are* tigers and that neither of them are *like* tigers, even though one might finally admit that a hammer has a 'claw.' It is the commitment to deep ontological differences between tigers and hammers that mandates that these comparisons can only be entertained when enduring bad riddles. Ordinarily, one just *doesn't* compare these things because tigers are a 'completely' different kind of thing than hammers. For the Ss who refused to seek similarities between nonliving things and living things, the living-nonliving distinction may have been internalized as a hyperstabilized distinction of the tiger-hammer type.

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However, one should note that many Ss were willing to grade the aliveness of entities which they had previously identified as being nonliving. This phenomenon can be interpreted in two ways. It may have been that the questions about relative aliveness provided more sensitive access to Ss' animistic intuitions than simple judgments of life status. That is, certain entities which, upon first appraisal, were not regarded as alive may have nevertheless been sincerely and animistically judged to be more alive than other entities when a finer judgment was requested.

Alternately, Ss may have blithely attributed the quality 'more alive' to entities which they still sincerely felt were not living in just the same way that adults might say that green is 'more blue' than red is, though of course neither green nor red are really blue. That is, Ss may have regarded the predicate *more alive* as equivalent to the predicate *more like something which is truly alive* when it was applied to entities which were not regarded as living at all.[136]

As always, it is difficult to say exactly what the children intended when they used the predicates *alive* and *more alive*. In particular, it is difficult to say whether their judgments of relative aliveness were intended as literally as their simple judgments of life status. The dominant fact remains, however, that these two kinds of judgments were given rationales which were highly similar, and animistic, in their content. Therefore, it would have to be said that animistic sensibilities were in play whether the children were speaking in literal terms, or not. At this age, it may be that the literal-nonliteral distinction tends to be permeable to animistic sentiment just because the distinction is not well enforced by sophisticated biological precepts.

How then did these animistic children's judgments of relative aliveness square with the decidedly nonliteral judgments of relative

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[136]This suggests that there is always some doubt that Ss are speaking 'literally' when they offer relative judgments of attributes.

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aliveness rendered by adults in Study 1? To address this issue, entities were credited with one (1) aliveness win if they were favored in a paired comparison, and with one-half (1/2) an aliveness win if they tied. The total number of aliveness wins for the 7 entities exhaustively compared in 21 paired comparisons are shown below in Table 22. Note that 180 total wins were possible for each entity (i.e., each entity was compared against 6 others x 30 protocols).

	Aliveness	
	no. raw wins	on 1000 pt. scale
lady	166.5	1000
tiger	155.0	926
spider	111.5	647
tree	75.5	417
sun	59.5	314
wind	51.5	263
stone	10.5	0

Table 22. Study 3: Total Aliveness Wins for Seven Entities in the Preschooler Sample

Below, Table 23 presents Aliveness wins for this pool of 7 entities as judged by the college students of Study 1.

	Aliveness	
	no. raw wins	on 1000 pt. scale
human	127	922
tiger	135	1000
spider	105	706
redwood	82	480
sun	75	412
wind	73	392
stone	33	0

Table 23. Study 3: Total Aliveness Wins for Seven Entities in the College Student Sample

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Kendall coefficients of concordance were calculated to assess the concordance between the preschoolers' judgments of relative aliveness and the college students' judgments. Two methods of calculation were employed. In the first method, the input data for each sample consisted of 7 cases: viz., the total number of aliveness wins secured by each of the 7 entities judged. (Incidentally, coefficients of concordance are also shown for comparisons involving the small high school sample of Study 2.)

	High School Students	Preschool Children
College Students	.9821 p = .0669	.9821 (sic) p = .0669
High School Students		.9643 p = .0722

Table 24. Concordance between Preschoolers', College Students', and High School Students' Judgements of Relative Aliveness (Method 1)

In the second method, the input data for each sample consisted of 21 cases: viz., the total wins of the first pairmember in each of the 21 paired comparisons which exhaustively compared the 7 entities of the children's microcosm.

	High School Students	Preschool Children
College Students	.9244 p = .0118	.9355 p = .0104
High School Students		.8846 p = .0181

Table 25. Concordance between Preschoolers', College Students', and High School Students' Judgements of Relative Aliveness (Method 2)

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As in Study 2, one might prefer the first method of calculating coefficients of concordance for the reason that it draws more directly from Ss' overall hierarchical intuitions, or one might prefer the second method for the reason that it brings more data points into consideration. Regardless of the method preferred, it was clear that the preschoolers' judgments of relative aliveness were very significantly aligned with the judgments rendered by college students (and high school students). Further, the hierarchies constructed by both children and adults were entirely consistent with the crosscultural animism hierarchy. In connection with biologically living entities, the main hierarchical themes were anthropocentrism and zoocentrism. In connection with inanimates, the main hierarchical theme was dynamism.

Aside from this powerful statistical demonstration, the similarity in the ranking tendencies of these two groups is perhaps best displayed in Table 26 below.

Entity	Pre-schoolers' Rating	College Students' Rating	Typical ANIMACY Status in Language
lady	100	92	ANIMATE - high
tiger	93	100	ANIMATE - high
spider	65	71	ANIMATE - low
tree	42	48	either
sun	31	42	either
wind	26	39	either
stone	0	0	INANIMATE

Table 26. Agreement between Preschoolers' and College Students' Ranking Tendencies

Here, it is evident that the aliveness hierarchies constructed by the preschoolers and the college students showed not only a strong rank correlation, but also the same clustering phenomena. That is, the relative distance between entities on the two aliveness

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hierarchies was comparable in such a way that the two hierarchies exhibited similar steps.

It is these steps which argue most forcefully for a relationship between ANIMACY phenomena and child animists' and adults' intuitions of relative aliveness. As Table 26 indicates so plainly, the degree to which languages are likely to classify an entity as ANIMATE was highly related to the level at which this entity was judged to be alive by both preschoolers and the college students. What has been obtained is a very direct demonstration that young animists and college students associate the predicate *alive* with different entities to a highly congruent degree, and that the intensity of these associations matches the typical level of ANIMACY accorded to entities. One would like to say that the associational norms of animistic children are preserved in adults, where they are reconstituted as the norms of ANIMACY classifications in language.

Finally, some note should be made of how advanced these preschoolers' were in their use of the word *alive* relative to children assessed in previous animism studies using very similar interview methods. Of the 41 children interviewed, only 7 (17%) had no concept of how to use the word *alive*, or applied the word to a completely unrestricted set of entities. 26 of the 41 (63%) were sufficiently advanced to restrict life to animals, or to animals and plants. Compare this with Laurendeau and Pinard's (1962) figures for French-Canadian 5-year-olds: 60% had no restricted concept of life, and only 6% restricted life to animals, or to animals and plants. In Laurendeau and Pinard's sample, it took the average child 4 years and 4 months to go from having no restricted concept of life to the restriction of life to animals, or to animals and plants. At the Jones Center, it took children about 17 months or less to travel this psycholinguistic distance.[137] One has to think that, at the Jones Center,

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[137]The difference in average age between Stage 0 and Stage 4 children was only .87 years. Alternately, one might note that all children younger than 3:10 were classified as Stage 0, while all children older than 5:3 were classified as Stage 3. Hence, by any

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the speed at which adult language usage patterns were acquired was approaching the theoretical envelope. Presumably, the semantic development of these children was hastened by the enriched, learning oriented environment of the Center, and by home advantages provided by the children's concerned and rather intelligent parents.

For preschoolers, the Jones Center children showed considerable biological acumen. However, one should note that their understanding was by no means mature. The Jones Center children used the word *alive* in an adultlike way because they had early on acquired logical inclusion formulae restricting the attribution of life to animals or to animals and plants, or because they had mastered a couple of rudimentary yet highly predictive biological criteria for assigning life — e.g., a need for nutrition; an ability to grow. Alongside their adultlike word use, there persisted any number of animistically colored speculations about what it meant to be alive, or about the biological workings of animals and, particularly, plants.

There is one final, somewhat sad observation which might be made, from the developmentalist's point of view. Since animism research takes the use of the word *alive* as its embarkation point, it appears that the time may be drawing near when research will become virtually impossible with samples of children raised in highly enriched learning environments, so quick may be their acquisition of adultlike fashions of speech. The acceleration of semantic development in information rich cultures may have the effect of eliminating animism as a traditional topic of psycholinguistic inquiry in some whole sectors of advanced societies. Whereas Piaget regarded animism as an inevitable and enduring theme of childhood, it appears already that, in certain local samples, animism as Piaget knew it has all but disappeared.

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reckoning, children were passing from Stage 0 to at least Stage 3 in from one to one and one-half years.

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4.5 Study 4 — Navajo ANIMACY Classifications Compared with College Students' Animistic Intuitions

In this study, the rank order of the 32 microcosm entities in the Study 1 college students' Aliveness hierarchy was compared with the rank order of these entities in the Navajo ANIMACY hierarchy, an elaborate system whose details accord completely with the crosslinguistic ANIMACY hierarchy. The present study was expected to show close agreement between the intuitions of hierarchical aliveness which emerged in Study 1 and crosslinguistic patterns of hierarchical ANIMACY.

4.51 Method

The Navajo ANIMACY system has been fully explicated in §3.32c above. Using the work of Creamer (1974) as the principal reference, the 32 microcosm entities of Study 1 were accorded the ranks they would receive in the Navajo system. With one proviso, the ranks reported here correspond exactly to the Levels put forth in §3.32c. The one proviso concerns the relationship between Levels 6 and 7.

> Level 6
>
> Here one finds nouns denoting "natural forces" such as windstorms, flood, sunshine (heat), and forest or range fire.
>
> Level 7
>
> Here one finds nouns denoting plants and inanimate objects. E.g., tree, branch, potato, milk, running water, water, snow, sand, rock, stick, jewel, metal, carton, car. "A special rule governs the interactions of the nouns within this classification when verbs with *yi-* and *bi-* forms are used. In each case, the semantic content of the verb implies movement on the part of one of the nouns in the sentence [i.e., presumably, the agent], and this noun then takes higher status than the more stationary object" Creamer, 1974:36).

Since it is not obvious what entities would be considered natural forces and what entities would be considered inanimates, and since Creamer offers no direct linguistic evidence that natural

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forces are hierarchically superior to *motile* inanimates, the relationship between Levels 6 and 7 was interpreted as principally a relationship between motile inanimates and nonmotile inanimates. Thus, in the present work, the motile inanimates (sun, waterfall, wind, thunder) were assigned a rank of 6, and the nonmotile inanimates (glacier, daylight[138], air, stone) were assigned a rank of 7.

On behalf of the English speaking college students of Study 1, ranks were assigned to the 32 microcosm entities in two ways. First, 'strict ranks' were assigned on the basis of the total number of aliveness wins which these entities received when they were exhaustively compared against each other. For example, it will be recalled that the tiger received 719 wins when it was pitted against the other 31 entities, while the human received 696 wins: these two top scorers were assigned strict ranks of 1 and 2, respectively.

Second, 'loose ranks' were assigned to the microcosm entities on the basis of how ontological groups were hierarchically arranged on the college students' Aliveness hierarchy. It will be recalled that, in this hierarchy, ontological groups of entities clustered into 5 levels.

Human

(Mammals + Birds)

(Bugs + Plants + High Inanimates)

Low Inanimates

Incorporeals

---

[138]While Creamer notes that the status of sunshine is elevated relative to nonmotile inanimates, she qualifies this by parenthetically equating sunshine with heat. In English, too, the word *sunshine* is also associated with heat. However, *daylight* is substantially free of these associations. Daylight is not heat, and cannot dramatically alter the state of entities in the way that heat can. It was felt that daylight, as light, was something a good deal more quiescent than heat and would, by Creamer's system, be classified along with the nonmotile inanimates.

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Accordingly, by this manner of reckoning, the human was assigned a rank of 1, the tiger was assigned a rank of 2, as were hawks, etc.

In addition, it was decided that biologists ought to be given an opportunity to be heard: the rank of 1 was assigned to all biologically living entities, and the rank of 2 was assigned to all nonliving entities. All of the relevant ranking data is provided below.

All Entities (N = 32)	Total Aliveness Wins	Students' Strict Ranks	Students' Loose Ranks	Biologists' Ranks	Navajos' Ranks
tiger	719	1	2	1	2
adult human	696	2	1	1	1
hawk	662	3	2	1	3
kangaroo	614	4	2	1	2
raccoon	607	5	2	1	3
owl	594	6	2	1	3
swan	587	7	2	1	3
sparrow	586	8	2	1	4
elephant	583	9	2	1	2
beaver	573	10	2	1	3
honeybee	565	11	3	1	5
spider	540	12	3	1	5
waterfall	533	13	3	2	6
hippo	531	14	2	1	2
possum	527	15	2	1	3
beetle	490	16	3	1	5
redwood	484	17	3	1	7
daisy	482	18	3	1	7
wind	457	19	3	2	6
sun	457	19	3	2	6
gnat	443	20	3	1	5
thunder	442	21	3	2	6
air	375	22	4	2	7
glacier	369	23	4	2	7
daylight	359	24	4	2	7
electromag.	300	25	5	2	8
gravity	293	26	5	2	8
stone	236	27	4	2	7
largeness	213	28	5	2	8
thickness	197	29	5	2	8
distance	191	30	5	2	8
equivalence	175	31	5	2	8

Table 27. Study 4: Aliveness Ranks and Navajo ANIMACY Ranks for the Microcosm Entities of Study 1

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4.52 Findings and Analysis

Kendall coefficients of concordance were calculated for the Navajo rankings vis-à-vis the college students' and biologists' rankings.

Concordance using all microcosm entities	Students' Strict Ranks	Students' Loose Ranks	Biologists' Ranks
Navajos' Ranks	.9520 p = .0018	.9810 p = .0011	.8907 p = .0047

Table 28. Concordance between Navajos' ANIMACY Ranks and the Aliveness Ranks of College Students and Biologists for All Microcosm Entities

The concordance between the rankings of college students and the rankings of Navajos was extremely pronounced, regardless of how the students' rankings were calculated. However, an argument can be made that the preferable method was the one used to produce loose rankings — the rankings which were in fact more highly aligned with the Navajo system. If one imagines that the college students of Study 1 were charged with the construction of an ANIMACY system, and that this system would have certain grammatical consequences in English — e.g., obligatory passivization when agents are less ANIMATE than patients — then it would certainly be the case that entities would not be assigned unique ANIMACY ranks, but would rather be assigned a rank which was common to other entities regarded as being in the same category. It is never the case in language that the ANIMACY of *every* entity is established independently from the entity's categorical affiliations, though to be sure *some* entities may acquire a special status — e.g., in Chinantec, mushrooms which are psychedelic. We know from Study 1 that, when regarding categories of entities, college students' intuitions of relative aliveness describe a hierarchy of five levels. If these college students were to create a Navajo-like ANIMACY system for English, it might well be a

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system of these five levels. At any rate, for purposes of comparison, it seems most apt to compare Navajos' categorical rankings to those rankings by English speakers' which are also of a categorical nature. Hence, the students' loose ranks are probably more appropriate for comparison than their strict ranks.

The high coefficient of concordance between the rankings of biologists and those of the Navajo ANIMACY system makes it clear that the system has a strong overall biological bias. One might speculate that, if biologists were asked to construct an ANIMACY system in accordance with biological principles, the system would be grossly similar to the Navajo system. However, it would lack much of the detail of the Navajo system. One cannot look to the formal precepts of biology to get any appreciable insight into why Navajo speakers might make hierarchical distinctions between living entities, or between nonliving entities. Within these subgroups, biological considerations cease to relate predictively with Navajo rankings. However, the correlation between intuitive judgments of relative aliveness and Navajo rankings remains extremely high, as indicated below in Table 29 and Table 30.

Concordance Using 18 Living Entities	Students' Strict Ranks	Students' Loose Ranks	Biologists' Ranks
Navajos' Ranks	.8471 p = .0364	.9429 p = .0148	.5000 p = .4544

Table 29. Concordance between Navajos' ANIMACY Ranks and the Aliveness Ranks of College Students and Biologists for All Living Microcosm Entities

Concordance Using 14 Non-living Entities	Students' Strict Ranks	Students' Loose Ranks	Biologists' Ranks
Navajos' Ranks	.9450 p = .0263	1.0000 p = .0170	.5000 p = .4478

Table 30. Concordance between Navajos' ANIMACY Ranks and the Aliveness Ranks of College Students and Biologists for All Nonliving Microcosm Entities

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The most striking feature of this subgroup data is the perfect correlation between the rankings accorded to nonliving entities by Navajo speakers and by nonNavajo speakers of English. Here, and in general, when it comes to addressing matters of relative 'aliveness,' broadly conceived, there is strong support for the view that the linguistically codified intuitions of Navajo speakers are entirely consonant with the uncodified or latent intuitions of relative 'aliveness' which are normal for speakers of English.

Conversely, there are no indications in any of the data of this study that the Navajo system of ranking ANIMACY expresses a world view that is a unique acquisition of Navajo minds. It may well be, as Witherspoon (1980) takes trouble to argue, that Navajo cosmology acts to support the Navajo ANIMACY system in a characteristically Navajo fashion. However, the evidence of the present study calls into grave doubt the inference that a causative relationship exists between Navajo cosmology and Navajo ANIMACY, since the ranking norms of the Navajo system can be so readily elicited from speakers of English with very diverse nonNavajo cultural backgrounds.

The data of the present study suggest that, if English speakers were somehow charged with the task of constructing an ANIMACY system, the system which would emerge would be remarkably like the extant system employed by the Navajo people. In order to do this, they would have only to grammaticalize the norms of semantic intuitions which are demonstrably already in place. (And, as explicated in §3.32b, some tendency toward grammaticalization of these norms is already in evidence.) Given that the norms of Navajo ANIMACY rankings correspond in their details to crosslinguistic patterns of ANIMACY ranking, and given that these norms can also be elicited from nonNavajo speakers of English under apt questioning, it is apparent that Navajo ANIMACY rankings are in no way under the final control of cosmological assumptions that are a special characteristic of Navajo culture and mind. The more appealing interpretation is that Navajo speakers and English speakers and other speakers share a universal, intuitive appreciation for the relative 'aliveness' of entities in

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the world and that, in Navajo culture, these sentiments are codified in language and echoed in cosmology.

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4.6 Summary

The four studies presented in this chapter have empirically demonstrated contiguities between animistic appraisal in overtly animistic children, figurative intuitions of relative aliveness in English speaking high school and college students, and the crosslinguistic norms of ANIMACY ranking, as exemplified by the Navajo ANIMACY system. The general interpretation of these findings is that the animistic norms of childhood are preserved into adulthood, where they may be codified in language via ANIMACY ranking phenomena. This interpretation is give further support in the principal study presented here by the demonstrated relationship between figurative intuitions of relative aliveness and intuitions of relative embodiment, purposiveness, and activity. It has been argued in Chapter Three that EPA considerations, broadly conceived, are the causal substrate of animistic appraisals of life status. Here, the data strongly suggest that EPA sensibilities stand in a causal relationship to more figurative judgments of aliveness as well.

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Chapter Five
Conclusion

5.1 A General Review and Discussion

Historically, scholars who have denied the presence of animistic tendencies in adults have not done so on the basis of empirical observations, but in accordance with broader commitments to the notion that pervasive cognitive relativities distinguished the conceptual life of children and adults — cognitive relativities of a sort thought to preclude the presence of animism in adults. Until well into this century, these biases were supported by Haeckelian analogies between cognitive development and evolutionary progression, or by Lèvy-Bruhl inspired distinctions between the world views of children and primitive peoples on the one hand, and 'culturally advanced' adults on the other.

In Piaget's developmental theory, this disposition to quantally distinguish between the mental life of children and adults was particularized as a commitment to global stagelike transformations of mental style from childhood realism to adult rationalism. Whereas rationalism was principally characterized as an ability to logically manipulate criterially defined concepts and categories, realism was characterized by the prominence of emotive and motoric sensibilities and by egocentric projection. Animism was represented as an expression of a universal childhood mentality which underwent, in predictable stages, a series of modifications prior to being extinguished in late childhood as the result of cognitive maturation and the acquisition of sophisticated biological and causal understanding.

The universality of animistic phenomena is strongly supported by an extensive crosscultural research literature. Childhood animism appears in cultures in every sector of the globe, and its structural features are everywhere the same. Life is attributed to animals relative to the degree of similarity between the animal in question and human beings. Dramatically active entities such as whirlpools and

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wind are often judged to be alive, while life is often denied to quiescent entities such as puddles and stones. The life status of plants is universally problematic for children, and often held doubt. Since the likelihood that a given entity will be judged alive is universally echoed as the likelihood that that entity will be judged to be *more* alive than other entities, one can securely speak of a crosscultural animism hierarchy.

However, the classical stage system which is said to superintend the transformation of the animistic orientation into a causal-biological orientation is quite without merit. The stages within the system are not defined in consistent ways; individuals are not assigned to the stages in consistent ways; neither are the stages properly isolable, or consistently associable with the age ranges often claimed for them. The empirical evidence does not support the traditional claim of stage system advocates that the animistic outlook of the child and the biological outlook of the adult represent developmentally and relativistically distinct mentalities. Neither is there generally empirical support for a globally coordinated stagewise emergence of conceptual abilities, or for either homogeneous realism in children or homogeneous rationalism in adults.

More recently, some theorists have reformulated Piaget's views on animism and development in Kuhnian terms, as a case of localized, weakly relativistic theory change. In these accounts, animism has been viewed as a naive biological theory constructed along the lines of an intuitive theory of behavior, a child's theory which is corrected with the acquisition of more sophisticated causal and biological knowledge. However, these reconstitutions of Piagetian views continue to presuppose that animism disappears in adults as the maturing thinker rationalizes and reforges his animistic views into veridical theories of biology and causation. Usually, these accounts also note that animistic expression seems in many cases to be a naive form of metaphor that arises from the semantic confusion, rather than the biological/causal confusion, of youth. Because the child hears the adult use such expressions as *live coals*

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and *live ball*, he also uses the word *alive* to refer to dramatic inanimates without realizing that he is speaking metaphorically: metaphorical and literal speech become fused.

Here it has been argued that animism cannot be regarded as a naive form of metaphor, since this very notion of naive metaphor is internally incoherent. One can only use a word metaphorically by contrasting its metaphorical sense against a literal sense. However, there is no evidence that the youngest animists contrast senses of the word *alive* which are animistic (and putatively metaphorical) against senses of the word *alive* which are biological (and putatively literal). Rather, since children first use the word *alive* animistically, it is only with the later attainment of biological understanding that a literal-nonliteral distinction can become possible at all. The empirical facts of the matter confirm that metaphoric understanding emerges just as biological understanding increases and animistic attributions decline. Also, prior to the acquisition of mature biological knowledge, it is seldom the case that the animist uses life-related words to mean just what the metaphorizing adult means by them; i.e., that the entities so described are energetic, activated, etc. Rather, it is generally the case that entities described as being alive are also thought to possess at least some of the biological properties which the animist associates with his own life. This suggests that, in early childhood, not much animistic word use can be regarded as metaphorical.

Neither is it appropriate to characterize animism as a naive theory of biology. To do so would violate the ways in which we use the words *theory* and *biology* to such a degree that neither word would be recognizable. The six summary points relevant to this issue are presented below.

1) Many animists regard life as a gradient attribute, but it is hard to imagine what it means to have a *biological* theory which regards life in this way. The beginning point for biology is the division of entities into living and nonliving classes.

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2) Animists may not be able to specify a determinate set of things which can be said to be alive. Even the best examples of living things are not guaranteed to be regarded as living by animists. But a *theory* must be able to specify the entities that the theory is about, at least in terms of some secure exemplars.

3) Animists may regard life as an intermittent status, and may be inconsistent over time in their attributions of life. Of course, an assertion that life was intermittent could be considered a mistaken biological view. But how mistaken can views get before they cease to be biological at all? And how can the evanescence of animistic attributions be interpreted as a theoretical belief? The inconstancy of animistic attributions violates the coherency requirements which we impose on theories.

4) For animists, there is only a tenuous relationship between attributions of life and attributions of traits biologically affiliated with life. Developmentally, the word *alive* is employed with much greater independence from the child's developing scientific theories than other biological predicates. The concept represented for the animist by the word *alive* does not appear to be the central or coordinating concept in a set of biological beliefs.

5) The rationales offered for animistic attributions of life address many issues which are not at all of a biological nature.

6) Neither do the social and personality factors which abet or inhibit animism have any clear relationship to a child's biological views, or to any other set of theoretically coordinated beliefs. Rather, these factors appear to be related to people's willingness to engage in nonanalytic thought activities, and to express the affective content of these engagements.

It is apparent that, unlike biology, animism need not be constituted as a set of biologically focussed, relatively determinate beliefs about a relatively determinate set of entities. In what sense,

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then, could animism be called a biological theory? To be sure, even in their earliest years, children conceptualize life as a cluster of affiliated traits. However, this cluster may for some time be very loosely bound, and the constitution of the cluster may vary between individuals, between entities being considered, and between occasions of inquiry. It may even be the case that none of the individual traits appearing in the cluster will necessarily lever an attribution of aliveness, or that no combination of the traits will be sufficient to do so. Thus, the attribution of traits biologically affiliated with life may ensue in mysterious independence from the attribution of life itself. In this early period, it is difficult to predict *what* biological commitments a child has in mind when he deploys the word *alive*.

As the child matures, the associations which bind the cluster of traits affiliated with life become strengthened, and fall increasingly under the control of biological knowledge. Biological beliefs become structured in the form of systematically related postulates about determinate classes of entities in the world. Abetted by social pressures to conceptualize biology as a science, the formalism of this knowledge supplants the asystematicity which characterized the child's earlier contemplations of the biological realm.

In the developmental scenario, the relationship between biology and animism is complex, but it is not the relationship one typically observes between successive theories, nor is it quite the relationship which one observes between incompatible systems of thought. For the most part, it can be expected that practical experience with entities and knowledge of their biology and of their causal mechanisms will mitigate against animistic projections. It is plainly the more enigmatic entities of the world which are most likely to be credited both with life and with other traits associated with life — particularly, traits of sentiency, which are themselves of an enigmatic character. However, there are ways in which an individual's incomplete biological knowledge may encourage as well as inhibit animistic attributions. For example, it is not uncommon that ani-

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mists attribute animal traits to plants on the rationale that living things (zoocentrically conceived) *ought* to be able to know, feel, breathe, etc. Strange to say, then, the freewheeling asystematicity of outlook which makes animistic projections possible may become directed in its content by the systematic expectations of incipient biological knowledge. Thus, in its affiliations with biological traits, the word *alive* may occupy a kind of semantic netherworld in which it is neither completely independent of such affiliations, nor completely amalgamated with them.

Neither does biology proceed without holistic sensibilities. The most fundamental questions in biology always bring biological science to an impasse, and this has the effect of turning scientific speculation back to more philosophical or intuitive avenues of thought. Biology reaches this impasse when attempting to specify the essential nature of life. This is because the properties of living things are for the most part emergent properties and typical properties rather than matters of determinate essence, and because the study of biology has to address three phenomena in which the state of being alive merges in inexplicable ways with a nonliving state. These three phenomena are:

> the presence of life in physical bodies which, in final reduction, are nonliving compounds, molecules, and atoms;
>
> the first emergence of life from nonliving material in geologic antiquity; and
>
> the passage from life into death.

These biological mysteries all address the problematic relationship between life and the physical structures that support it. They underline the fact that life is itself an emergent property of physical systems, and hence cannot be defined in the essentialist terms that one might classically or ideally expect of a science. Contrary to the classical view that animism must necessarily cease in late childhood, one has the impression that animism can hardly

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fail to persevere, since even biological science (the nemesis of animism in the Piagetian account) has the effect of delivering thinkers over to the kinds of holistic orientations in which animism thrives.

In point of fact, convergent evidence from several sources now argues for the perseverance in adults of the animistic sentiment and the animistic norms found in children. These sources include data from neuropsychological studies and from reports of certain religious, legal, and literary practices which reflect an animistic orientation to the natural order, as well as data from experimental investigations of animism in adults. In numerous provocative but often ignored studies since the 1950's, adults judge the same entities to be alive and not alive and relatively more or relatively less alive as do animistic children, and do so in the same relative proportions as do animistic children, and offer the same kinds of rationales for their judgments as do animistic children. The animistic judgments of adults may express a considered intellectual belief that the difficulties in defining life set biological and animistic rationales on an equal footing, or they may represent an intuitive reversion to animistic norms in moments of intellectual desperation.

To be sure, the animistic sentiment of adults is not likely to be identical to that of children, given adults' causal and biological sophistication. Adults' animistic proclamations cannot help but be tempered by their sophisticated knowledge, and by a tendency toward metaphor. But *regardless* of whether the adults exhibiting such behavior are acting metaphorically, they give voice to the same norms which are constitutive of animism in children. There can be no doubt that the animistic sensibilities and the animistic norms of childhood have been preserved into their adult years.

The evidence suggests that animism is not so much a theory as an activity, a mode of engagement with entities in the world, and that the word *alive* is used to gauge the intensity of that engagement. Apparently, the tension between animistic appraisal and biological appraisal is first and foremost related to how entities are to

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be entertained in general. The animistic tendency is to regard entities from the perspective of a greater intuitive situatedness; to regard entities in terms of the immediate and subjectivized whole of context and activity. The biological tendency is to regard entities in terms which are more essentialistic, analytic, and context-independent. This is a very intriguing kind of tension, but it is not a tension between two forms of biological thinking, one sophisticated and one naive. Neither is it a tension which is of necessity derived from the cognitive differences between children and adults. When an animist proclaims that an entity X is alive, there is no evidence that he means something that *only* a child could mean.

It is apparent from the kinds of entities that are classified as alive or as not alive, and from the rationales offered for these classifications, that, for both children and adults, the animistic mode of engaging with entities of the world is primarily directed by sensitivities to those entities' embodiment, purposiveness, and activity, broadly conceived. Embodiment, purposiveness and activity (EP&A) are at once the principal themes and causal ground of animistic appraisal, and the principal semantic dimensions of *alive*$_{animistic}$. On the subjective side, EP&A represent the principal phenomenological dimensions of one's own life, the three dimensions in terms of which one always understands one's own life. By virtue of this orientation to one's own being, and thence to the world, certain entities show up more prominently than others. On the objective side, EP&A represent the three principal clusters of attributes which propel certain entities to the forefront of our attention, since it is these entities which show up as having, in EPA terms, the *same kind* of being as our own; viz., a being characterized by physical substance, discrete form, functional parts, purposive involvements, continuous activity, etc. In acknowledgement of the special salience of these entities, we may animistically or projectively label these entities as alive, whether or not they are actually regarded as other beings of like kind. Another way of putting this is to say that, since we are constituted in such a way that we are always directed toward our own being, we are also constituted as detectors of like

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beings in general. Analytically, it may be said that we are sensitive to embodiment, purposiveness, and activity as the primary phenomenological dimensions of the kind of being which we and other beings possess. However, in being sensitive to EP&A, other entities with holistically greater or lesser claims to being regarded as genuine beings are also brought to the forefront of our attention.

The most plausible interpretation of the disappearance of overt animism in adults is not that adults have undergone a rationalizing conceptual transformation which precludes animistic thinking, or that animistic theories of the natural order have been transformed into scientific ones. Children were always rational enough, and animism need not be any kind of a theory. Overt animism disappears in adults for two reasons. First, animism is generally suppressed by the ascendancy of scientific knowledge and, even more crucially, by the ascendancy of the analytic style of cognition which supports such knowledge. Second, the tension between animistic and scientific appraisals of the natural order is always resolved, by popular accord, in the favor of science by saying of the scientific view that it is the literal view while saying of the animistic view that it is metaphorical or figurative. In every culture, it is the facts presented by the scientific orientation rather than the facts presented by the animistic orientation that get to be called the literal facts. Thus, when adults express animistic views, they do so in a manner which they and their interlocutors both regard as nonliteral, and this is not popularly taken to be any kind of animism at all. Metaphor is one way in which the tension between animistic sentiments and sophisticated biological and causal knowledge is resolved: statements such as 'the wind is alive' are regarded as sincere but not literal. Instead of regarding metaphor as faux animism, students of development might alternately regard metaphor as the dominant form that animism takes in adults. Actually, it may be that adults exhibit animism in its most purified form; i.e., animism without the decoration of false causal and biological beliefs.

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The worldwide consistency with which animistic views are devalued as nonliteral and nonprimary while biological views are regarded as literal and accorded first rights to the word *alive* offers the most highly documented evidence to date that less determinate cognitive styles and categories are universally devalued relative to more determinate ones. Nowhere else is the case made more convincingly, since biological perspectives always eventually predominate in spite of the fact that animistic perspectives have the developmental advantage of being first. The principle or motive behind this preference for criterially defined concepts is entirely familiar: the drive for cognitive economy which directs the formation of categories in general also acts to hyperstabilize some categories along criterial or quasicriterial lines, and it is this same drive for category stability and strict determination that sets in place the ideal according to which categories of determinate structure are preferred over categories of greater plasticity. Hence, the acceptance of biological attributions of life as literal and the sequestering of adult animistic expression in the realm of the nonliteral presents a universal with very general cognitive linguistic implications.

With regard to the prominence of EPA sensitivities in nonliteral speech, the case of English may serve as a demonstration of a semantic pattern which is held to be general across languages. Examination of a large sample of English roots, derived forms, collocations, idioms and compounds has indicated that better than half of the senses of life- and death-related words and expressions in English are nonbiological in meaning. A very sizeable proportion of all of the nonbiological uses of life- and death-related words can be related to EPA considerations. Hence, not only are the animistic sensibilities of childhood *preserved in the adult, but they are preserved* in sufficient force to give rise to conventionalized expressions of animism in language.

Linguistic conventionalizations of animistic sensibilities may also be observed in both grammatically 'hard' and grammatically 'soft' ANIMACY phenomena. ANIMACY phenomena from around the world

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give evidence for a crosslinguistic ANIMACY hierarchy in which all of the important themes of the crosscultural animism hierarchy are repeated. This hierarchy diverges from biology and accords with animistic sensibilities in several respects. First, ANIMACY systems may be graded, while judgments of biological life status are binary. Second, ANIMACY systems are anthropocentric. Intact adult humans are always assigned to the highest ANIMACY class, and may be the only entities assigned to that class. Also, higher animals are often assigned to a higher ANIMACY class than lower life forms which are far less similar to humans. Third, the ANIMACY distinctions among humans relate to matters of human capacities to act or interact rather than to biological life status. Fourth, whole animals are likely to be regarded as more ANIMATE than body parts, though an animal and his parts are equally alive. Fifth, the status of plants is problematic. They may be classified with animals (presumably in appreciation of their biology), or classified with inanimates (presumably on account of their inertness), or given their own class. Sixth, dramatically active or motile inanimates may be classified in a higher ANIMACY class than quiescent inanimates, and may even be assigned to a higher class than plants or some animals. Seventh, natural inanimates are more likely than manmade inanimates to be accorded a higher ANIMACY classification. Eighth, entities which are countable or definite in discourse may be regarded as more ANIMATE than entities that are noncountable (i.e., mass entities) or less definite in discourse. Ninth, entities which are physically real may be regarded as more ANIMATE than entities which are abstract. Tenth, ANIMACY classes and classifications may alter from one grammatical occasion to the next, while biological status is fixed. In short, in ANIMACY systems one finds reproduced the gradability, the anthropocentricity, the EPA sensitivity, and the inherent plasticity of animistic thought. This argues that perseverant animism in adults is universally the causal ground for the divergence of linguistic ANIMACY systems from biological models.

Four empirical studies were here undertaken to establish more firmly that the animistic intuitions and norms of children are pre-

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served in adults, and that these norms correspond to the norms of the crosslinguistic ANIMACY hierarchy. In Study 1, it was demonstrated that college students' figurative judgments of relative aliveness vis-à-vis a microcosm of 32 entities could be related to judgments of these entities' relative embodiment, purposiveness and activity, and that the 5-level Aliveness hierarchy produced was in full structural accord with both the crosscultural animism hierarchy and the crosslinguistic ANIMACY hierarchy. In addition, when asked to assess the relative Aliveness of entities in 26 special paired comparisons reflecting hierarchical distinctions found in ANIMACY systems around the world, the college students' judgments of relative Aliveness ran in the same direction as the hierarchical distinctions made in language by a margin of 5-1.

Study 2 replicated the principal finding of Study 1 in a somewhat younger population by demonstrating that the college students' Aliveness hierarchy could be elicited from high school students as well. This is particularly noteworthy because some previous research has indicated that older high school students are among those least given to overt displays of animistic sentiment.

Study 3 compared the college students' and high school students' intuitions of relative aliveness to those offered by animistic preschoolers in connection with a subsample of 7 of the 32 entities presented in Studies 1 and 2. Again, the agreement between hierarchical intuitions was striking, as was the correspondence between these intuitions and the hierarchical distribution of entities in ANIMACY systems around the world.

In Study 4, it was demonstrated that the rank order of the 32 entities in the college students' Aliveness hierarchy correlated very impressively with the rank order of these entities in the Navajo ANIMACY hierarchy, an elaborate system whose details accord completely with the crosslinguistic ANIMACY hierarchy.

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These four studies empirically demonstrate contiguities between animistic appraisal in overtly animistic children, figurative intuitions of relative aliveness in English speaking high school and college students, and the crosslinguistic norms of ANIMACY ranking, as exemplified by the Navajo ANIMACY system. The general interpretation of these findings is that the animistic norms of childhood are preserved into adulthood, where they may be conventionalized in figurative expressions or codified as norms for ANIMACY ranking phenomena. This interpretation is give further support in Study 1, the principal study, by the demonstrated relationship between figurative intuitions of relative aliveness and intuitions of relative embodiment, purposiveness, and activity. Just as EPA considerations, broadly conceived, appear to be the causal foundation of animistic appraisals of life status, the data of Study 1 strongly suggest that EPA sensibilities stand in a causal relationship to more figurative judgments of aliveness as well.

At some length, we have addressed the question of how the word *alive* is understood by children and adults. We have explored the range of cognitive strategies which are used, in early and later life, to structure the concept {alive} and to semantically specify the word *alive*. (And we have noted that, to some degree, the semantic structure of the word *alive* may be determined by the type of language game in which the word *alive* is used.) Life, and the meaning of the word *alive*, may be conceptualized in terms of set inclusions as a minimally specified predicate applied to an approximately determinate set of entities; i.e., as 'that biological status which is common to animals and plants.' Alternately, life may be conceptualized with greater biological specificity as, approximately, a determinate set of necessary and sufficient biological properties: viz., genetic determination, cellular organization, metabolic capacity, etc. Finally, life may be conceptualized as that general kind of being and relationship to the world which is best exemplified by our own lives: broadly, life may be intuitively understood in terms of the embodiment, purposiveness, and activity which constitute the principal dimensions of our own being, and of our own self-understanding. It is

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this last mode of conceptualizing life that goes by the name of animism.

As cognitive strategies, these three procedures for conceptualizing life are entirely general. It is just generally the case that categories may be defined in terms of class inclusions and exclusions, or in terms of necessary and sufficient criterial features, or in terms of more affectively clustered attributes. (And it is this last category formation strategy which is taken to be primary in concept formation.)

Given this, the conventional view that animistic conceptualizations of life are lost to the adult must strike one as a hypothesis of deeply cynical sentiment, since it suggests a withering of subjectively anchored conceptualization capacities in adulthood. Is it really the case that the rationality of the adult depends on a renunciation of concepts subjectively or indeterminately conceived?

The empirical facts available to us suggest that, while childhood conceptions are continually being set aside in the course of development, it is not necessarily the case that they are lost or suppressed altogether. They may continue to exert a real influence on the adult's cognitive activities, among which must be included the institution of linguistic conventions. The world of the child is an ephemeral one, yet the phenomena discussed here give evidence for the preservation and reconstitution of the child's animistic sentiments in the figurative expressions and ANIMACY systems of adults.

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5.2 The Master Argument Structure of the Project

The hypothesis that childhood animism perseveres into adulthood where it gives rise to animistic linguistic conventions can be graphically represented as a three-sided pyramid (here viewed from above):

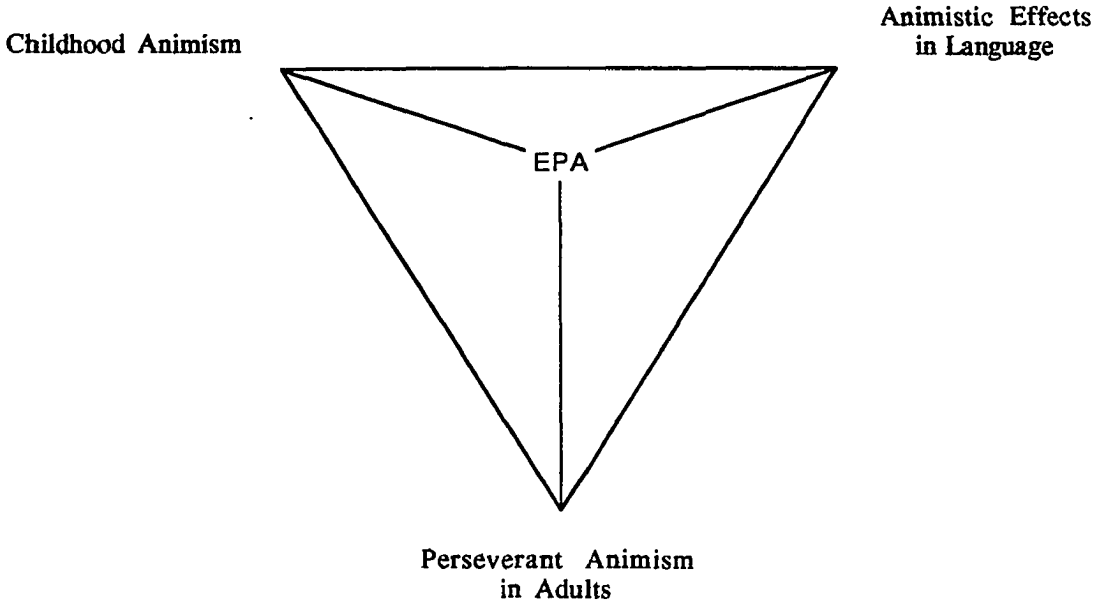


Figure 5. A Tetrahedral Representation of the Dissertation's Hypothesis

The interpretation of this figure is that Childhood Animism, Perseverant Animism in Adults, and Animistic Effects in Language are linked as behaviors of like kind in which entities are grouped and hierarchically ranked in similar ways, and that these behaviors are further united by virtue of sharing a common causal source in EPA considerations. It has been the task of the dissertation to establish the various links shown above. As a retrospect, in Figure 6, the individual arguments developed in the dissertation are mapped onto the pyramidal structure above.

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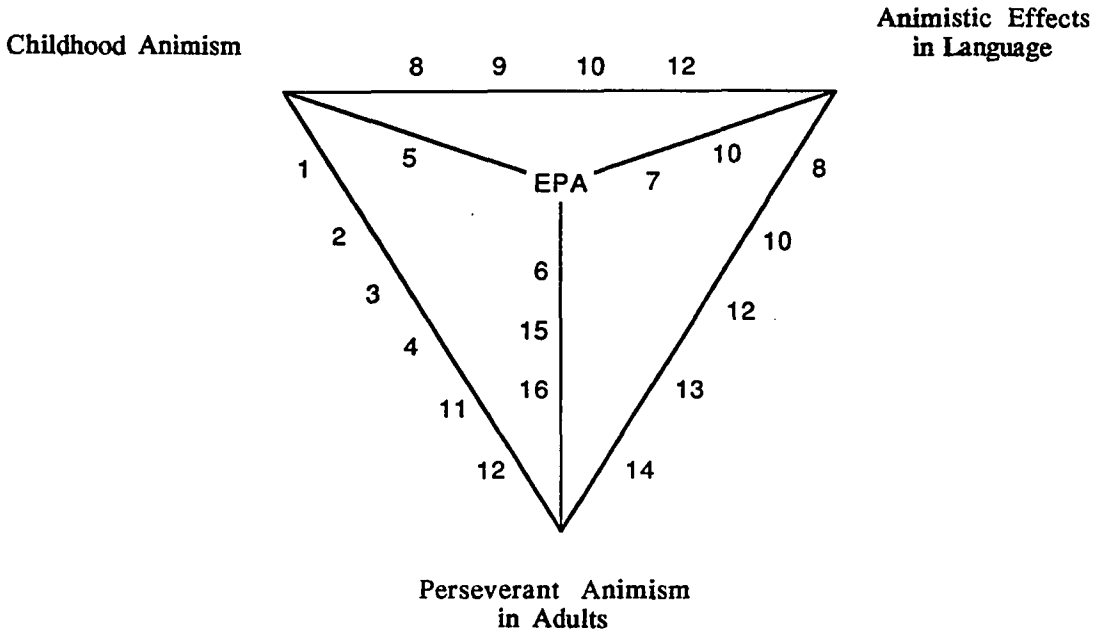


Figure 6. A Tetrahedral Representation of the Dissertation's Argument Structure

1) Experimental psychological studies comparable to the classical Piagetian studies undertaken with children offer prima facie evidence for the perseverance of animistic sensibilities and the preservation of animistic norms in adults (§2.2362).

2) Neurological studies of adult aphasics who have naming difficulties sensitive to the alive-inanimate distinction give some evidence that this distinction is conceptualized in part along animistic rather than biological lines (§2.2363).

3) Literary research suggests that the likelihood that one ontological type of entity (e.g., mammal, insect, tree) will be fictionally transformed into another type of entity is determined by the degree of affective similarity between the two entities. This research gives evidence that plants are judged to be more similar to inanimates than to animal life, and that the degree to which animal life forms are similar to humans is gradient: mammals and birds are more like humans than reptiles etc., and reptiles etc. are more like humans than insects. Hence, the likelihood that a human might be transformed into another type of entity (or vice versa) corresponds to the likelihood that that type of entity would be judged alive by animists: some adult judgments of similarity, and hence transformability, appear to reflect animistic sensibilities (§2.2364).

4) Anthropological studies demonstrate that the same noble inanimates favored by children for animistic attribution are also the animates most likely to be deified in adults' mythologies and magicoreligious systems. Anthropological studies also observe that legal systems treat objects involved in crimes in animistically colored ways (e.g., ritualistic destruction, banishment) (§2.2365).

5) Children offer EPA rationales for their animistic positions (§2.22; 2.32; 2.33).

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6) Animistic adults offer EPA rationales for their animistic positions (§2.2362; 2.32; 2.33).

7) It is EPA considerations which principally underlie the nonbiological senses and figurative usage of basic life- and death-related words (§3.2 et seq.).

8) In the crosslinguistic ANIMACY hierarchy, as in the crosscultural animism hierarchy, the ranking of entities is graded rather than binary (§2.233, §2.234, §2.2362, §3.3 et seq.).

9) In ANIMACY phenomena, as in childhood animism, the 'life status' of an entity is not necessarily fixed across all occasions on which it is considered (§2.233, §2.234, §3.3 et seq., §3.4).

10) The principles which determine the ANIMACY of entities reflect the EPA sensibilities observed in animistic children and animistic adults. Hence, ANIMACY hierarchies are anthropocentric rather than systems of biological fair treatment; ANIMACY distinctions among humans relate to matters of human capacities, prestige and relations rather than to biological life status; whole animals are likely to be regarded as more ANIMATE than body parts, though an animal and an animal's parts are equally alive; plants and lower animals are treated ambivalently in language, and may be classed with either ANIMATES or INANIMATES; dramatically active natural inanimates may be classified in a higher ANIMACY class than quiescent or manmade inanimates; and entities which are physically real, countable or definite in discourse may be regarded as more ANIMATE than inanimates that are abstract, noncountable or less definite in discourse (§2.233, §2.234, §2.2362, §3.3 et seq.).

11) In the empirical research here reported, the animistic preschoolers' Aliveness rankings for seven living and nonliving test entities were in close concordance with the college students' Aliveness rankings of these entities (§4.42).

12) In the empirical research here reported, the college students' and animistic preschoolers' Aliveness ratings gave rise to Aliveness hierarchies which were structurally similar to both the crosscultural animism hierarchy and the crosslinguistic ANIMACY hierarchy (§2.233; 3.31; 4.22; 4.42).

13) In the empirical research here reported, the rank order of the 32 entities in the college students' Aliveness hierarchy correlated impressively with the rank order of these entities in the Navajo ANIMACY hierarchy, a system whose details accord completely with the crosslinguistic ANIMACY hierarchy (§4.52).

14) In the empirical research here reported, when asked to assess the relative Aliveness of entities in 26 special pairs selected to exemplify hierarchical distinctions found in ANIMACY systems around the world, the college students' judgments of relative Aliveness ran in the same direction as the hierarchical distinctions made in language by a margin of 5-1 (§4.22).

15) In the empirical research here reported, the college students' EPA ratings for entities correlated closely with their Aliveness ratings for the entities (§4.22).

16) In the empirical research here reported, the breaks or steps between levels in the college students' Aliveness hierarchy corresponded to breaks between levels in their Embodiment, Purposiveness, and Activity hierarchies (§4.22).

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APPENDIX A

A GLOSSARY OF SWAHILI LIFE- AND DEATH- RELATED WORDS

The parenthesized notation **(not JR)** indicates that the word or the sense being considered is not in the idiolect of my primary language consultant, Josephat Rugemalira.

The category 'incorporeals' is diverse, comprising abstract concepts (e.g., fairness, equality, symmetry, interval, eon), natural forces (e.g., gravity, electromagnetism), states of affairs (e.g., imbalance), states of being (e.g., pain, confidence), emotions (e.g., anger), qualities (e.g., beauty, redness, opacity), activities (e.g., campaigning, procrastination), events (e.g., the county fair), periods of time (e.g., the last week in June), institutions (e.g., congress), regions (the Pacific Northwest, the outskirts of town), and other diverse intellectual objects (e.g., democracy, game theory, fauvism, piety). What they have in common is a lack of physical form — though to be sure, congress is constituted by its elected officials, pain is physicalized as the suffering of individuals, fauvism is realized in a body of specific artworks, etc. The diversity of incorporeals makes it difficult to assess the selectional restrictions regarding them. When it is said that a given word can be used in connection with incorporeals, this must be taken to mean that it can be used in connection with at least some incorporeals.

Occasionally, it will be noted in square brackets that a word or a sense appears only in the work of a single lexicographer; e.g., [in Krapf only]. This may be of historical interest; e.g., Krapf worked 100+ years ago and was not followed by another lexicographer for 60 years.

Nouns are cited in their singular form, followed in parentheses by their plural marker; e.g., mtu, n. (wa-).

In Arabic etymological notes, long vowels are represented as doubled vowels; ḥ is represented as h; š is represented as sh.

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Main Entries

Basic Vocabulary Related to the Concept {Alive}:

hai	(< Arabic) 'alive'
ishi	(< Arabic) 'live (through time); stay'
mimba	'fetus'
mwili	'body'
-zima	'alive; healthy; functional; mature; whole'

Basic Vocabulary Related to the Concept {Dead}:

fa	'die'
fariki	(< Arabic) 'part company; depart from; die'
haribu	(< Arabic) 'spoil; miscarry a fetus'
kauka	'dry up; (for a plant to) die'
kipinda	'carcass'
maiti	(< Arabic) 'corpse'
mauti	(< Arabic) 'death'
mwili	'body; corpse'
mzoga	'carcass'
toa	'put out; abort a fetus'
ua	'kill'

Additional Forms of Interest:

isha	'bring to an end; finish off (i.e., kill somone)'
nyauka	'dry up; shrivel'
zima	'extinguish, burn out, dry up, rub out, quell'

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fa v.

1. perish; die; cease to live.

Restrictions: used only in connection with humans (except fetuses) and animals. Fetuses do not 'depart,' but rather 'go out' or are 'taken out,' or more simply 'spoil' (see **toa** and **haribu**).

kufa kwa maradhi
'to die from disease'

kufa kwa baridi
'to die from cold'

kufa (kwa) njaa
'to die from hunger'

kufa (kwa) jua
'to die from sun (i.e., from sunstroke)'

kufa (kwa) maji
'to die from water (i.e., to drown)'

jahazi ilizama na akthari ya abiria walikufa maji
ship sunk and most of passengers died of-water
'the ship sunk and most of the passengers drowned'

mdudu aliyekufa
insect which-has-died
'the insect which has died / the dead insect'

* mimba iliyokufa
fetus which-has-died
'the fetus which has died / the dead fetus'

mimba iliyotoka
fetus which-has-gone-out
'the fetus which has miscarried / the fetus which has died'

Collocation: kufa kingoto
I.e., to endure hardship without complaining.

Collocation: kufa kiofisa
to-die like-an-officer
I.e., to continue performing one's duties in order not to lose face and to fulfill one's obligations, even in the face of inconvenience or personal hardship; to endure all hardships without grumbling.

Collocation: kufa kikondoo
to-die like-a-sheep
I.e., to bear hardship without protesting; submit without protest.

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nina hiari kufa kikondoo kuliko kwenda kukopa
I-have willingness to-die like-a-sheep (rather)-than go to-borrow
'I would rather bear this hardship than go to ask for a loan'

Collocation: kufa (au/na) kupona
to-die (or/and) to-recover
I.e., to do or die.

nitamlipa kwa dhuluma hii, kufa kupona
I-shall-repay-him for injustice this, to-die to-get-well
'I shall pay him back for this injustice, do or die'

2. cease to be, function, operate; come to an end; hence, lose strength, fade, decay.

Restrictions: used most readily in connection with inanimates, though its use is not unrestricted. **Kufa** can also be used in connection with at least some incorporeals, though complete acceptability is not always ensured.

njia imekufa
path has-died
'the path has fallen into disuse'

saa imekufa
watch/clock has-died
'the watch/clock is broken, has stopped'

gari limekufa
car has-died
'the car has broken down'

mipango imekufa
plans have-died
'the plans have fallen through, have been abandoned'

desturi inakufa
custom is-dying
'the custom is dying (i.e., is disappearing)'

matumaini yameniisha 'hopes have ended on me'
? matumaini yamekufa 'hopes have died on me'

moto umezimika
fire went-out; was-quenched
'the fire went out'

* moto umekufa
fire has-died
'the fire has died out'

wino umekuisha
ink has-finished-off/run-out
(*said of a pen*) 'the ink is all gone; the pen has run dry'

* kalamu imekufa
pen has-died
'the pen has stopped working'

Collocation: wanachama waliokufa 'members who died'; cf. wanachama hai 'living members' under **hai**.

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In Tanzania, in the 1980's, inactive members of the Chama cha Mapinduzi (Party of Revolution) began to be referred to as 'wanachama waliokufa'. The phrase could be ambiguously interpreted as either 'members who (biologically) died' or 'members who have become (politically) inactive'. The 'inactive' sense is restricted to just this one context: other organizations do not refer to inactive members in this way.

Collocation: kufa ganzi 'to become numb' (lit., 'to die' + 'numbness')
mkono umekufa ganzi
arm has-died numbness
'the arm is benumbed, is asleep'

Restrictions: used idiomatically in connection with body parts, but not in connection with a whole body - e.g., in connection with a sleeping or anesthetized person. Passive expressions involving the passive form, fiwa, of the prepositional form, fia, are disallowed: e.g., an arm cannot 'go numb on' someone.

Proverb: Heri kufa macho kuliko kufa moyo.
better to-die eyes rather-than to-die heart
Better for one's eyes to die than for one's heart to die;
i.e., Better that one go blind than that one's spirit be lost.

Note: JR can in his native language, Runyambo, say 'eyes die' to mean 'go blind'; however, this locution is not acceptable to him in Swahili.

Proverb: Sikio la kufa halisikii dawa.
ear of death does-not-hear medicine
The dying ear does not hear medicine;
i.e., A person who is destined for a bad end will not heed any warning.

3. be consumed or overwhelmed by feeling (e.g., by desire or by suffering).

Restrictions: used only in connection with humans (except fetuses). The occasions on which one can 'die' in the suffering sense are roughly the same as in English. The occasions on which one can 'die' in the desiring sense are more restricted than in English. E.g., one cannot in Swahili 'by dying for a beer,' 'be dying to get out of class,' etc.

nakufa kwa baridi
'I'm dying from this cold weather; this cold weather is killing me'

nakufa kwa kiu
'I'm dying of thirst'

nakufa kwa njaa
'I'm dying of hunger'

nakufa kwa aibu
'I'm dying of shame'

nimekufa kwa mapenzi
I-have-died of love
'I've died of love'
In this usage, the love being discussed is not necessarily unrequitted.

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nakufa kwa msichana yule
'I'm dying for that girl'

namfia msichana yule
'I'm dying for that girl'

nimekufa juu yake
I-have-died on-account-of his/her
'I have died on his/her account'
Note: the 'cause of death' can only be love.

Collocation: kufa kucheka
to-die to-laugh
'to laugh loudly and excessively; to die laughing'

nilikufa kucheka kwa mikasa yake
I-died to-laugh from stories his
'I died laughing from his stories'

Related forms:

fia prepositional form

1. to die at (a location).

Restrictions: used in connection with the death of humans (except fetuses), animals, and insects — but not in connection with plants.

fia bahari
'die at sea'

fia bara
'die up country'

2. to die on (someone).

Restrictions: see the entry below for **fiwa**.

gari imenifia	'car has-died-on-me'	'the car has died on me'
baisikeli imenifia	'bicycle has-died-on-me'	'the bicycle has died on me'
saa imenifia	'watch has-died-on-me'	'the watch has stopped on me'
* kalamu imenifia	'pen has-died-on-me'	'the pen has dried up on me'
** moto imenifia	'fire has-died-on-me'	'the fire has gone out on me'

3. to cease to be or function at (a location).

Restrictions: used only in connection with (some) inanimates and (some) incorporeals.

gari yangu imefia barabarani
car my has-died on-the-road
'my car broke down on the road'

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matumaini yake yalifia marekani
hopes his/her died-in America
This is a much stronger statement than matumaini yake yaliishia marekani 'his/her hopes came to an end in America'.

* bahati yake ilifia marekani
luck his died-at America
'his luck died in America'

fiwa passive form of the prepositional form **fia**

1. have someone 'die on' another; to 'lose someone'; i.e., have a death in one's family or among one's friends.

Restrictions: the deceased entity and the bereaved entity can be either human (excluding fetuses) or animal (excluding insects). Higher animals (especially, domestic animals or pets) are definitely preferred. Since use of the verb form suggests a social or familial relationship between the deceased and the bereaved, it is most felicitously used in connection with human beings. The degree to which you can extend the usage to animal life depends on the degree to which you feel that such a relationship obtains between the animals being considered. In connection with fish, crustaceans, insects, etc. the usage becomes highly improbable. The emotional intensity of the form is roughly equivalent to that of English **lose**, as in 'She lost her brother in the war.' However, this translation fails to fully capture the oblique sensitivity of the passive form, which is definitely preferred over the active form **fia** in the reporting of human death.

tumefiwa nyumbani
one-has-died-on-us household/family
'one of our relations has died; we have lost one of our relatives'

nimefiwa na ng'ombe wangu
I-was-died-on by cow my
'my cow died on me; I lost my cow'

mtoto wa simba alifiwa na mama yake
child of lion was-died-on by mother its
'the lion cub lost its mother'

kobe huyu amefiwa na watoto wake
tortoise this was-died-on by children its
'this (e.g., mother) tortoise lost its children'

2. for an object to cease to function (for someone)

Restrictions: the entity which does the 'dying' must be an inanimate, while the entity which is 'died on' must be human. **Fiwa** is not used in connection with all inanimate entities: the form is perhaps most felicitously used in connection with machines. To some degree, the direct form **fia** seems preferable to **fiwa** in connection with inanimates: after all, there is no need for the obliqueness of a passive form in reporting the 'death' of inanimates. (Note: In Runyambo, **fiwa** is more readily used in connection with inanimates to indicate that they have ceased to function.)

nimefiwa na gari	I-was-died-on by car	'the car died on me'
nimefiwa na baisikeli	I-was-died-on by bicycle	'the bicycle died on me'

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? nimefiwa na saa	I-was-died-on	by	watch	'the watch stopped on me'
* nimefiwa na kalamu	I-was-died-on	by	pen	'the pen dried up on me'
** nimefiwa na moto	I-was-died-on	by	fire	'the fire went out on me'

jifia < **ji** reflexive + **fia** prepositional form

1. die on oneself; i.e., pass away.

Restrictions: can only be felicitously used in connection with humans (excepting fetuses). As with **fiwa**, the use of the verb form expresses something about the relationship between the deceased and the bereaved. With **jifia**, the empathy of the speaker is expressed by his gentle reference to the death of the bereaved via a morphologically shrouded verb form. The use of **jifia** in Swahili is much like the use of **pass away** in English, but the Swahili form carries with it even more personal feeling. Hence, this form can only be felicitously used in connection with departed humans. To use the form in connection with animals (e.g., pets or dear domestic animals) would require very special circumstances indeed.

amejifia
he-has-died-on-himself
(*empathetically*) 'he passed away'

jifia kwa uwongo
'he died to himself (i.e. destroyed himself) with lies' (not JR) [in Krapf only]

kifo n. (vi-) cp. **mauti** '(human) death' and **mwisho** 'end'

1. death (conceived of as an event).

Restrictions: used in connection with humans (except fetuses) and with animals (though it would only be under unusual circumstances that one would refer to the death of insects). Not used in connection with plant life.

kifo chake kiliuwa cha mateso
death his was of pain
'his death was painful'

kifo cha mtu yule
death of person that
'the death of that person'

kifo cha ng'ombe yule
'the death of that cow'

kifo cha panzi kilisababishwa na madawa
death of grasshoppers was-caused by chemicals
'the extermination of the grasshoppers was effected by chemicals.'

* kifo cha maua yale
'the death of those flowers'

Proverb: kifo cha panzi; furaha ya kunguru
death of grasshoppers; joy of crows

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I.e., the death of grasshoppers is the joy of crows.

2. cessation.

Restrictions: used only in connection with some incorporeals. Note that **kifo** is not used in connection with inanimates.

mwisho wa ujamaa
end of socialism
kifo cha ufashisti katika Italia
death of fascism in Italy
Note: One makes a much stronger statement by using **kifo** 'death' instead of **mwisho** 'end.' And in almost every case, **mwisho** would be preferred.

* kifo cha matumaini	mwisho wa matumaini
death of hopes	end of hopes

* kifo cha gari yangu kilitegemewa
death of car my was-expected
'the death of my car was expected'

fariki v. (cp. Swah. **faraka** 'division, sect'; Arabic **faraqa** 'to divide, part')

The root here centrally relates to 'separating; dividing off; dividing away,' and hence to notions of disagreement, alienation, sectarianism, departure and death. Some of these senses today receive less lexical support than they did in Krapf's time (note the entries labelled [in Krapf only]): however, the 'die' sense has come to be at least co-equal with the 'division' senses and, in some dialects (such as JR's), **fariki** is only used in the sense of 'die.' Relative to **fa**, **fariki** has the same softened oblique sense in Swahili that **pass away** and **depart** have in English relative to **die**.

1. depart from, part company with (not JR).

2. die, decease.

Restrictions: used only in connection with humans (except fetuses).

Collocation: fariki dunia
depart the-world
I.e., 'die'

hai adj. (cf. Arabic **hayy** [and also **ahyaa'**] 'living, alive; lively, active, energetic, lusty, unbroken, undaunted; living being; tribe, tribal community')

1. alive, living, animate.

Restrictions: can be used in connection with anything which is biologically alive, but not in any extended senses with inanimates or incorporeals. **Hai** can be used in connection with body parts and fetuses but, in the normal course of events, an occasion for such use

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is unlikely to arise. The word can be used in connection with fetuses if, for example, one needs to speak of the life of the fetus independently from the life of the mother. Normally, however, one conceives of these lives as united. To say that a mimba 'fetus' has uhai suggests that the mimba has a life of its own, and this paradoxically suggests that the mimba is an mtoto 'child' rather than a fetus. Hence, the use of **hai** in connection with fetuses is always awkward, even though **hai** properly describes the life status of the fetus. The word can be used in connection with body parts if, for example, one needs to distinguish between body parts which are alive and body parts which are not alive (e.g., the scalp vs. hair). Again, the occasions which permit such usage seem contrived. References to the life of plants seem awkward, and are likely to occur only under special circumstances, e.g., in botanical discussions.

bayolojia ni elimu ya viumbe vyenye uhai
biology is learning/study of (created)-things with life
'biology is the study of living things'

? uhai wa mimba
life of fetus
'the life (i.e., the being alive) of the fetus'

? kucha si hai lakini vidole viko hai
fingernails are-not alive but fingers are alive

kucha hazina uhai lakini vidole vina uhai
fingernails have-not life but fingers have life
Note: expression in this format is more acceptable and definitely preferred to the format above.

? nywele si hai
hair not-be alive
'hair is not alive'

nywele si sehemu hai ya mwili
hair not-be part living of body
'hair is not a living part of the body'
Note: this is more acceptable than the entry above.

kucha si sehemu hai ya mwili
fingernails not-be part living of body
'fingernails are not a living part of the body'

ndege bado yu hai
bird still be alive
'the bird is still alive'

samaki hai
fish alive
'a live fish'

? mti hai
tree alive
'a live tree'
Note: acceptable in a botanical discussion; pedantic for a laymen.

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* mti ule si hai
tree that not-be alive
'that tree is not alive'
Note: a layman would never say this.

mzimu hauna uhai
ghost has-not life
'a ghost is not alive'

mzimu si kitu hai
ghost is-not thing living
'a ghost is not a living thing'

Collocation: wanachama hai 'living (i.e., active) members (of the Chama cha Mapinduzi — i.e., Party of Revolution)'; cf. wanachama waliokufa 'members who died (i.e., have become inactive)' under **fa.**

A related form:

uhai abstract n.

1. life or being alive (from a biological perspective); biological life in general.

Restrictions: can be used in connection with all living things; however, reference to the life of body parts independent from the life of the whole body would require a special circumstance, as would reference to the life of the fetus independent from the life of the mother. Even given a suitable circumstance, use in connection with fetuses would remain awkward. In connection with plants, **uhai** would probably only be used if one were engaged in a scientific discussion, or relating a scientific point of view. The word is not used, even in any extended senses, with inanimates or incorporeals.

mwanadamu atagundua siri ya uhai
child-of-Adam will-discover secret of life
'Mankind will discover the secret of life'

wakati wa uhai wake
time-period of being-alive his
'his lifetime'

? uhai wa mimba
life of fetus
'the life (i.e., the being alive) of the fetus'

? mimba ni kiumbe chenye uhai
fetus is created-thing with life
'the fetus is a living entity'

? mimba ikitoka inapoteza uhai
fetus if-it-goes-out it-loses life
'if a fetus miscarries, it dies'

kucha hazina uhai lakini vidole vina uhai
fingernails have-not life but fingers have life

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wadudu wana uhai kama simba walivio na hai
insects have life as lions are with life

mimea ni viumbe vyenye uhai
plants are created-things with/having life

mzimu hauna uhai
ghost has-not life
'a ghost is not alive'

2. lifetime, the period of one's being alive. (not JR)

anakumbuka uhai wake [Rechenbach]
he-is-calling-to-mind life his
'he is reviewing his life (history)'

3. existence. (not JR) [in Rechenbach only] (dubious usage).

haribu v. (cf. Arabic xaraba 'destroy, devastate, wreck, lay waste')

1. destroy, damage, ruin, spoil, injure, demoralize.

2. (*in connection with a fetus*) miscarry, cause to be miscarried, kill. Note: if the speaker wanted to indicate that the fetus had been aborted, he would use **toa** 'put out.'

madawa haya yanaharibu mimba
drugs these they-spoil fetus
'these drugs (can) kill a fetus; these drugs (can) cause miscarriage'

yule mama ameharibu mimba mara nyingi
that mother/woman has-spoiled fetus times many
'that woman has had many miscarriages'

Collocation: haribu mimba [Rechenbach only]
spoil fetus
'procure abortion'

isha v.

1. (*in connection with some inanimates and some incorporeals*) end, come to an end, bring to an end, make an end of, finish, close, complete.

ugomvi umekwisha
'the dispute has been ended'

kwisha kazi
'to finish a job'

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2. (*in connection with humans*)finish off, i.e. kill.

alipigana nao akawaisha
he-fought-with-them and-these he-finished-them-off
'he fought with them and finished them off (i.e. killed them)'

A related form:

mwisho

1. n. (mi-) time or place or manner or means of ending, or bringing to an end; end, result, conclusion, final step, extreme limit, consummation, annihilation, death.

2. adv. finally, lastly.

ishi v. (cf. Arabic 'aasha [and also 'aish, 'iisha, ma'iish, ma'iisha, ma'aash] 'to live, be alive')

1. (for biologically living things to) live (through a period of time).

Restrictions: used only in connection with the lifetimes of humans (including fetuses) and animals. **Ishi** is not used in connection with body parts, inanimates, or incorporeals. **Ishi** makes reference to living as a process continuing through time, and so maintains a certain tension with:

dumu	'last'
chukua	'carry; take; take (a certain length of time)'
kaa	'stay, remain'
endelea	'go on, advance, progress, continue'

In connection with plants, lay speakers are very likely to favor **kaa**, while **ishi** would be awkward. In connection with fetuses, some speakers may prefer **ishi** while others prefer **kaa** while others feel equally at ease (or equally awkward) using both.

nimeishi miaka arubaini
I-have-lived years forty
'I've lived forty years; I am forty years of age'

aishi milele
may-he-live forever
'may he live forever'

kuishi pamoja kwa amani
to-live together in peace
'peaceful coexistence'

inzi huishi siku kumi
fly lives days ten
'a fly lives ten days'

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mtu huishi miaka hamsini
man lives years fifty
'a man lives fifty years'

mimba ikitoka haiendelea kuishi
fetus if-it-goes-out does-not-continue to-live
'if a fetus miscarries, it does not continue to live

Mozart hakuishi sana
Mozart not-live much
'Mozart didn't live long'

yule mtoto mgonjwa hakuishi muda mrefu
that child sick not-live time-period long
'that sick child didn't live long' (e.g., the child died after a few years of life)

yule mtoto mgonjwa hakukaa muda mrefu
'that sick child didn't stay long' (e.g., the child died a few hours after birth)

yule ndama mgonjwa hakuishi/hakukaa muda mrefu
that calf sick didn't-live/didn't stay time-period long
'that sick calf didn't live long'

mwanahewa yule hakuishi sana
astronaut (< mwana 'child' + hewa 'air') that not-live much
mwanahewa yule hakuishi maisha marefu
astronaut that not-live lifetime long
'that astronaut didn't live long'

mwanahewa yule hakudumu sana
'that astronaut didn't last long' (e.g., in the G-force test)

mwanahewa yule hakukaa sana
'that astronaut didn't stay long' (e.g., in NASA, on Mars, etc.)

mmea nilionunua haukudumu/haukukaa/? haukuishi sana
plant which-I-bought /didn't-last/didn't-stay/? didn't-live much
'the plant which I bought didn't live long'
Note: haukuishi might be acceptable in a botanical discussion.

Note: When it is said of the astronaut that he didn't 'stay' or 'last', it is not assumed that the astronaut died; however, when it is said that a plant didn't 'stay' or 'last', it is assumed that the plant died.

mmea uliishi miaka miwili
plant lived years two
'the plant lived two years'
(acceptable to a biologist or botanist)

mmea ulikaa/ulidumu miaka miwili
'the plant stayed/lasted (i.e., lived) two years'
(preferred by laypeople)

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* mkutano umeishi masaa mawili
mkutano umedumu masaa mawili
mkutano umechukua masaa mawili
mkutano umeendelea kwa masaa mawili
meeting has-lasted (for) hours two
'the meeting has gone on for two hours'

* chama cha wafanyakazi hakikuishi muda mrefu
chama cha wafanyakazi hakikudumu muda mrefu
union of workers not-last time-period long
'the workers' union didn't last long'

* karanga hazikuishi sana
karanga hazikudumu sana
karanga hazikukaa sana
peanuts not-last much
'the peanuts didn't last long' (i.e. they were quickly eaten up)

2. dwell

Restrictions: used only in connection with humans (including fetuses) and animal life. **Kaa** 'stay' may be used in connection with all animal life as an alternative to **ishi**. In connection with inanimates, only **kaa** may be used. In connection with plant life, neither **kaa** nor **ishi** may be used: **patikana** 'be found in; be obtainable in' is preferred.

Wanyambo wanaishi/wanakaa Karagwe
Wanyambo dwell/stay Karagwe
'the Wanyambo people live in the Karagwe district'

simba huishi/hukaa porini
'lions dwell/stay in the wilderness'

mende huishi/hukaa majumbani
'cockroaches dwell/stay in houses'

mimba huishi/hukaa tumboni miezi tisa
fetus dwells/stays in-stomach months nine
'the fetus lives/stays in the mother for nine months'

gari *huishi/hukaa gerejini
'a car *dwells/stays in the garage'

matumaini *huishi/hukaa moyoni
'hopes *dwell/stay in the heart'

mana *huishi/*hukaa/hupatikana bustanini
'flowers *dwell/*stay/are found in the garden'

3. exist (not JR) [in Rechenbach only] (dubious).

A related form:

maisha n. (only common in this plural form), adv.

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1. lifetime, life, period of living; mode of life.

Restrictions: can be used in connection with humans (except fetuses), animals, and plants. The time that a fetus spends in the womb is not considered to be a lifetime; rather, a lifetime begins at birth. The use of **maisha** in connection with body parts is very unlikely outside of special circumstances, e.g., a discussion among doctors about the relative longevity of different organs.

nitakaa hapa maisha
I-will-stay here lifetime
'I will live here my whole life'

maisha pamoja kwa salama
lifetime together in peace
'peaceful coexistence'

maisha mengi
lifetime much
'long life'

In grave circumstances, one might remark to a third person:

hana maisha marefu
he-does-not-have lifetime long
'he does not have long to live'

maisha na milele
for-life and for-eternity
'for ever and ever'

usitufunge maisha yetu
do-not-imprison-us lifetime our
'do not imprison us for life'

mpaka maisha
until lifetime
'until life ends, the whole life long'

mti una maisha marefu zaidi kuliko ua
tree has lifetime long more than flower
'a tree has a longer lifetime than a flower'

maisha ya mgomba ni miaka miwili kwa wastani
lifetime of banana-tree is miaka two on average
'the lifetime of a banana tree is roughly two years'

Collocation: maisha maovu
lifetime evil
'evil/riotous living'

2. lifetime (in the sense of duration; duration of usefulness).

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Restrictions: used in connection with inanimate objects, and in connection with (some) incorporeals. The use of the word in connection with body parts is likely to be unacceptable, since body parts are not conceived of as having any lifetime which is separate from the lifetime of the whole organism. Hence, for example, the unacceptability of

* maisha ya masikio/macho/vidole/mapafu
lifetime of ears/eyes/fingers/lungs

However, one can indirectly or idiomatically warn another person to consider the health and safety of his ears, eyes, fingers, or lungs by making reference to their lifetime as a way of making reference to their essential mortality and fragility:

masikio yako yana maisha mafupi
macho yako yana maisha mafupi
vidole vyako vina maisha mafupi
mapafu yako yana maisha mafupi
ears/eyes/fingers/lungs your have lifetime short
'your ears/eyes/fingers/lungs have a short lifetime'
I.e., be careful or your ears/eyes/fingers/lungs won't last long; be careful, your ears/eyes/fingers/lungs are only mortal.

Similarly, it could be said to a person who leads a riotous life:

una maisha mafupi
you-are-with lifetime short
(*roughly*) 'your days are numbered'

In the sense of 'duration; duration of usefulness,' however, **maisha** is used with the most felicity in connection with inanimates:

Land Rover ina maisha marefu
Land Rover has life long
'a Land Rover has a long life'

mti huu una maisha marefu
tree this has lifetime long
'this wood is very durable'

maisha ya charmed particles ni mafupi
duration/lifetime of charmed particles is short

maisha ya taifa yanaweza kuwa marefu au mafupi
duration/lifetime of nation can be long or short

*mawazo ya Plato yamekuwa na maisha marefu
ideas of Plato have-been with life long
'Plato's ideas have had a long lifetime'

mawazo ya Plato yamedumu sana
ideas of Plato have-lasted much
'Plato's ideas have lasted a long time'

3. age. (not JR) [in Krapf only, who equates it with **umri**]

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kauka v.

1. dry up; be parched; become dry, stiff, and hard.

Restrictions: used only in connection with inanimates and plants (see sense 2 below). **Kauka** can only be used in connection with animal life if it is being said that the dead bodies of the animals are drying up: **kauka** is not used to mean 'dehydrate; wither; atrophy' (cp. **kaukiana**).

mto umekauka
'the stream has dried up'

nchi imekauka
'the earth has parched'

*matumaini yalikauka
hopes dried-up

* pendo lilikauka
love dried-up

* mkono umekauka
arm has-dried-up
mkono umepooza
arm has-ceased-functioning
mkono umedhoofu/umedhoofika
arm has-become-feeble

nimekauka
I-have-dried-up
(*colloquial*) 'I am broke (i.e., without money)' (not JR)

Collocation: sauti imemkauka
'his voice has dried up; he is hoarse'

Collocation: damu imemkauka
blood has-dried-up-on-him
said of a person whose weight has diminished, whose health has been ruined.

2. (for a plant) to die.

Restrictions: used only in connection with plants. When it is said of a plant that it has 'dried up,' this is accepted as the normal (and in fact the only) way to affirm that the plant has died. In consequence, a dead plant, even if physically soaking wet, will be referred to as 'dried up.' If the speaker wants to affirm that the plant has dehydrated to a degree but is not yet dead, then he will use **nyauka** 'dry up; shrivel' (cp. **nyauka**).

mti umekauka 'the tree has dried up (i.e., died)'
* mti umekufa 'the tree has died'
** mti umefariki 'the tree has departed (i.e., died)'

tulikwenda katika tingatinga kukata matete lakini yalikuwa yamekauka
we-went to marsh to-cut reeds but they-were they-have-dried-up

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'we went to the marsh to cut reeds but they were dead'

yale matete makavu yalikuwa na maji mengi,
those reeds dry they-were with water much,
kwa hiyo tuliyaweka juani ili yakauke
for that we-put-them sun-in so-that they-dry
'those dead reeds were soaking wet, therefore we put them in the sun so that they would dry'

Related forms:

kaukiana reciprocal prepositional form

1. become all dried up, become bone dry, become absolutely stiff.
Restrictions: used only in connection with inanimates and plants.

rangi yangu imekaukiana juwani
paint my has-dried-up sun-in
'my paint has dried up in the sun'

Collocation: askari wamekaukiana
soldiers be-dried-up
I.e., for soldiers to stand stiffly at attention

2. waste away, lose weight, become shriveled or emaciated.

Restrictions: used only in connection with humans (excluding fetuses), animals and plants. In connection with humans, **dhoofika** or **dhoofu** 'become feeble' or **konda** 'emaciate, pine, grow thin' might be preferred. **Kaukiana** is not used in connection with insects: the Swahili speaker has neither the interest nor the criteria to identify cases of insect emaciation. Not used in connection with body parts. (cp. **nyauka**, sense 2)

mtu yule amekaukiana kwa kukosa chkula
person that has-dried-up from lacking food
'that person has wasted away from lack of food'

ng'ombe wamekaukiana kwa kukosa majani
cows have-dried-up from lacking grass
'the cows lost weight from lack of grass'

mahindi yamekaukiana
maize has-shriveled-up

* mkono (uliopooza) umekaukiana
arm (which-ceased-functioning) has-dried-up
'the arm has shriveled, atrophied'

- **kavu** adj.

1. dry, parched, waterless.

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Restrictions: used only in connection with inanimates and plants. **-kavu** cannot be used in connection with animal life to mean 'thirsty' or 'emaciated,' or in connection with body parts to mean 'stiff.'

nchi kavu
land dry
'dry land' (as opposed to bahari 'sea')

kuni kavu
firewood dry
'dry firewood'

nguo kavu
clothes dry
'dry clothes'

* goti kavu
knee dry
'stiff knee'

Collocation: maiti kavu (JR would prefer a verbal form)
corpse dry
'a corpse in a state of rigor mortis'

Proverb: maji mafu, mvuvi mkavu
(at) neap tides, fisherman parched
'at the neap tide, the fisherman gets little'

2. dried up and dead.

Restrictions: used only in connection with plants.

mti mkavu hautoi matunda
tree dry does-not-produce fruit
'a dry/dead tree produces no fruit'

3. dry, satirical, sarcastic, impudent, deceitful, intrepid, nonchalant. (not JR)

mtu mkavu
person dry
'a sly, deceitful person'

Collocation: mkavu wa macho / mwenye macho mkavu
dry of eyes / with eyes dry
I.e., said of an impudent, intrepid, nonchalant person.

kipinda

1. n. (vi-), carcass of an animal which has died a natural death (not JR); cadaver [Rechenbach only] (not JR).

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2. adv., curled up; bent up.

Collocation: kufa kipinda [Rechenbach]; kufa upinda [Johnson]; kufa kwa kipinda [Johnson]. (none of these variations are JR)
to-die curled-up
I.e., to curl up and die; hence, to die a natural death.

A related form:

pinda, v.

1. bend , fold; be convulsed.

maiti n. (cf. Arabic mayyit 'dead,' maita 'corpse') (cp. **mzoga** 'carcass'; **mwili** 'body'; **kipinda** 'animal which has died naturally')

1. human corpse.

Restrictions: used only in connection with humans (excluding fetuses). Note that fetuses are not mourned; neither are there burial ceremonies established for fetuses.

maiti ya mtu	'corpse of a person'
* maiti ya mimba	'corpse of a fetus'
* maiti ya mnyama	'corpse of an animal'
* maiti ya mdudu	'corpse of an insect'
* maiti ya mti	'corpse of a tree'

mauti n. (cf. Arabic maut 'death')

1. death

Restrictions: used only in connection with humans. Cp. **kifo** 'death (of animal life),' **-kavu** 'dried up; dead (for plants), **mwisho** 'end.'

mauti ya mtu yule
death of person that
'the death of that person'

* mauti ya ng'ombe yule
'the death of that cow'

* mauti ya maua yale
'the death of those flowers'

** mauti ya gari lile
'the death of that car'

** mauti ya ujamaa
'the death of socialism'

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mwisho wa ujamaa
'the end of socialism'

Collocation: patwa na mauti
to-be-gotten by death
'to die'

alipatikana na mauti
he-was-gotten by death
'he met his death'

mimba n.

1. fetus

Collocation: shika (chukua, tunga) mimba
take hold of (carry, put together) fetus
'be pregnant; become pregnant'
cp. mke wangu ana himila
wife my has load
'my wife is with child'

Collocation: tia mimba
place/set/cause/bring-about fetus
'cause to become pregnant'

2. ear of a plant

mtama unafanya mimba
millet is-formng ear
'the millet is just forming in the ear'

mwili n.

1. body (living or dead); trunk of body.

Restrictions: used only in connection with humans (excluding fetuses). As in English, **mwili** can be used as a synonym for **maiti** 'corpse.'

mwili wake utaletwa kwa ndege
body his will-be-brought by bird
'his body will be brought by plane'

mzoga n.

1. dead body of an animal; carcass.

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Restrictions: ordinarily only used in connection with animals (except insects). In connection with insects, the use of **mzoga** is awkward. However, assuming that some speaker had an interest in the dead body of an insect, he might favor the lexically efficient single word **mzoga** over the circumlocution **mdudu aliyekufa** 'the insect which died.' Under no circumstances can **mzoga** be used in connection with a plant or a fetus, where phrasal forms would have to be used (**mti mkavu** 'the dried tree'; **mimba iliyotoka** 'the fetus which has gone out'). While Johnson and Rechenbach affirm that **mzoga** could be used to mean 'human corpse,' these lexicographers may have just been referring to the fact that, as with English **carcass**, **mzoga** can be used to dehumanize a human corpse; e.g., in reference to a body which a murderer has butchered. The word is not used in connection with inanimates to mean 'framework, base structure, stripped remains' (though a creative usage of this type might well be accepted).

mzoga wa mnyama	'carcass of an animal'
? mozoga wa mdudu	'carcass of an insect'
* mozoga wa mtu	'carcass of a person'
* mozoga wa mimba	'carcass of a fetus'
* mozoga wa mti	'carcass of a tree'

nyauka v.

1. dry up.

Restrictions: used only in connection with plants. **Nyauka** is used when the state of being dried up is less severe than the state referred to by **kauka**; hence, it is not affirmed that the dried up plant has died.

ua limenyauka
flower has-wither

mahindi yamenyauka
maize has-withered

* rangi yangu imenyauka juwani
paint my has-dried-up sun-in
'my paint has dried up in the sun'

nguo zangu *zimenyauka/zimekauka/zimekaukiana juwani
clothes my have-dried-up sun-in
'my clothes have dried out in the sun'

2. shrivel from heat or drought, wither, emaciate. (= **kaukiana**)

Restrictions: used in connection with humans (excluding fetuses), animals, and plants. However, in connection with all entities except plants, **kaukiana** would be preferred. In connection with humans, **dhoofika** or **dhoofu** 'become feeble' or **konda** 'emaciate, pine, grow thin' would be preferred. **Nyauka** cannot be used in connection with body parts to mean 'wither; atrophy.' **Nyauka** is not used in connection with insects: the Swahili speaker has neither the interest nor the criteria to identify cases of insect emaciation.

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mtu amenyauka (= mtu amekaukiana)
person has-withered
'the person has lost weight, has emaciated'

mtu amedhoofu / mtu amedhoofika
'the person has became feeble'

* mkono umenyauka
'the arm has withered'

toa v. (cp. **haribu**)

1. One of the commonest verbs in Swahili, with a central sense of 'put out; take out.' In a widely used collocation, it may refer to the abortion of a fetus. It may also refer elliptically to murderous intent.

Collocation: kutoa mimba
to-take-out fetus
'to produce an abortion'

Collocation: mtu huyu ataka kututoa roho zetu
man this wants take-out spirit our
'this man wants to take us out, release our soul, take our lives'

A related form:

toka, stative v. (cp. **haribika**)

1. come out, go out; hence, idiomatically, for a fetus to leave the womb in miscarriage (i.e., to die).

Collocation: mimba imetoka
fetus has-gone-out
'the fetus has miscarried'

ua v.

1. kill

Restrictions: used only when the object is human (excluding fetuses) or animal. Even in a scientific discussion, **kauka** would be much preferred in connection with plants.

2. cause to end, or to fall into disuse, or to cease to function

Restrictions: used in connection with some incorporeals (especially, perhaps, those having to do with human institutions), but not used in connection with inanimates (as in the English expressions 'kill the engine,' 'kill the light,' 'kill the beer,' etc.).

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wakoloni waliua utamaduni wetu
colonialists killed culture our
'colonialists killed our culture'

wakoloni waliua lugha yetu
colonialists killed language our
'colonialists killed our language'

umaskini umeua siasa yetu ya ujamaa
poverty killed policy/ideology our of socialism
'poverty killed our socialist ideology'

aspirini imetuliza/* imeua maumivu yangu
aspirin soothed/* killed pain my
'aspirin soothed/* killed my pain'

ameharibu mimba	'she spoiled (miscarried) the fetus'
ametoa mimba	'she put out (aborted) the fetus'
* ameua mimba	'she killed the fetus'

- zima adj.

Each of the senses below may be considered equally prominent. Three of these senses are biological in focus: the ones meaning "live," 'mature,' and 'healthy.' The 'alive' sense is comfortably used only in connection with animal life. The 'mature' and 'healthy' senses tend strongly to be used in connection with human life. Because of its focus on human life, **-zima** is typically the form chosen to refer to life in religious contexts. The remaining two senses are nonbiological in focus. The sense meaning 'whole' nonbiologically echoes the sense meaning 'mature'; the sense meaning 'functional' nonbiologically echoes the sense meaning 'healthy.'

1. alive.

Restrictions: **-zima** in the sense of 'biologically alive' can be used in connection with all living things. However, its use seems awkward in connection with fetuses (whose life is bound up with that of the mother), body parts (whose life is bound up with that of the whole person), and plants. Special circumstances would be required for **-zima** to be used in connection with these entities. This semantic sense of **-zima** (of Bantu origin) is equivalent to the semantic sense of **hai** (of Arabic origin), and the selectional restrictions of the two words are the same.

samaki mzima
fish live
'a live fish'

ndege ni mzima
bird be alive
(*said perhaps emphatically*) 'the bird is alive'

2. healthy, vigorous, in good (biological) condition, unspoiled (i.e. fresh).

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Restrictions: **-zima** in the sense of 'healthy' is readily used only in connection with human beings, though it can be used in special circumstances in connection with fetuses, body parts, and animals (including insects). Use always assumes that one has some concern for the health of the entity being described, and the likelihood of having such a concern differs between entities. For example, **-zima** could be easily enough used in connection with a domestic animal, but its use in connection with wild animals is not very likely. Use is always awkward in connection with fetuses, since the health of the fetus is not ordinarily considered to be independent from that of the mother. Use is also always awkward in connection with insects, since interest in the health of insects is quite unusual, and criteria for their health are not established. **-zima** is not used in connection with plant life, inanimates or incorporeals.

mimi mzima
I well
'I am well'

alikuwa mgonjwa, lakini sasa mzima kabisa
he-was ill, but now well quite
'he was ill, but now he is quite well again'

yule mbwa si mzima
that dog is-not well
'that dog is not well'

macho yako ni mazima
eyes your are healthy
'your eyes are in good condition'

samaki mzima
fish sound
'fresh fish'

nyama ni nzima
meat be sound
'good/unspoiled meat; the meat is unspoiled'

mayai ni mazima
eggs be sound
'the eggs are unspoiled/fresh (or unbroken)'

? mimba yako ni nzima
fetus your is healthy
'your little one is healthy'
(perhaps an acceptable utterance from an obstetrician to his patient, though he or she would be more likely to say 'you are healthy')

maharage yamestawi '(the) beans are doing well'
* maharage mazima 'the beans are healthy'

Proverb: nazi mbovu harabu ya nzima
coconut spoiled ruins/spoils of sound-ones
'a bad coconut spoils/is the ruin of the good ones'

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3. sound, in good (operating or physical) condition, functional.

Restrictions: **-zima** in the 'functional' sense is used only in connection with inanimates.

gari yangu ni nzima
car my is sound
'my car is not broken; my car is running okay'

mashine ile ni nzima
machine that is sound
'that machine is operating okay'

taa/simu/baiskeli ni nzima
lamp/telephone/bicycle is sound
'the lamp/telephone/bicycle is operating okay'

mayai ni mazima
eggs be sound
'the eggs are unbroken (or unspoiled)'

viatu ni vizima
shoes are sound
'the shoes are in good condition'

kiti ni kizima
chair is sound
'the chair is in good condition'

* serikali ni nzima
government is functional
'the government is functioning okay'

4. full-grown, adult, mature.

Restrictions: **-zima** in the 'mature' sense is used only in connection with humans. The word cannot be used in connection with animals (to mean 'mature' or 'full grown'), or with plants (to mean 'full-grown' or 'ripe'), or with inanimates or incorporeals (to mean 'fully developed' or 'completed'). In connection with nonhuman life forms, the word **-kubwa** 'big' is used instead, and this carries with it the sense of 'mature.'

mtu mzima 'mature person'
mtu mkubwa 'big person; person with authority; mature person'
mtoto mkubwa 'big child'
simba mkubwa 'big/mature lion'
* simba mzima 'mature lion'
ndege mkubwa 'big/mature bird'
* ndege mzima 'mature bird'
kobe mkubwa 'big/mature tortoise'
* kobe mzima 'mature tortoise'
nyoka mkubwa 'big/mature snake'
* nyoka mzima 'mature snake'

mende mkubwa 'big/mature cockroach'
* mende mzima 'big/mature cockroach'

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mti mkubwa 'big/mature tree'
* mti mzima 'mature tree'

watu wazima
people mature
'grown-up people' I.e., people in the prime of life, as opposed to vijana 'young people up to the age of app. thirty'

mtu mzima asifanye mambo ya kitoto
person mature does-not-do things/affairs of a-small-child
a grown-up person does not behave like a child

mtu mzima kabisa
person mature quite
(*politely*) 'old person; senior citizen'

Collocation: utu uzima
state-of-being-human full
'full age, manhood, age of discretion'
Note: the **u-** in **utu** is the derivational prefix **u-** used in forming abstract nouns (here, < **mtu** 'person'); the **u-** in **uzima** is an agreement marker.

5. entire, whole, complete, full.

Restrictions: used most readily in connection with concrete countable inanimate objects. In appropriate circumstances, it can be used in connection with humans (including fetuses), body parts, animals (including insects), plants, and (some) incorporeals. However, note that, in connection with animals, **-zima** is more likely to be interpreted as 'mature,' 'healthy' or 'alive,' since in most circumstances there is no need to refer to the wholeness of an animal. Note that **-zima** is not used to mean 'having all one's body parts, being a whole person.' A person who was missing an arm would not on that account fail to be mzima.

samaki mzima
fish whole
'a whole fish'

alikula samaki mzima
he-ate fish whole
'he ate the whole fish'

mguu mzima wa ng'ombe
leg whole of cow
'a whole leg of (a slaughtered) cow'

waliukata mkono mzima
they cut-off arm whole
'[in Islamic punishment] they cut off the whole arm'

alipata upele mwili mzima
he-got eruptions body whole
'he got eruptions/a rash over his whole body'

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waliubeba mti mzimamzima
they-carried tree whole-whole
'[the landscapers] transported the tree, whole, living, and intact'

chungwa zima
orange whole
'a whole orange'

kasha zima
(cardboard)-box whole
'the whole box; the full box'

tufe nzima
a solid sphere [the 'solid' sense appears in Rechenbach only and is not shared by JR]

nyumba nzima
house whole
'the whole house; all the people in the house' [in Krapf only]

mkate mzima, sio kipande tu
bread whole, not piece only
'a whole loaf of bread, not just a piece'

nchi nzima
country whole
'the entire country'

baraza/bunge zima
council/parliament whole
'the whole council/parliament'

saa nzima
hour whole
'a whole hour'

karne nzima
century whole
'a whole century'

namba nzima
number whole
'the whole number' or
Collocation: (*in mathematics*) whole numbers (not JR)

falsafa nzima
philosophy whole
falsafa yote
philosophy all
'the whole philosophy [e.g., of Spinoza]'

vita vyote vilikua Ulaya
war all was-in Europe
? vita vizima vilikua Ulaya
war whole was-in Europe

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'the whole war was (fought) in Europe'

mimekupa mapenzi yangu yote
I've-given-you love my all
* mimekupa mapenzi yangu mazima
I've-given-you love my whole
'I've given you all my love'

uzuri wake wote ulipotea
beauty her all got-lost
* uzuri wake mzima ulipotea
beauty her whole got-lost
'all her beauty was lost'

Related forms:

mzima n. (wa-) (actually understood quasi-adjectivally, as mtu mzima, watu wazima)

1. grown-up person, adult.

2. healthy person.

uzima abstract n.

1. human life (from a spiritualistic or phenomenalistic perspective).

Note: uzima is an abstract state of (human) being. It might be said that the biologist studies uhai rather than uzima. There is a feeling that **uzima** is more appropriate than **uhai** in religious contexts.

Restrictions: used only in connection with human life. A body part has uzima insofar as a whole body has uzima, and a fetus has uzima insofar as the mother and the fetus together have uzima — but uzima would not be used in connection with fetuses or body parts alone.

Mungu ndiye ametupa uzima
God is-the-one-who has-given-us life

uzima wa milele
life of eternity
'Eternal Life'

2. (not JR) state of having good health, vitality, vigor, energy.
3. (not JR) freedom from defect or shortcomings.
4. (not JR) adulthood, maturity, full development. (for 'adulthood,' JR would use **ukubwa** 'bigness')
5. (not JR) completeness, wholeness, totality, full dimensions.
6. [rare] lifetime. (this is commonly expressed as **maisha**)

zima v.

This verb, and forms related or potentially related to it, tends in a general way to model death as an extinguishment or as a drying up; as a loss of physical substance.

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1. put out, rub out, extinguish, quench, quell.

zima moto
'extinguish (a) fire'

zima kiu
'quench thirst'

zima maneno
'erase words'

zima ugomvi
'quell (an) argument'

zima roho
'put out life; cause to lose consciousness' (**roho** 'soul, spirit; life; vital principal')

Related forms:

kizimwe n. (vi-) (not JR)

1. something (nonanimal) dried up, dead, withered, lacking in life.

nazi kizimwe (not JR)
coconut dried-up

2. (*in botany*) blight, smut (of grains).

zimwe n. (ma-) or adj.

1. something extinguished or quenched.

makaa (ma)zimwe
burnt out embers, dead coals

Semantically associable forms (etymological relationship unknown):

kizimwi n. (vi-)

1. fairy, sorceress, evil spirit, ghost.

kuzimu n.

1. underworld; the state, place or condition of departed spirits.

mzimu n. (mi-)

1. soul/spirit of a dead person/ancestor. When a man dies, he is said to lose his body and become a mzimu.

2. place where offerings are made to the spirits of ancestors.

3. a kind of white earth used for smearing novitiates in initiation rites.

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wazimu n.

1. madness, mania, hallucination, desperation, infatuation. Johnson (1939b:528) speculates that wazimu may be connected to mzimu and mean literally possession by evil spirits. Krapf (1882:432) appears to endorse this connection.

zimu v.

1. [Krapf] to disappear, to become invisible; to be about to die.

zimwi n. (ma-)

1. spirit, fairy, demon, goblin, ogre, ghost; [in Krapf only] an evil being which devours men.

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APPENDIX B

EXPERIMENT 1: FREQUENCY OF WINS WITHIN EACH PAIR

In the tables below, for each of the 576 paired comparisons in the study, the number of wins and the statistical significance of these wins is presented for each pairmember in each semantic dimension. The number assigned to a specific paired comparison can be found by referring to the Microcosm Index or the Supplementary Comparison Index provided below.

Microcosm Index

	tiger	kanga	eleph	hippo	beavr	raccn	possm	hawk	sprro	owl	swan
human	323	193	301	208	369	479	258	4	304	354	209
tiger		538	231	116	305	140	162	67	505	385	69
kanga			257	514	561	147	524	164	172	452	298
eleph				329	540	341	17	547	432	435	410
hippo					64	120	93	292	203	554	315
beavr						276	349	539	74	355	493
raccn							472	58	92	311	159
possm								170	25	163	401
hawk									568	300	490
sprro										548	229
owl											8
swan											
bee											
gnat											
spidr											
beetl											
redwd											
daisy											
sun											
wtrfl											
wind											
thun											
glacr											
daylt											
air											
stone											
grav											
elect											
large											
thick											
dist											
equiv											

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Microcosm Index, cont.

	bee	gnat	spidr	beetl	rdwd	daisy	sun	wtrfl	wind	thun	glacr
human	562	397	125	511	543	478	137	1	101	3	445
tiger	70	520	207	21	157	117	443	525	576	303	326
kanga	357	407	457	363	322	237	350	393	27	51	536
eleph	152	36	212	384	180	507	133	183	440	571	483
hippo	467	318	20	122	418	40	552	356	181	438	246
beavr	513	10	255	30	249	283	437	166	455	112	155
raccn	380	484	572	42	148	320	413	218	515	532	481
possm	423	28	260	465	60	519	567	262	330	191	422
hawk	199	460	453	386	267	308	226	291	415	361	48
sprro	135	241	496	214	302	400	35	50	482	104	99
owl	230	235	149	153	485	546	81	299	494	18	388
swan	156	228	168	293	529	365	78	492	219	220	56
bee		107	41	462	475	75	564	37	430	335	405
gnat			416	297	29	9	497	118	310	254	426
spidr				76	179	420	553	59	344	198	366
beetl					367	233	454	506	265	403	201
redwd						471	364	421	24	23	205
daisy							521	542	270	186	177
sun								187	253	271	251
wtrfl									34	185	288
wind										431	109
thun											377
glacr											
daylt											
air											
stone											
grav											
elect											
large											
thick											
dist											
equiv											

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Microcosm Index, cont.

	daylt	air	stone	grav	elect	large	thick	dist	equiv
human	196	121	498	22	13	339	97	404	456
tiger	469	213	348	144	224	470	57	195	417
kanga	412	165	272	6	44	287	49	66	346
eleph	54	83	26	414	480	370	275	127	279
hippo	569	141	33	307	396	545	269	217	459
beavr	280	378	46	566	114	463	468	473	190
raccn	239	211	143	398	244	16	427	325	91
possm	333	281	371	487	510	282	102	565	313
hawk	509	424	242	131	204	100	503	82	126
sprro	314	227	461	136	210	319	419	387	362
owl	150	428	434	278	2	263	124	234	68
swan	429	389	556	436	337	32	129	381	500
bee	273	296	259	108	317	517	558	238	88
gnat	146	145	268	298	486	110	15	502	358
spidr	324	402	379	248	312	488	115	79	559
beetl	53	175	551	284	533	142	549	495	138
rdwd	570	499	541	105	466	382	55	176	222
daisy	188	447	331	61	119	215	328	528	43
sun	399	85	206	290	332	154	178	327	134
wtrfl	372	563	442	353	245	409	448	62	522
wind	550	39	383	261	106	71	223	316	394
thun	376	411	86	408	96	250	340	449	516
glacr	12	374	182	537	247	19	345	392	31
daylt		80	192	7	111	161	477	309	256
air			45	232	544	338	352	167	264
stone				334	391	439	221	174	184
grav					446	531	72	5	573
elect						73	474	128	321
large							373	518	444
thick								216	47
dist									266
equiv									

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Supplementary Comparison Index

Comparisons involving natural inanimates:

95.	lightning v. the sun	
200.	lightning v. a waterfall	
103.	hail v. a waterfall	
139.	hail v. wind	
151.	fire v. wind	
347.	fire v. the sun	
489.	smoke v. thunder	
526.	smoke v. air	
160.	a bay v. glacier	
84.	a bay v. wind	
530.	heat v. thunder	
557.	heat v. air	
11.	fog v. air	
274.	fog v. thunder	
14.	a puddle v. a stone	
52.	a puddle v. daylight	

Comparisons testing the limits of categories:

89.	an elderly person v. a dolphin	['poor' human v. 'good' mammal]
286.	a human baby v. a dolphin	['poor' human v. 'good' mammal]
433.	a barnacle v. lightning	['poor' animal v. 'good' inanimate]
225.	a barnacle v. hail	['poor' animal v. 'good' inanimate]
458.	a barnacle v. fire	['poor' animal v. 'good' inanimate]
173.	a clam v. a redwood tree	['poor' animal v. 'good' plant]
38.	a turtle v. a redwood tree	['poor' animal v. 'good' plant]
294.	a barnacle v. a redwood tree	['poor' animal v. 'good' plant]
527.	a barnacle v. a stone	['poor' animal v. 'poor' inanimate]
90.	a barnacle v. a glacier	['poor' animal v. 'poor' inanimate]
512.	a barnacle v. daylight	['poor' animal v. 'poor' inanimate]
197.	moss v. lightning	['poor' plant v. 'good' inanimate]
508.	moss v. hail	['poor' plant v. 'good' inanimate]
158.	moss v. fire	['poor' plant v. 'good' inanimate]
501.	moss v. a stone	['poor' plant v. 'poor' inanimate]
523.	moss v. a glacier	['poor' plant v. 'poor' inanimate]
534.	moss v. daylight	['poor' plant v. 'poor' inanimate]
94.	moss v. a barnacle	['poor' plant v. 'poor' animal]
277.	a redwood tree v. moss	['good' plant v. 'poor' plant]

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Comparisons involving an automobile:

252. an automobile v. the sun
295. an automobile v. a waterfall
236. an automobile v. an automobile designer
194. an automobile v. a person driving an automobile
189. an automobile v. an automobile mechanic
289. an automobile v. a pedestrian

Comparisons intended as minimal EPA pairs:

Intended Embodiment Minimal Pairs:

450. a 100 MPH cyclone v. a 100 MPH wind
504. a whirlpool v. a river current
169. a cloud v. fog
123. a person who just arrived v. a person who just left
130. a tower v. a blueprint for a tower
336. a sphere v. a circle

Intended Purposiveness Minimal Pairs:

87. speech v. noise
451. a brick v. a stone
285. a man fishing to eat v. a man fishing for fun
171. a good worker who understands the whole operation v. a good worker who understands just his own job
555. a person with a project v. a person who is idle
425. a productive person v. an unproductive person
243. a carpenter v. an adventurer

Intended Activity Minimal Pairs:

Active v. Inactive

390. an untraveled river v. an untraveled road
63. a lightning bolt v. a ray of light
359. a restless sea v. a quiet sea
202. a layer of mist v. a layer of dust
491. a balloon v. a bowling ball
343. a daydream v. a mental plan

Self Locomoting v. Non Self locomoting

476. a moped v. a bicycle
132. a toy car that winds up v. a toy car that you push
306. roller skates v. basketball shoes

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Comparisons reflecting crosslinguistic ANIMACY distinctions:

Whole Animal v. Body Part

395. you v. your head
535. a cat v. a cat's ear

Kin/Named v. Nonkin/Nonnamed

342. someone you know very well v. someone you know only slightly
464. a relative you only met once v. a nonrelative you only met once

Free v. Nonfree

375. a person with options v. a person without options
77. a free man v. a slave

Adult v. Nonadult

240. an adult v. an elderly person
574. an adult v. a teenager
113. an adult v. a baby

Ablebodied v. Disabled

441. a sighted person v. a blind person
368. a hearing person v. a deaf person
406. a hearing artist v. a deaf artist

Linguistic v. Nonlinguistic

65. a 2-year-old who can talk v. a 2-year-old who can't yet talk
351. a talkative person v. a quiet person
575. a person speaking out loud v. person thinking to himself

Motile Inanimate v. Nonmotile Inanimate

(pairs appear above as Intended Activity Minimal Pairs)

Inanimate v. Incorporeal

360. snowflake v. symmetry
560. flag pole v. perpendicularity

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1.		Aliveness	Embodiment	Purposiveness	Activity
	waterfall	7	8	10	26
	adult human	23	22	20	4
	p ≤	.0062	.0176	.1003	.0001

2.		Aliveness	Embodiment	Purposiveness	Activity
	owl	22	26	15	16
	electromagnetism	8	4	15	14
	p ≤	.0176	.0001	1.0000	.8551

3.		Aliveness	Embodiment	Purposiveness	Activity
	adult human	18	23	21	15
	thunder	12	7	9	15
	p ≤	.3613	.0062	.0446	1.0000

4.		Aliveness	Embodiment	Purposiveness	Activity
	adult human	12	19	21	7
	hawk	18	11	9	23
	p ≤	.3613	.2012	.0446	.0062

5.		Aliveness	Embodiment	Purposiveness	Activity
	gravity	23	24	28	20
	distance	7	6	2	10
	p ≤	.0062	.0019	.0001	.1003

6.		Aliveness	Embodiment	Purposiveness	Activity
	gravity	8	6	17	9
	kangaroo	22	24	13	21
	p ≤	.0176	.0019	.5839	.0446

7.		Aliveness	Embodiment	Purposiveness	Activity
	daylight	23	15	23	9
	gravity	7	15	7	21
	p ≤	.0062	1.0000	.0062	.0446

8.		Aliveness	Embodiment	Purposiveness	Activity
	owl	21	10	16	9
	swan	9	20	14	21
	p ≤	.0446	.1003	.8551	.0446

9.		Aliveness	Embodiment	Purposiveness	Activity
	daisy	13	23	17	4
	gnat	17	7	13	26
	p ≤	.5839	.0062	.5839	.0001

10.		Aliveness	Embodiment	Purposiveness	Activity
	beaver	28	27	28	21
	gnat	2	3	2	9
	p ≤	.0001	.0001	.0001	.0446

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11.	Aliveness	Embodiment	Purposiveness	Activity
air	17	9	20	17
fog	13	21	10	13
p ≤	.5839	.0446	.1003	.5839

12.	Aliveness	Embodiment	Purposiveness	Activity
daylight	20	5	17	12
glacier	10	25	13	18
p ≤	.1003	.0005	.5839	.3613

13.	Aliveness	Embodiment	Purposiveness	Activity
electromagnetism	2	4	10	12
adult human	28	26	20	18
p ≤	.0001	.0001	.1003	.3613

14.	Aliveness	Embodiment	Purposiveness	Activity
stone	6	22	10	5
puddle	24	8	20	25
p ≤	.0019	.0176	.1003	.0005

15.	Aliveness	Embodiment	Purposiveness	Activity
thickness	10	14	15	3
gnat	20	16	15	27
p ≤	.1003	.8551	1.0000	.0001

16.	Aliveness	Embodiment	Purposiveness	Activity
raccoon	25	29	19	26
largeness	5	1	11	4
p ≤	.0005	.0001	.2012	.0001

17.	Aliveness	Embodiment	Purposiveness	Activity
possum	19	3	8	22
elephant	11	27	22	8
p ≤	.2012	.0001	.0176	.0176

18.	Aliveness	Embodiment	Purposiveness	Activity
thunder	13	9	17	16
owl	17	21	13	14
p ≤	.5839	.0446	.5839	.8551

19.	Aliveness	Embodiment	Purposiveness	Activity
largeness	6	7	10	5
glacier	24	23	20	25
p ≤	.0019	.0062	.1003	.0005

20.	Aliveness	Embodiment	Purposiveness	Activity
hippopotamus	14	26	8	3
spider	16	4	22	27
p ≤	.8551	.0001	.0176	.0001

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21.	Aliveness	Embodiment	Purposiveness	Activity
tiger	21	27	22	19
beetle	9	3	8	11
p ≤	.0446	.0001	.0176	.2012

22.	Aliveness	Embodiment	Purposiveness	Activity
adult human	22	21	17	22
gravity	8	9	13	8
p ≤	.0176	.0446	.5839	.0176

23.	Aliveness	Embodiment	Purposiveness	Activity
redwood tree	22	25	20	7
thunder	8	5	10	23
p ≤	.0176	.0005	.1003	.0062

24.	Aliveness	Embodiment	Purposiveness	Activity
redwood tree	16	22	9	1
wind	14	8	21	29
p ≤	.8551	.0176	.0446	.0001

25.	Aliveness	Embodiment	Purposiveness	Activity
sparrow	20	12	21	28
possum	10	18	9	2
p ≤	.1003	.3613	.0446	.0001

26.	Aliveness	Embodiment	Purposiveness	Activity
elephant	26	23	27	27
stone	4	7	3	3
p ≤	.0001	.0062	.0001	.0001

27.	Aliveness	Embodiment	Purposiveness	Activity
kangaroo	16	26	9	14
wind	14	4	21	16
p ≤	.8551	.0001	.0446	.8551

28.	Aliveness	Embodiment	Purposiveness	Activity
gnat	9	3	9	18
possum	21	27	21	12
p ≤	.0446	.0001	.0446	.3613

29.	Aliveness	Embodiment	Purposiveness	Activity
gnat	18	4	7	26
redwood tree	12	26	23	4
p ≤	.3613	.0001	.0062	.0001

30.	Aliveness	Embodiment	Purposiveness	Activity
beetle	10	3	6	9
beaver	20	27	24	21
p ≤	.1003	.0001	.0019	.0446

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31.	Aliveness	Embodiment	Purposiveness	Activity
equivalence	8	8	13	3
glacier	22	22	17	27
p ≤	.0176	.0176	.5839	.0001

32.	Aliveness	Embodiment	Purposiveness	Activity
swan	29	26	20	29
largeness	1	4	10	1
p ≤	.0001	.0001	.1003	.0001

33.	Aliveness	Embodiment	Purposiveness	Activity
stone	4	5	7	4
hippopotamus	26	25	23	26
p ≤	.0001	.0005	.0062	.0001

34.	Aliveness	Embodiment	Purposiveness	Activity
waterfall	19	25	14	23
wind	11	5	16	7
p ≤	.2012	.0005	.8551	.0062

35.	Aliveness	Embodiment	Purposiveness	Activity
sparrow	23	12	4	25
sun	7	18	26	5
p ≤	.0062	.3613	.0001	.0005

36.	Aliveness	Embodiment	Purposiveness	Activity
gnat	9	1	8	22
elephant	21	29	22	8
p ≤	.0446	.0001	.0176	.0176

37.	Aliveness	Embodiment	Purposiveness	Activity
honeybee	17	15	14	13
waterfall	13	15	16	17
p ≤	.5839	1.0000	.8551	.5839

38.	Aliveness	Embodiment	Purposiveness	Activity
redwood tree	10	16	22	5
turtle	20	14	8	25
p ≤	.1003	.8551	.0176	.0005

39.	Aliveness	Embodiment	Purposiveness	Activity
air	9	9	17	2
wind	21	21	13	28
p ≤	.0446	.0446	.5839	.0001

40.	Aliveness	Embodiment	Purposiveness	Activity
hippopotamus	21	23	16	24
daisy	9	7	14	6
p ≤	.0446	.0062	.8551	.0019

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41.	Aliveness	Embodiment	Purposiveness	Activity
spider	11	11	8	12
honeybee	19	19	22	18
p ≤	.2012	.2012	.0176	.3613

42.	Aliveness	Embodiment	Purposiveness	Activity
beetle	10	4	8	13
raccoon	20	26	22	17
p ≤	.1003	.0001	.0176	.5839

43.	Aliveness	Embodiment	Purposiveness	Activity
equivalence	6	7	17	6
daisy	24	23	13	24
p ≤	.0019	.0062	.5839	.0019

44.	Aliveness	Embodiment	Purposiveness	Activity
kangaroo	22	23	10	21
electromagnetism	8	7	20	9
p ≤	.0176	.0062	.1003	.0446

45.	Aliveness	Embodiment	Purposiveness	Activity
stone	12	19	2	6
air	18	11	28	24
p ≤	.3613	.2012	.0001	.0019

46.	Aliveness	Embodiment	Purposiveness	Activity
stone	7	3	7	1
beaver	23	27	23	29
p ≤	.0062	.0001	.0062	.0001

47.	Aliveness	Embodiment	Purposiveness	Activity
thickness	18	23	10	10
equivalence	12	7	20	20
p ≤	.3613	.0062	.1003	.1003

48.	Aliveness	Embodiment	Purposiveness	Activity
hawk	25	17	17	27
glacier	5	13	13	3
p ≤	.0005	.5839	.5839	.0001

49.	Aliveness	Embodiment	Purposiveness	Activity
kangaroo	22	26	18	29
thickness	8	4	12	1
p ≤	.0176	.0001	.3613	.0001

50.	Aliveness	Embodiment	Purposiveness	Activity
waterfall	12	17	21	17
sparrow	18	13	9	13
p ≤	.3613	.5839	.0446	.5839

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51.	Aliveness	Embodiment	Purposiveness	Activity
kangaroo	22	20	15	16
thunder	8	10	15	14
p ≤	.0176	.1003	1.0000	.8551

52.	Aliveness	Embodiment	Purposiveness	Activity
puddle	14	21	6	18
daylight	16	9	24	12
p ≤	.8551	.0446	.0019	.3613

53.	Aliveness	Embodiment	Purposiveness	Activity
beetle	22	17	9	23
daylight	8	13	21	7
p ≤	.0176	.5839	.0446	.0062

54.	Aliveness	Embodiment	Purposiveness	Activity
daylight	6	4	21	10
elephant	24	26	9	20
p ≤	.0019	.0001	.0446	.1003

55.	Aliveness	Embodiment	Purposiveness	Activity
thickness	8	6	7	8
redwood tree	22	24	23	22
p ≤	.0176	.0019	.0062	.0176

56.	Aliveness	Embodiment	Purposiveness	Activity
glacier	8	14	19	4
swan	22	16	11	26
p ≤	.0176	.8551	.2012	.0001

57.	Aliveness	Embodiment	Purposiveness	Activity
tiger	25	27	20	29
thickness	5	3	10	1
p ≤	.0005	.0001	.1003	.0001

58.	Aliveness	Embodiment	Purposiveness	Activity
hawk	25	14	21	28
raccoon	5	16	9	2
p ≤	.0005	.8551	.0446	.0001

59.	Aliveness	Embodiment	Purposiveness	Activity
spider	19	14	11	12
waterfall	11	16	19	18
p ≤	.2012	.8551	.2012	.3613

60.	Aliveness	Embodiment	Purposiveness	Activity
redwood tree	8	20	24	5
possum	22	10	6	25
p ≤	.0176	.1003	.0019	.0005

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61.	Aliveness	Embodiment	Purposiveness	Activity
gravity	6	13	25	18
daisy	24	17	5	12
p ≤	.0019	.5839	.0005	.3613

62.	Aliveness	Embodiment	Purposiveness	Activity
distance	2	5	7	2
waterfall	28	25	23	28
p ≤	.0001	.0005	.0062	.0001

63.	Aliveness	Embodiment	Purposiveness	Activity
ray of light	6	11	15	4
lightning bolt	24	19	15	26
p ≤	.0019	.2012	1.0000	.0001

64.	Aliveness	Embodiment	Purposiveness	Activity
hippopotamus	15	21	6	3
beaver	15	9	24	27
p ≤	1.0000	.0446	.0019	.0001

65.	Aliveness	Embodiment	Purposiveness	Activity
2-y.o. who can talk	19	20	18	18
2-y.o. who can't talk	11	10	12	12
p ≤	.2012	.1003	.3613	.3613

66.	Aliveness	Embodiment	Purposiveness	Activity
distance	2	5	12	2
kangaroo	28	25	18	28
p ≤	.0001	.0005	.3613	.0001

67.	Aliveness	Embodiment	Purposiveness	Activity
hawk	5	7	13	15
tiger	25	23	17	15
p ≤	.0005	.0062	.5839	1.0000

68.	Aliveness	Embodiment	Purposiveness	Activity
equivalence	4	6	15	4
owl	26	24	15	26
p ≤	.0001	.0019	1.0000	.0001

69.	Aliveness	Embodiment	Purposiveness	Activity
tiger	26	21	22	23
swan	4	9	8	7
p ≤	.0001	.0446	.0176	.0062

70.	Aliveness	Embodiment	Purposiveness	Activity
honeybee	8	6	15	18
tiger	22	24	15	12
p ≤	.0176	.0019	1.0000	.3613

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71.	Aliveness	Embodiment	Purposiveness	Activity
largeness	7	6	6	0
wind	23	24	24	30
p ≤	.0062	.0019	.0019	.0001

72.	Aliveness	Embodiment	Purposiveness	Activity
thickness	8	12	4	2
gravity	22	18	26	28
p ≤	.0176	.3613	.0001	.0001

73.	Aliveness	Embodiment	Purposiveness	Activity
largeness	9	17	8	1
electromagnetism	21	13	22	29
p ≤	.0446	.5839	.0176	.0001

74.	Aliveness	Embodiment	Purposiveness	Activity
beaver	17	22	22	9
sparrow	13	8	8	21
p ≤	.5839	.0176	.0176	.0446

75.	Aliveness	Embodiment	Purposiveness	Activity
daisy	8	6	5	3
honeybee	22	24	25	27
p ≤	.0176	.0019	.0005	.0001

76.	Aliveness	Embodiment	Purposiveness	Activity
spider	20	20	23	24
beetle	10	10	7	6
p ≤	.1003	.1003	.0062	.0019

77.	Aliveness	Embodiment	Purposiveness	Activity
slave	7	10	12	7
free man	23	20	18	23
p ≤	.0062	.1003	.3613	.0062

78.	Aliveness	Embodiment	Purposiveness	Activity
sun	4	13	24	9
swan	26	17	6	21
p ≤	.0001	.5839	.0019	.0446

79.	Aliveness	Embodiment	Purposiveness	Activity
spider	23	20	18	26
distance	7	10	12	4
p ≤	.0062	.1003	.3613	.0001

80.	Aliveness	Embodiment	Purposiveness	Activity
air	17	10	14	15
daylight	13	20	16	15
p ≤	.5839	.1003	.8551	1.0000

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81.	Aliveness	Embodiment	Purposiveness	Activity
sun	3	15	26	8
owl	27	15	4	22
p ≤	.0001	1.0000	.0001	.0176

82.	Aliveness	Embodiment	Purposiveness	Activity
hawk	28	27	21	27
distance	2	3	9	3
p ≤	.0001	.0001	.0446	.0001

83.	Aliveness	Embodiment	Purposiveness	Activity
elephant	22	22	8	14
air	8	8	22	16
p ≤	.0176	.0176	.0176	.8551

84.	Aliveness	Embodiment	Purposiveness	Activity
wind	15	10	18	26
bay	15	20	12	4
p ≤	1.0000	.1003	.3613	.0001

85.	Aliveness	Embodiment	Purposiveness	Activity
air	9	9	9	18
sun	21	21	21	12
p ≤	.0446	.0446	.0446	.3613

86.	Aliveness	Embodiment	Purposiveness	Activity
thunder	25	12	24	26
stone	5	18	6	4
p ≤	.0005	.3613	.0019	.0001

87.	Aliveness	Embodiment	Purposiveness	Activity
noise	9	12	7	19
speech	21	18	23	11
p ≤	.0446	.3613	.0062	.2012

88.	Aliveness	Embodiment	Purposiveness	Activity
honeybee	28	23	14	27
equivalence	2	7	16	3
p ≤	.0001	.0062	.8551	.0001

89.	Aliveness	Embodiment	Purposiveness	Activity
dolphin	20	16	13	29
elderly person	10	14	17	1
p ≤	.1003	.8551	.5839	.0001

90.	Aliveness	Embodiment	Purposiveness	Activity
glacier	10	16	23	26
barnacle	20	14	7	4
p ≤	.1003	.8551	.0062	.0001

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91.	Aliveness	Embodiment	Purposiveness	Activity
raccoon	21	25	12	28
equivalence	9	5	18	2
p ≤	.0446	.0005	.3613	.0001

92.	Aliveness	Embodiment	Purposiveness	Activity
raccoon	18	23	16	5
sparrow	12	7	14	25
p ≤	.3613	.0062	.8551	.0005

93.	Aliveness	Embodiment	Purposiveness	Activity
hippopotamus	17	25	17	10
possum	13	5	13	20
p ≤	.5839	.0005	.5839	.1003

94.	Aliveness	Embodiment	Purposiveness	Activity
moss	10	14	18	13
barnacle	20	16	12	17
p ≤	.1003	.8551	.3613	.5839

95.	Aliveness	Embodiment	Purposiveness	Activity
lightning	21	10	8	26
sun	9	20	22	4
p ≤	.0446	.1003	.0176	.0001

96.	Aliveness	Embodiment	Purposiveness	Activity
thunder	22	23	10	17
electromagnetism	8	7	20	13
p ≤	.0176	.0062	.1003	.5839

97.	Aliveness	Embodiment	Purposiveness	Activity
adult human	30	26	27	30
thickness	0	4	3	0
p ≤	.0001	.0001	.0001	.0001

98.	Aliveness	Embodiment	Purposiveness	Activity
swan	10	9	7	7
kangaroo	20	21	23	23
p ≤	.1003	.0446	.0062	.0062

99.	Aliveness	Embodiment	Purposiveness	Activity
glacier	9	12	19	7
sparrow	21	18	11	23
p ≤	.0446	.3613	.2012	.0062

100.	Aliveness	Embodiment	Purposiveness	Activity
largeness	3	5	13	0
hawk	27	25	17	30
p ≤	.0001	.0005	.5839	.0001

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101.	Aliveness	Embodiment	Purposiveness	Activity
wind	12	6	17	26
adult human	18	24	13	4
p ≤	.3613	.0019	.5839	.0001

102.	Aliveness	Embodiment	Purposiveness	Activity
possum	22	26	14	29
thickness	8	4	16	1
p ≤	.0176	.0001	.8551	.0001

103.	Aliveness	Embodiment	Purposiveness	Activity
hail	3	10	7	5
waterfall	27	20	23	25
p ≤	.0001	.1003	.0062	.0005

104.	Aliveness	Embodiment	Purposiveness	Activity
sparrow	16	20	12	18
thunder	14	10	18	12
p ≤	.8551	.1003	.3613	.3613

105.	Aliveness	Embodiment	Purposiveness	Activity
redwood tree	27	27	10	6
gravity	3	3	20	24
p ≤	.0001	.0001	.1003	.0019

106.	Aliveness	Embodiment	Purposiveness	Activity
electromagnetism	15	12	16	9
wind	15	18	14	21
p ≤	1.0000	.3613	.8551	.0446

107.	Aliveness	Embodiment	Purposiveness	Activity
gnat	8	3	2	8
honeybee	22	27	28	22
p ≤	.0176	.0001	.0001	.0176

108.	Aliveness	Embodiment	Purposiveness	Activity
honeybee	24	22	7	24
gravity	6	8	23	6
p ≤	.0019	.0176	.0062	.0019

109.	Aliveness	Embodiment	Purposiveness	Activity
glacier	8	24	14	2
wind	22	6	16	28
p ≤	.0176	.0019	.8551	.0001

110.	Aliveness	Embodiment	Purposiveness	Activity
gnat	20	16	11	26
largeness	10	14	19	4
p ≤	.1003	.8551	.2012	.0001

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111.	Aliveness	Embodiment	Purposiveness	Activity
daylight	16	15	22	7
electromagnetism	14	15	8	23
p ≤	.8551	1.0000	.0176	.0062

112.	Aliveness	Embodiment	Purposiveness	Activity
thunder	9	8	16	8
beaver	21	22	14	22
p ≤	.0446	.0176	.8551	.0176

113.	Aliveness	Embodiment	Purposiveness	Activity
baby	19	5	9	14
adult	11	25	21	16
p ≤	.2012	.0005	.0446	.8551

114.	Aliveness	Embodiment	Purposiveness	Activity
beaver	21	24	13	24
electromagnetism	9	6	17	6
p ≤	.0446	.0019	.5839	.0019

115.	Aliveness	Embodiment	Purposiveness	Activity
thickness	3	8	10	3
spider	27	22	20	27
p ≤	.0001	.0176	.1003	.0001

116.	Aliveness	Embodiment	Purposiveness	Activity
tiger	22	10	27	30
hippopotamus	8	20	3	0
p ≤	.0176	.1003	.0001	.0001

117.	Aliveness	Embodiment	Purposiveness	Activity
tiger	28	27	21	28
daisy	2	3	9	2
p ≤	.0001	.0001	.0446	.0001

118.	Aliveness	Embodiment	Purposiveness	Activity
waterfall	13	19	27	27
gnat	17	11	3	3
p ≤	.5839	.2012	.0001	.0001

119.	Aliveness	Embodiment	Purposiveness	Activity
electromagnetism	7	8	23	26
daisy	23	22	7	4
p ≤	.0062	.0176	.0062	.0001

120.	Aliveness	Embodiment	Purposiveness	Activity
raccoon	18	5	21	28
hippopotamus	12	25	9	2
p ≤	.3613	.0005	.0446	.0001

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121.	Aliveness	Embodiment	Purposiveness	Activity
air	6	5	21	8
adult human	24	25	9	22
p ≤	.0019	.0005	.0446	.0176

122.	Aliveness	Embodiment	Purposiveness	Activity
hippopotamus	20	26	19	4
beetle	10	4	11	26
p ≤	.1003	.0001	.2012	.0001

123.	Aliveness	Embodiment	Purposiveness	Activity
person who arrived	20	23	22	17
person who left	10	7	8	13
p ≤	.1003	.0062	.0176	.5839

124.	Aliveness	Embodiment	Purposiveness	Activity
owl	27	25	21	27
thickness	3	5	9	3
p ≤	.0001	.0005	.0446	.0001

125.	Aliveness	Embodiment	Purposiveness	Activity
adult human	20	29	23	15
spider	10	1	7	15
p ≤	.1003	.0001	.0062	1.0000

126.	Aliveness	Embodiment	Purposiveness	Activity
equivalence	4	1	15	1
hawk	26	29	15	29
p ≤	.0001	.0001	1.0000	.0001

127.	Aliveness	Embodiment	Purposiveness	Activity
elephant	28	24	12	27
distance	2	6	18	3
p ≤	.0001	.0019	.3613	.0001

128.	Aliveness	Embodiment	Purposiveness	Activity
electromagnetism	23	18	14	27
distance	7	12	16	3
p ≤	.0062	.3613	.8551	.0001

129.	Aliveness	Embodiment	Purposiveness	Activity
thickness	3	6	12	2
swan	27	24	18	28
p ≤	.0001	.0019	.3613	.0001

130.	Aliveness	Embodiment	Purposiveness	Activity
tower	27	28	11	15
blueprint for tower	3	2	19	15
p ≤	.0001	.0001	.2012	1.0000

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131.	Aliveness	Embodiment	Purposiveness	Activity
hawk	28	24	8	25
gravity	2	6	22	5
p ≤	.0001	.0019	.0176	.0005

132.	Aliveness	Embodiment	Purposiveness	Activity
toy car that winds up	23	18	14	21
toy car that you push	7	12	16	9
p ≤	.0062	.3613	.8551	.0446

133.	Aliveness	Embodiment	Purposiveness	Activity
sun	12	12	27	9
elephant	18	18	3	21
p ≤	.3613	.3613	.0001	.0446

134.	Aliveness	Embodiment	Purposiveness	Activity
equivalence	7	0	2	2
sun	23	30	28	28
p ≤	.0062	.0001	.0001	.0001

135.	Aliveness	Embodiment	Purposiveness	Activity
honeybee	9	7	25	17
sparrow	21	23	5	13
p ≤	.0446	.0062	.0005	.5839

136.	Aliveness	Embodiment	Purposiveness	Activity
gravity	10	8	23	7
sparrow	20	22	7	23
p ≤	.1003	.0176	.0062	.0062

137.	Aliveness	Embodiment	Purposiveness	Activity
adult human	21	21	9	24
sun	9	9	21	6
p ≤	.0446	.0446	.0446	.0019

138.	Aliveness	Embodiment	Purposiveness	Activity
beetle	28	25	14	30
equivalence	2	5	16	0
p ≤	.0001	.0005	.8551	.0001

139.	Aliveness	Embodiment	Purposiveness	Activity
wind	23	14	24	19
hail	7	16	6	11
p ≤	.0062	.8551	.0019	.2012

140.	Aliveness	Embodiment	Purposiveness	Activity
raccoon	6	5	8	8
tiger	24	25	22	22
p ≤	.0019	.0005	.0176	.0176

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141.	Aliveness	Embodiment	Purposiveness	Activity
hippopotamus	25	24	8	18
air	5	6	22	12
p ≤	.0005	.0019	.0176	.3613

142.	Aliveness	Embodiment	Purposiveness	Activity
largeness	7	9	16	2
beetle	23	21	14	28
p ≤	.0062	.0446	.8551	.0001

143.	Aliveness	Embodiment	Purposiveness	Activity
raccoon	26	22	16	29
stone	4	8	14	1
p ≤	.0001	.0176	.8551	.0001

144.	Aliveness	Embodiment	Purposiveness	Activity
tiger	28	24	9	26
gravity	2	6	21	4
p ≤	.0001	.0019	.0446	.0001

145.	Aliveness	Embodiment	Purposiveness	Activity
gnat	24	22	4	24
air	6	8	26	6
p ≤	.0019	.0176	.0001	.0019

146.	Aliveness	Embodiment	Purposiveness	Activity
daylight	8	11	26	6
gnat	22	19	4	24
p ≤	.0176	.2012	.0001	.0019

147.	Aliveness	Embodiment	Purposiveness	Activity
raccoon	6	3	4	4
kangaroo	24	27	26	26
p ≤	.0019	.0001	.0001	.0001

148.	Aliveness	Embodiment	Purposiveness	Activity
raccoon	19	11	6	29
redwood tree	11	19	24	1
p ≤	.2012	.2012	.0001	.0001

149.	Aliveness	Embodiment	Purposiveness	Activity
spider	6	3	13	20
owl	24	27	17	10
p ≤	.0019	.0001	.5839	.1003

150.	Aliveness	Embodiment	Purposiveness	Activity
owl	26	24	4	23
daylight	4	6	26	7
p ≤	.0001	.0019	.0001	.0062

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151.	Aliveness	Embodiment	Purposiveness	Activity
wind	8	7	12	16
fire	22	23	18	14
p ≤	.0176	.0062	.3613	.8551

152.	Aliveness	Embodiment	Purposiveness	Activity
honeybee	16	5	23	25
elephant	14	25	7	5
p ≤	.8551	.0005	.0062	.0005

153.	Aliveness	Embodiment	Purposiveness	Activity
owl	22	26	19	9
beetle	8	4	11	21
p ≤	.0176	.0001	.2012	.0446

154.	Aliveness	Embodiment	Purposiveness	Activity
sun	23	26	29	28
largeness	7	4	1	2
p ≤	.0062	.0001	.0001	.0001

155.	Aliveness	Embodiment	Purposiveness	Activity
beaver	19	16	10	25
glacier	11	14	20	5
p ≤	.2012	.8551	.1003	.0005

156.	Aliveness	Embodiment	Purposiveness	Activity
swan	20	25	5	7
honeybee	10	5	25	23
p ≤	.1003	.0005	.0005	.0062

157.	Aliveness	Embodiment	Purposiveness	Activity
tiger	22	14	10	29
redwood tree	8	16	20	1
p ≤	.0176	.8551	.1003	.0001

158.	Aliveness	Embodiment	Purposiveness	Activity
fire	25	14	22	29
moss	5	16	8	1
p ≤	.0005	.8551	.0176	.0001

159.	Aliveness	Embodiment	Purposiveness	Activity
swan	9	14	12	7
raccoon	21	16	18	23
p ≤	.0446	.8551	.3613	.0062

160.	Aliveness	Embodiment	Purposiveness	Activity
bay	11	12	16	15
glacier	19	18	14	15
p ≤	.2012	.3613	.8551	1.0000

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161.	Aliveness	Embodiment	Purposiveness	Activity
largeness	6	11	4	4
daylight	24	19	26	26
p ≤	.0019	.2012	.0001	.0001

162.	Aliveness	Embodiment	Purposiveness	Activity
possum	8	2	2	5
tiger	22	28	28	25
p ≤	.0176	.0001	.0001	.0005

163.	Aliveness	Embodiment	Purposiveness	Activity
possum	12	14	6	12
owl	18	16	24	18
p ≤	.3613	.8551	.0019	.3613

164.	Aliveness	Embodiment	Purposiveness	Activity
hawk	16	7	14	14
kangaroo	14	23	16	16
p ≤	.8551	.0062	.8551	.8551

165.	Aliveness	Embodiment	Purposiveness	Activity
air	10	6	22	6
kangaroo	20	24	8	24
p ≤	.1003	.0019	.0176	.0019

166.	Aliveness	Embodiment	Purposiveness	Activity
waterfall	12	11	23	20
beaver	18	19	7	10
p ≤	.3613	.2012	.0062	.1003

167.	Aliveness	Embodiment	Purposiveness	Activity
air	21	18	23	26
distance	9	12	7	4
p ≤	.0446	.3613	.0062	.0001

168.	Aliveness	Embodiment	Purposiveness	Activity
swan	20	25	13	11
spider	10	5	17	19
p ≤	.1003	.0005	.5839	.2012

169.	Aliveness	Embodiment	Purposiveness	Activity
cloud	14	14	15	16
fog	16	16	15	14
p ≤	.8551	.8551	1.0000	.8551

170.	Aliveness	Embodiment	Purposiveness	Activity
hawk	19	18	26	26
possum	11	12	4	4
p ≤	.2012	.3613	.0001	.0001

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171.	Aliveness	Embodiment	Purposiveness	Activity
knows whole operation	28	26	24	26
knows just his own job	2	4	6	4
p ≤	.0001	.0001	.0019	.0001

172.	Aliveness	Embodiment	Purposiveness	Activity
sparrow	14	4	9	17
kangaroo	16	26	21	13
p ≤	.8551	.0001	.0446	.5839

173.	Aliveness	Embodiment	Purposiveness	Activity
redwood tree	24	20	26	14
clam	6	10	4	16
p ≤	.0019	.1003	.0001	.8551

174.	Aliveness	Embodiment	Purposiveness	Activity
distance	11	10	19	21
stone	19	20	11	9
p ≤	.2012	.1003	.2012	.0446

175.	Aliveness	Embodiment	Purposiveness	Activity
air	12	6	25	11
beetle	18	24	5	19
p ≤	.3613	.0019	.0005	.2012

176.	Aliveness	Embodiment	Purposiveness	Activity
redwood tree	28	26	21	21
distance	2	4	9	9
p ≤	.0001	.0001	.0446	.0446

177.	Aliveness	Embodiment	Purposiveness	Activity
daisy	17	9	12	13
glacier	13	21	18	17
p ≤	.5839	.0446	.3613	.5839

178.	Aliveness	Embodiment	Purposiveness	Activity
thickness	8	4	1	2
sun	22	26	29	28
p ≤	.0176	.0001	.0001	.0001

179.	Aliveness	Embodiment	Purposiveness	Activity
redwood tree	14	22	23	4
spider	16	8	7	26
p ≤	.8551	.0176	.0062	.0001

180.	Aliveness	Embodiment	Purposiveness	Activity
redwood tree	12	11	24	7
elephant	18	19	6	23
p ≤	.3613	.2012	.0019	.0062

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181.	Aliveness	Embodiment	Purposiveness	Activity
hippopotamus	17	22	6	10
wind	13	8	24	20
p ≤	.5839	.0176	.0019	.1003

182.	Aliveness	Embodiment	Purposiveness	Activity
glacier	21	23	25	29
stone	9	7	5	1
p ≤	.0446	.0062	.0005	.0001

183.	Aliveness	Embodiment	Purposiveness	Activity
elephant	15	19	5	4
waterfall	15	11	25	26
p ≤	1.0000	.2012	.0005	.0001

184.	Aliveness	Embodiment	Purposiveness	Activity
stone	15	24	14	21
equivalence	15	6	16	9
p ≤	1.0000	.0019	.8551	.0446

185.	Aliveness	Embodiment	Purposiveness	Activity
waterfall	25	25	19	23
thunder	5	5	11	7
p ≤	.0005	.0005	.2012	.0062

186.	Aliveness	Embodiment	Purposiveness	Activity
daisy	22	19	13	9
thunder	8	11	17	21
p ≤	.0176	.2012	.5839	.0446

187.	Aliveness	Embodiment	Purposiveness	Activity
waterfall	18	8	7	27
sun	12	22	23	3
p ≤	.3613	.0176	.0062	.0001

188.	Aliveness	Embodiment	Purposiveness	Activity
daylight	8	9	26	12
daisy	22	21	4	18
p ≤	.0176	.0446	.0001	.3613

189.	Aliveness	Embodiment	Purposiveness	Activity
automobile mechanic	23	16	17	7
automobile	7	14	13	23
p ≤	.0062	.8551	.5839	.0062

190.	Aliveness	Embodiment	Purposiveness	Activity
beaver	21	26	15	29
equivalence	9	4	15	1
p ≤	.0446	.0001	1.0000	.0001

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191.	Aliveness	Embodiment	Purposiveness	Activity
possum	24	21	5	17
thunder	6	9	25	13
p ≤	.0019	.0446	.0005	.5839

192.	Aliveness	Embodiment	Purposiveness	Activity
stone	11	19	8	5
daylight	19	11	22	25
p ≤	.2012	.2012	.0176	.0005

193.	Aliveness	Embodiment	Purposiveness	Activity
kangaroo	9	5	3	25
adult human	21	25	27	5
p ≤	.0446	.0005	.0001	.0005

194.	Aliveness	Embodiment	Purposiveness	Activity
automobile	4	6	5	27
driver of automobile	26	24	25	3
p ≤	.0001	.0019	.0005	.0001

195.	Aliveness	Embodiment	Purposiveness	Activity
tiger	24	27	19	30
distance	6	3	11	0
p ≤	.0019	.0001	.2012	.0001

196.	Aliveness	Embodiment	Purposiveness	Activity
adult human	24	26	11	28
daylight	6	4	19	2
p ≤	.0019	.0001	.2012	.0001

197.	Aliveness	Embodiment	Purposiveness	Activity
moss	20	19	8	0
lightning	10	11	22	30
p ≤	.1003	.2012	.0176	.0001

198.	Aliveness	Embodiment	Purposiveness	Activity
spider	27	23	15	22
thunder	3	7	15	8
p ≤	.0001	.0062	1.0000	.0176

199.	Aliveness	Embodiment	Purposiveness	Activity
hawk	22	26	15	19
honeybee	8	4	15	11
p ≤	.0176	.0001	1.0000	.2012

200.	Aliveness	Embodiment	Purposiveness	Activity
lightning	12	6	10	9
waterfall	18	24	20	21
p ≤	.3613	.0019	.1003	.0446

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201.	Aliveness	Embodiment	Purposiveness	Activity
glacier	9	16	21	6
beetle	21	14	9	24
p ≤	.0446	.8551	.0446	.0019

202.	Aliveness	Embodiment	Purposiveness	Activity
layer of mist	27	13	29	21
layer of dust	3	17	1	9
p ≤	.0001	.5839	.0001	.0446

203.	Aliveness	Embodiment	Purposiveness	Activity
sparrow	19	9	25	29
hippopotamus	11	21	5	1
p ≤	.2012	.0446	.0005	.0001

204.	Aliveness	Embodiment	Purposiveness	Activity
electromagnetism	7	10	20	7
hawk	23	20	10	23
p ≤	.0062	.1003	.1003	.0062

205.	Aliveness	Embodiment	Purposiveness	Activity
glacier	9	7	12	24
redwood tree	21	23	18	6
p ≤	.0446	.0062	.3613	.0019

206.	Aliveness	Embodiment	Purposiveness	Activity
sun	25	19	28	28
stone	5	11	2	2
p ≤	.0005	.2012	.0001	.0001

207.	Aliveness	Embodiment	Purposiveness	Activity
tiger	22	26	17	20
spider	8	4	13	10
p ≤	.0176	.0001	.5839	.1003

208.	Aliveness	Embodiment	Purposiveness	Activity
hippopotamus	6	9	2	1
adult human	24	21	28	29
p ≤	.0019	.0446	.0001	.0001

209.	Aliveness	Embodiment	Purposiveness	Activity
adult human	19	25	24	22
swan	11	5	6	8
p ≤	.2012	.0005	.0019	.0176

210.	Aliveness	Embodiment	Purposiveness	Activity
electromagnetism	4	8	22	4
sparrow	26	22	8	26
p ≤	.0001	.0176	.0176	.0176

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211.	Aliveness	Embodiment	Purposiveness	Activity
raccoon	25	24	9	25
air	5	6	21	5
p ≤	.0005	.0019	.0446	.0005

212.	Aliveness	Embodiment	Purposiveness	Activity
spider	10	5	19	21
elephant	20	25	11	9
p ≤	.1003	.0005	.2012	.0446

213.	Aliveness	Embodiment	Purposiveness	Activity
tiger	23	25	11	28
air	7	5	19	2
p ≤	.0062	.0005	.2012	.0001

214.	Aliveness	Embodiment	Purposiveness	Activity
sparrow	23	25	24	24
beetle	7	5	6	6
p ≤	.0062	.0005	.0019	.0019

215.	Aliveness	Embodiment	Purposiveness	Activity
daisy	28	27	20	23
largeness	2	3	10	7
p ≤	.0001	.0001	.1003	.0062

216.	Aliveness	Embodiment	Purposiveness	Activity
thickness	14	23	9	7
distance	16	7	21	23
p ≤	.8551	.0062	.0446	.0062

217.	Aliveness	Embodiment	Purposiveness	Activity
distance	9	4	17	7
hippopotamus	21	26	13	23
p ≤	.0446	.0001	.5839	.0062

218.	Aliveness	Embodiment	Purposiveness	Activity
raccoon	23	20	13	7
waterfall	7	10	17	23
p ≤	.0062	.1003	.5839	.0062

219.	Aliveness	Embodiment	Purposiveness	Activity
wind	12	5	20	22
swan	18	25	10	8
p ≤	.3613	.0005	.1003	.0176

220.	Aliveness	Embodiment	Purposiveness	Activity
thunder	7	8	19	13
swan	23	22	11	17
p ≤	.0062	.0176	.2012	.5839

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221.	Aliveness	Embodiment	Purposiveness	Activity
stone	24	22	15	17
thickness	6	8	15	13
p ≤	.0019	.01763	1.0000	.5839

222.	Aliveness	Embodiment	Purposiveness	Activity
redwood tree	23	27	11	26
equivalence	7	3	19	4
p ≤	.0062	.0001	.2012	.0001

223.	Aliveness	Embodiment	Purposiveness	Activity
wind	24	12	26	29
thickness	6	18	4	1
p ≤	.0019	.3613	.0001	.0001

224.	Aliveness	Embodiment	Purposiveness	Activity
tiger	27	24	12	25
electromagnetism	3	6	18	5
p ≤	.0001	.0019	.3613	.0005

225.	Aliveness	Embodiment	Purposiveness	Activity
barnacle	23	24	14	2
hail	7	6	16	28
p ≤	.0062	.0019	.8551	.0001

226.	Aliveness	Embodiment	Purposiveness	Activity
hawk	19	18	7	25
sun	11	12	23	5
p ≤	.2012	.3613	.0062	.0005

227.	Aliveness	Embodiment	Purposiveness	Activity
sparrow	22	25	13	28
air	8	5	17	2
p ≤	.0176	.0005	.5839	.0001

228.	Aliveness	Embodiment	Purposiveness	Activity
gnat	6	5	4	22
swan	24	25	26	8
p ≤	.0019	.0005	.0001	.0176

229.	Aliveness	Embodiment	Purposiveness	Activity
sparrow	15	7	17	27
swan	15	23	13	3
p ≤	1.0000	.0062	.5839	.0001

230.	Aliveness	Embodiment	Purposiveness	Activity
owl	25	26	7	2
honeybee	5	4	23	28
p ≤	.0005	.0001	.0062	.0001

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231.	Aliveness	Embodiment	Purposiveness	Activity
tiger	24	10	20	30
elephant	6	20	10	0
p ≤	.0019	.1003	.1003	.0001

232.	Aliveness	Embodiment	Purposiveness	Activity
air	23	15	8	18
gravity	7	15	22	12
p ≤	.0062	1.0000	.0176	.3613

233.	Aliveness	Embodiment	Purposiveness	Activity
daisy	13	13	16	2
beetle	17	17	14	28
p ≤	.5839	.5839	.8551	.0001

234.	Aliveness	Embodiment	Purposiveness	Activity
owl	26	25	13	28
distance	4	5	17	2
p ≤	.0001	.0005	.5839	.0001

235.	Aliveness	Embodiment	Purposiveness	Activity
gnat	4	1	5	19
owl	26	29	25	11
p ≤	.0001	.0001	.0005	.2012

236.	Aliveness	Embodiment	Purposiveness	Activity
automobile designer	22	18	21	6
automobile	8	12	9	24
p ≤	.0176	.3613	.0446	.0019

237.	Aliveness	Embodiment	Purposiveness	Activity
daisy	8	3	10	1
kangaroo	22	27	20	29
p ≤	.0176	.0001	.1003	.0001

238.	Aliveness	Embodiment	Purposiveness	Activity
honeybee	28	24	18	30
distance	2	6	12	0
p ≤	.0001	.0019	.3613	.0001

239.	Aliveness	Embodiment	Purposiveness	Activity
raccoon	24	24	6	27
daylight	6	6	24	3
p ≤	.0019	.0019	.0019	.0001

240.	Aliveness	Embodiment	Purposiveness	Activity
elderly person	12	10	7	0
adult	18	20	23	30
p ≤	.3613	.1003	.0062	.0001

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241.	Aliveness	Embodiment	Purposiveness	Activity
gnat	5	1	3	12
sparrow	25	29	27	18
p ≤	.0005	.0001	.0001	.3613

242.	Aliveness	Embodiment	Purposiveness	Activity
stone	2	6	5	0
hawk	28	24	25	30
p ≤	.0001	.0019	.0005	.0001

243.	Aliveness	Embodiment	Purposiveness	Activity
carpenter	12	13	13	2
adventurer	18	17	17	28
p ≤	.3613	.5839	.5839	.0001

244.	Aliveness	Embodiment	Purposiveness	Activity
raccoon	27	25	11	24
electromagnetism	3	5	19	6
p ≤	.0001	.0005	.2012	.0019

245.	Aliveness	Embodiment	Purposiveness	Activity
waterfall	27	24	13	29
electromagnetism	3	6	17	1
p ≤	.0001	.0019	.5839	.0001

246.	Aliveness	Embodiment	Purposiveness	Activity
hippopotamus	25	16	7	24
glacier	5	14	23	6
p ≤	.0005	.8551	.0062	.0019

247.	Aliveness	Embodiment	Purposiveness	Activity
electromagnetism	14	9	19	13
glacier	16	21	11	17
p ≤	.8551	.0446	.2012	.5839

248.	Aliveness	Embodiment	Purposiveness	Activity
gravity	10	10	26	6
spider	20	20	4	24
p ≤	.1003	.1003	.0001	.0019

249.	Aliveness	Embodiment	Purposiveness	Activity
beaver	18	16	15	30
redwood tree	12	14	15	0
p ≤	.3613	.8551	1.000	.0001

250.	Aliveness	Embodiment	Purposiveness	Activity
thunder	29	20	22	28
largeness	1	10	8	2
p ≤	.0001	.1003	.0176	.0001

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251.	Aliveness	Embodiment	Purposiveness	Activity
sun	22	15	26	17
glacier	8	15	4	13
p ≤	.0176	1.0000	.0001	.5839

252.	Aliveness	Embodiment	Purposiveness	Activity
sun	22	19	26	2
automobile	8	11	4	28
p ≤	.0176	.2012	.0001	.0001

253.	Aliveness	Embodiment	Purposiveness	Activity
wind	12	6	6	28
sun	18	24	24	2
p ≤	.3613	.0019	.0019	.0001

254.	Aliveness	Embodiment	Purposiveness	Activity
thunder	11	13	20	10
gnat	19	17	10	20
p ≤	.2012	.5839	.1003	.1003

255.	Aliveness	Embodiment	Purposiveness	Activity
beaver	25	25	21	15
spider	5	5	9	15
p ≤	.0005	.0005	.0446	1.0000

256.	Aliveness	Embodiment	Purposiveness	Activity
daylight	24	23	25	27
equivalence	6	7	5	3
p ≤	.0019	.0062	.0005	.0001

257.	Aliveness	Embodiment	Purposiveness	Activity
elephant	17	24	17	1
kangaroo	13	6	13	29
p ≤	.5839	.0019	.5839	.0001

258.	Aliveness	Embodiment	Purposiveness	Activity
possum	6	4	2	13
adult human	24	26	28	17
p ≤	.0019	.0019	.0001	.5839

259.	Aliveness	Embodiment	Purposiveness	Activity
honeybee	29	18	25	30
stone	1	12	5	0
p ≤	.0001	.3613	.0005	.0001

260.	Aliveness	Embodiment	Purposiveness	Activity
possum	18	25	8	9
spider	12	5	22	21
p ≤	.3613	.0005	.0176	.0446

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261.	Aliveness	Embodiment	Purposiveness	Activity
gravity	11	18	23	6
wind	19	12	7	24
p ≤	.2012	.3613	.0062	.0019

262.	Aliveness	Embodiment	Purposiveness	Activity
waterfall	17	14	19	24
possum	13	16	11	6
p ≤	.5839	.8551	.2012	.0019

263.	Aliveness	Embodiment	Purposiveness	Activity
largeness	11	6	14	1
owl	19	24	16	29
p ≤	.2012	.0019	.8551	.0001

264.	Aliveness	Embodiment	Purposiveness	Activity
air	28	24	23	28
equivalence	2	6	7	2
p ≤	.0001	.0019	.0062	.0001

265.	Aliveness	Embodiment	Purposiveness	Activity
wind	5	8	21	19
beetle	25	22	9	11
p ≤	.0005	.0176	.0446	.2012

266.	Aliveness	Embodiment	Purposiveness	Activity
equivalence	7	10	14	6
distance	23	20	16	24
p ≤	.0062	.1003	.8551	.0019

267.	Aliveness	Embodiment	Purposiveness	Activity
hawk	20	10	15	29
redwood tree	10	20	15	1
p ≤	.1003	.1003	1.000	.0001

268.	Aliveness	Embodiment	Purposiveness	Activity
gnat	21	18	14	30
stone	9	12	16	0
p ≤	.0446	.3613	.8551	.0001

269.	Aliveness	Embodiment	Purposiveness	Activity
hippopotamus	25	21	22	28
thickness	5	9	8	2
p ≤	.0005	.0446	.0176	.0001

270.	Aliveness	Embodiment	Purposiveness	Activity
daisy	28	21	6	2
wind	2	9	24	28
p ≤	.0001	.0446	.0019	.0001

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271.	Aliveness	Embodiment	Purposiveness	Activity
thunder	10	10	4	20
sun	20	20	26	10
p ≤	.1003	.1003	.0001	.1003

272.	Aliveness	Embodiment	Purposiveness	Activity
kangaroo	29	24	22	30
stone	1	6	8	0
p ≤	.0001	.0019	.0176	.0001

273.	Aliveness	Embodiment	Purposiveness	Activity
honeybee	25	23	7	30
daylight	5	7	23	0
p ≤	.0005	.0062	.00623	.0001

274.	Aliveness	Embodiment	Purposiveness	Activity
thunder	24	10	13	21
fog	6	20	17	9
p ≤	.0019	.1003	.5839	.0446

275.	Aliveness	Embodiment	Purposiveness	Activity
elephant	27	24	18	27
thickness	3	6	12	3
p ≤	.0001	.0019	.3613	.0001

276.	Aliveness	Embodiment	Purposiveness	Activity
raccoon	14	21	7	16
beaver	16	9	23	14
p ≤	.8551	.0446	.0062	.8551

277.	Aliveness	Embodiment	Purposiveness	Activity
moss	10	3	4	14
redwood tree	20	27	26	16
p ≤	.1003	.0001	.0001	.8551

278.	Aliveness	Embodiment	Purposiveness	Activity
owl	24	21	9	28
gravity	6	9	21	2
p ≤	.0019	.0446	.0446	.000

279.	Aliveness	Embodiment	Purposiveness	Activity
equivalence	8	6	15	2
elephant	22	24	15	28
p ≤	.0176	.0019	1.0000	.0001

280.	Aliveness	Embodiment	Purposiveness	Activity
daylight	8	5	21	3
beaver	22	25	9	27
p ≤	.0176	.0005	.0446	.0001

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281.	Aliveness	Embodiment	Purposiveness	Activity
air	6	5	20	11
possum	24	25	10	19
p ≤	.0019	.0005	.1003	.2012

282.	Aliveness	Embodiment	Purposiveness	Activity
largeness	10	8	14	1
possum	20	22	16	29
p ≤	.1003	.0176	.8551	.0001

283.	Aliveness	Embodiment	Purposiveness	Activity
beaver	19	24	24	29
daisy	11	6	6	1
p ≤	.2012	.0019	.0019	.0001

284.	Aliveness	Embodiment	Purposiveness	Activity
beetle	25	21	8	27
gravity	5	9	22	3
p ≤	.0005	.0446	.0176	.0001

285.	Aliveness	Embodiment	Purposiveness	Activity
man fishing to eat	15	24	27	22
man fishing for fun	15	6	3	8
p ≤	1.0000	.0019	.0001	.0176

286.	Aliveness	Embodiment	Purposiveness	Activity
dolphin	21	19	21	27
baby	9	11	9	3
p ≤	.0446	.2012	.0446	.0001

287.	Aliveness	Embodiment	Purposiveness	Activity
largeness	9	6	12	0
kangaroo	21	24	18	30
p ≤	.0446	.0019	.3613	.0001

288.	Aliveness	Embodiment	Purposiveness	Activity
waterfall	22	13	16	29
glacier	8	17	14	1
p ≤	.0176	.5839	.8551	.0001

289.	Aliveness	Embodiment	Purposiveness	Activity
automobile	2	10	9	20
pedestrian	28	20	21	10
p ≤	.0001	.1003	.0446	.1003

290.	Aliveness	Embodiment	Purposiveness	Activity
gravity	3	3	7	20
sun	27	27	23	10
p ≤	.0001	.0001	.0062	.1003

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291.	Aliveness	Embodiment	Purposiveness	Activity
hawk	23	26	10	16
waterfall	7	4	20	14
p ≤	.0062	.0001	.1003	.8551

292.	Aliveness	Embodiment	Purposiveness	Activity
hawk	25	5	27	29
hippopotamus	5	25	3	1
p ≤	.0005	.0005	.0001	.0001

293.	Aliveness	Embodiment	Purposiveness	Activity
beetle	12	9	13	14
swan	18	21	17	16
p ≤	.3613	.0446	.5839	.8551

294.	Aliveness	Embodiment	Purposiveness	Activity
redwood tree	26	23	22	14
barnacle	4	7	8	16
p ≤	.0001	.0062	.0176	.8551

295.	Aliveness	Embodiment	Purposiveness	Activity
waterfall	25	10	21	16
automobile	5	20	9	14
p ≤	.0005	.1003	.0446	.8551

296.	Aliveness	Embodiment	Purposiveness	Activity
air	5	3	19	9
honeybee	25	27	11	21
p ≤	.0005	.0001	.2012	.0446

297.	Aliveness	Embodiment	Purposiveness	Activity
beetle	27	28	26	11
gnat	3	2	4	19
p ≤	.0001	.0001	.0001	.2012

298.	Aliveness	Embodiment	Purposiveness	Activity
gravity	10	4	25	15
gnat	20	26	5	15
p ≤	.1003	.0001	.0005	1.0000

299.	Aliveness	Embodiment	Purposiveness	Activity
waterfall	11	4	19	21
owl	19	26	11	9
p ≤	.2012	.0001	.2012	.0446

300.	Aliveness	Embodiment	Purposiveness	Activity
hawk	27	10	22	26
owl	3	20	8	4
p ≤	.0001	.1003	.0176	.0001

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301.	Aliveness	Embodiment	Purposiveness	Activity
elephant	7	20	6	6
adult human	23	10	24	24
p ≤	.0062	.1003	.0019	.0019

302.	Aliveness	Embodiment	Purposiveness	Activity
sparrow	20	19	10	29
redwood tree	10	11	20	1
p ≤	.1003	.2012	.1003	.0001

303.	Aliveness	Embodiment	Purposiveness	Activity
thunder	11	2	17	14
tiger	19	28	13	16
p ≤	.2012	.0001	.5839	.8551

304.	Aliveness	Embodiment	Purposiveness	Activity
sparrow	13	5	4	17
adult human	17	25	26	13
p ≤	.5839	.0005	.0001	.5839

305.	Aliveness	Embodiment	Purposiveness	Activity
tiger	23	25	11	18
beaver	7	5	19	12
p ≤	.0062	.0005	.2012	.3613

306.	Aliveness	Embodiment	Purposiveness	Activity
roller skates	19	8	16	24
basketball shoes	11	22	14	6
p ≤	.2012	.0176	.8551	.0019

307.	Aliveness	Embodiment	Purposiveness	Activity
gravity	11	3	24	20
hippopotamus	19	27	6	10
p ≤	.2012	.0001	.0019	.1003

308.	Aliveness	Embodiment	Purposiveness	Activity
daisy	8	3	12	6
hawk	22	27	18	24
p ≤	.0176	.0001	.3613	.0019

309.	Aliveness	Embodiment	Purposiveness	Activity
daylight	23	23	25	20
distance	7	7	5	10
p ≤	.0062	.0062	.0005	.1003

310.	Aliveness	Embodiment	Purposiveness	Activity
gnat	16	23	1	7
wind	14	7	29	23
p ≤	.8551	.0062	.0001	.0062

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311.	Aliveness	Embodiment	Purposiveness	Activity
owl	7	14	21	11
raccoon	23	16	9	19
p ≤	.0062	.8551	.0446	.2012

312.	Aliveness	Embodiment	Purposiveness	Activity
spider	25	28	11	21
electromagnetism	5	2	19	9
p ≤	.0005	.0001	.2012	.0446

313.	Aliveness	Embodiment	Purposiveness	Activity
possum	24	29	11	24
equivalence	6	1	19	6
p ≤	.0019	.0001	.2012	.0019

314.	Aliveness	Embodiment	Purposiveness	Activity
sparrow	19	28	8	24
daylight	11	2	22	6
p ≤	.2012	.0001	.0176	.0019

315.	Aliveness	Embodiment	Purposiveness	Activity
hippopotamus	16	25	7	6
swan	14	5	23	24
p ≤	.8551	.0005	.0062	.0019

316.	Aliveness	Embodiment	Purposiveness	Activity
wind	30	21	25	27
distance	0	9	5	3
p ≤	.0001	.0446	.0005	.0001

317.	Aliveness	Embodiment	Purposiveness	Activity
electromagnetism	10	2	17	9
honeybee	20	28	13	21
p ≤	.1003	.0001	.5839	.0446

318.	Aliveness	Embodiment	Purposiveness	Activity
gnat	17	1	7	26
hippopotamus	13	29	23	4
p ≤	.5839	.0001	.0062	.0001

319.	Aliveness	Embodiment	Purposiveness	Activity
sparrow	24	26	14	26
largeness	6	4	16	4
p ≤	.0019	.0001	.8551	.0001

320.	Aliveness	Embodiment	Purposiveness	Activity
daisy	11	2	14	5
raccoon	19	28	16	25
p ≤	.2012	.0001	.8551	.0001

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321.	Aliveness	Embodiment	Purposiveness	Activity
equivalence	12	8	10	6
electromagnetism	18	22	20	24
p ≤	.3613	.0176	.1003	.0019

322.	Aliveness	Embodiment	Purposiveness	Activity
kangaroo	24	22	12	28
redwood tree	6	8	18	2
p ≤	.0019	.0176	.3613	.0001

323.	Aliveness	Embodiment	Purposiveness	Activity
tiger	14	17	5	14
adult human	16	13	25	16
p ≤	.8551	.5839	.0005	.8551

324.	Aliveness	Embodiment	Purposiveness	Activity
spider	24	27	10	23
daylight	6	3	20	7
p ≤	.0019	.0001	.1003	.0062

325.	Aliveness	Embodiment	Purposiveness	Activity
raccoon	26	29	12	27
distance	4	1	18	3
p ≤	.0001	.0001	.3613	.0001

326.	Aliveness	Embodiment	Purposiveness	Activity
glacier	9	4	21	6
tiger	21	26	9	24
p ≤	.0446	.0001	.0446	.0019

327.	Aliveness	Embodiment	Purposiveness	Activity
distance	1	2	4	6
sun	29	28	26	24
p ≤	.0001	.0001	.0001	.0019

328.	Aliveness	Embodiment	Purposiveness	Activity
thickness	0	8	13	4
daisy	30	22	17	26
p ≤	.0001	.0176	.5839	.0001

329.	Aliveness	Embodiment	Purposiveness	Activity
hippopotamus	11	8	3	4
elephant	19	22	27	26
p ≤	.2012	.0176	.0001	.0001

330.	Aliveness	Embodiment	Purposiveness	Activity
possum	17	28	4	7
wind	13	2	26	23
p ≤	.5839	.0001	.0001	.0062

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331.	Aliveness	Embodiment	Purposiveness	Activity
stone	10	14	16	3
daisy	20	16	14	27
p ≤	.1003	.8551	.8551	.0001

332.	Aliveness	Embodiment	Purposiveness	Activity
sun	26	28	21	16
electromagnetism	4	2	9	14
p ≤	.0001	.0001	.0446	.8551

333.	Aliveness	Embodiment	Purposiveness	Activity
possum	24	29	7	18
daylight	6	1	23	12
p ≤	.0019	.0001	.0062	.3613

334.	Aliveness	Embodiment	Purposiveness	Activity
stone	12	23	3	7
gravity	18	7	27	23
p ≤	.3613	.0062	.0001	.0062

335.	Aliveness	Embodiment	Purposiveness	Activity
thunder	7	4	11	16
honeybee	23	26	19	14
p ≤	.0062	.0001	.2012	.8551

336.	Aliveness	Embodiment	Purposiveness	Activity
circle	12	5	6	11
sphere	18	25	24	19
p ≤	.3613	.0005	.0019	.2012

337.	Aliveness	Embodiment	Purposiveness	Activity
electromagnetism	3	1	23	13
swan	27	29	7	17
p ≤	.0001	.0001	.0062	.5839

338.	Aliveness	Embodiment	Purposiveness	Activity
largeness	4	11	5	4
air	26	19	25	26
p ≤	.0001	.2012	.0005	.0001

339.	Aliveness	Embodiment	Purposiveness	Activity
adult human	28	29	23	29
largeness	2	1	7	1
p ≤	.0001	.0001	.0062	.0001

340.	Aliveness	Embodiment	Purposiveness	Activity
thunder	30	16	18	28
thickness	0	14	12	2
p ≤	.0001	.8551	.3613	.0001

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341.	Aliveness	Embodiment	Purposiveness	Activity
elephant	11	24	24	8
raccoon	19	6	6	22
p ≤	.2012	.0019	.0019	.0176

342.	Aliveness	Embodiment	Purposiveness	Activity
person known well	24	25	27	24
person known slightly	6	5	3	6
p ≤	.0019	.0005	.0001	.0019

343.	Aliveness	Embodiment	Purposiveness	Activity
daydream	21	17	15	20
mental plan	9	13	15	10
p ≤	.0446	.5839	1.0000	.1003

344.	Aliveness	Embodiment	Purposiveness	Activity
wind	7	5	23	18
spider	23	25	7	12
p ≤	.0062	.0005	.0062	.3613

345.	Aliveness	Embodiment	Purposiveness	Activity
thickness	7	4	7	4
glacier	23	26	23	26
p ≤	.0062	.0001	.0062	.0001

346.	Aliveness	Embodiment	Purposiveness	Activity
equivalence	1	1	20	2
kangaroo	29	29	10	28
p ≤	.0001	.0001	.1003	.0001

347.	Aliveness	Embodiment	Purposiveness	Activity
sun	13	22	24	8
fire	17	8	6	22
p ≤	.5839	.0176	.0062	.0176

348.	Aliveness	Embodiment	Purposiveness	Activity
tiger	29	25	17	29
stone	1	5	13	1
p ≤	.0001	.0005	.5839	.0001

349.	Aliveness	Embodiment	Purposiveness	Activity
possum	9	16	5	4
beaver	21	14	25	26
p ≤	.0446	.8551	.0005	.0001

350.	Aliveness	Embodiment	Purposiveness	Activity
sun	12	10	26	11
kangaroo	18	20	4	19
p ≤	.3613	.1003	.0001	.2012

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351.	Aliveness	Embodiment	Purposiveness	Activity
talkative person	18	17	8	25
quiet person	12	13	22	5
p ≤	.3613	.5839	.0176	.0005

352.	Aliveness	Embodiment	Purposiveness	Activity
thickness	2	18	3	3
air	28	12	27	27
p ≤	.0001	.3613	.0001	.0001

353.	Aliveness	Embodiment	Purposiveness	Activity
waterfall	28	25	11	23
gravity	2	5	19	7
p ≤	.0001	.0005	.2012	.0062

354.	Aliveness	Embodiment	Purposiveness	Activity
owl	10	7	4	10
adult human	20	23	26	20
p ≤	.1003	.0062	.0001	.1003

355.	Aliveness	Embodiment	Purposiveness	Activity
beaver	19	19	19	21
owl	11	11	11	9
p ≤	.2012	.2012	.2012	.0446

356.	Aliveness	Embodiment	Purposiveness	Activity
hippopotamus	14	25	4	2
waterfall	16	5	26	28
p ≤	.8551	.0005	.0001	.0001

357.	Aliveness	Embodiment	Purposiveness	Activity
kangaroo	22	28	10	15
honeybee	8	2	20	15
p ≤	.0176	.0001	.1003	1.0000

358.	Aliveness	Embodiment	Purposiveness	Activity
equivalence	7	4	25	4
gnat	23	26	5	26
p ≤	.0062	.0001	.0005	.0001

359.	Aliveness	Embodiment	Purposiveness	Activity
restless sea	19	15	10	26
quiet sea	11	15	20	4
p ≤	.2012	1.0000	.1003	.0001

360.	Aliveness	Embodiment	Purposiveness	Activity
snowflake	28	26	10	28
symmetry	2	4	20	2
p ≤	.0001	.0001	.1003	.0001

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361.	Aliveness	Embodiment	Purposiveness	Activity
hawk	24	27	15	21
thunder	6	3	15	9
p ≤	.0019	.0001	1.0000	.0446

362.	Aliveness	Embodiment	Purposiveness	Activity
sparrow	29	29	9	28
equivalence	1	1	21	2
p ≤	.0001	.0001	.0446	.0001

363.	Aliveness	Embodiment	Purposiveness	Activity
kangaroo	22	28	12	21
beetle	8	2	18	9
p ≤	.0176	.0001	.3613	.0446

364.	Aliveness	Embodiment	Purposiveness	Activity
redwood tree	21	18	7	7
sun	9	12	23	23
p ≤	.0446	.3613	.0062	.0062

365.	Aliveness	Embodiment	Purposiveness	Activity
swan	21	27	22	24
daisy	9	3	8	6
p ≤	.0446	.0001	.0176	.0019

366.	Aliveness	Embodiment	Purposiveness	Activity
spider	23	20	11	18
glacier	7	10	19	12
p ≤	.0062	.1003	.2012	.3613

367.	Aliveness	Embodiment	Purposiveness	Activity
redwood tree	14	14	24	5
beetle	16	16	6	25
p ≤	.8551	.8551	.0019	.0005

368.	Aliveness	Embodiment	Purposiveness	Activity
deaf person	6	14	19	10
hearing person	24	16	11	20
p ≤	.0019	.8551	.2012	.1003

369.	Aliveness	Embodiment	Purposiveness	Activity
beaver	3	10	7	17
adult human	27	20	23	13
p ≤	.0001	.1003	.0062	.5839

370.	Aliveness	Embodiment	Purposiveness	Activity
elephant	30	29	19	25
largeness	0	1	11	5
p ≤	.0001	.0001	.2012	.0005

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371.	Aliveness	Embodiment	Purposiveness	Activity
possum	23	25	19	27
stone	7	5	11	3
p ≤	.0062	.0005	.2012	.0001

372.	Aliveness	Embodiment	Purposiveness	Activity
daylight	12	4	20	7
waterfall	18	26	10	23
p ≤	.3613	.0001	.1003	.0062

373.	Aliveness	Embodiment	Purposiveness	Activity
thickness	16	19	14	7
largeness	14	11	16	23
p ≤	.8551	.2012	.8551	.0062

374.	Aliveness	Embodiment	Purposiveness	Activity
air	14	5	19	21
glacier	16	25	11	9
p ≤	.8551	.0005	.2012	.0446

375.	Aliveness	Embodiment	Purposiveness	Activity
person without options	3	6	4	4
person with options	27	24	26	26
p ≤	.0001	.0019	.0001	.0001

376.	Aliveness	Embodiment	Purposiveness	Activity
daylight	9	12	23	10
thunder	21	18	7	20
p ≤	.0446	.3613	.0062	.1003

377.	Aliveness	Embodiment	Purposiveness	Activity
glacier	12	26	15	11
thunder	18	4	15	19
p ≤	.3613	.0001	1.0000	.2012

378.	Aliveness	Embodiment	Purposiveness	Activity
air	11	1	22	11
beaver	19	29	8	19
p ≤	.2012	.0001	.0176	.2012

379.	Aliveness	Embodiment	Purposiveness	Activity
spider	22	21	18	28
stone	8	9	12	2
p ≤	.0176	.0446	.3613	.0001

380.	Aliveness	Embodiment	Purposiveness	Activity
raccoon	23	29	8	4
honeybee	7	1	22	26
p ≤	.0062	.0001	.0176	.0001

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381.	Aliveness	Embodiment	Purposiveness	Activity
swan	29	29	11	25
distance	1	1	19	5
p ≤	.0001	.0001	.2012	.0005

382.	Aliveness	Embodiment	Purposiveness	Activity
redwood tree	22	29	26	24
largeness	8	1	4	6
p ≤	.0176	.0001	.0001	.0019

383.	Aliveness	Embodiment	Purposiveness	Activity
stone	4	23	4	2
wind	26	7	26	28
p ≤	.0001	.0062	.0019	.0001

384.	Aliveness	Embodiment	Purposiveness	Activity
beetle	6	5	10	19
elephant	24	25	20	11
p ≤	.0019	.0005	.1003	.2012

385.	Aliveness	Embodiment	Purposiveness	Activity
tiger	20	24	17	29
owl	10	6	13	1
p ≤	.1003	.0019	.5839	.0001

386.	Aliveness	Embodiment	Purposiveness	Activity
beetle	3	7	4	6
hawk	27	23	26	24
p ≤	.0001	.0062	.0001	.0019

387.	Aliveness	Embodiment	Purposiveness	Activity
distance	11	6	19	8
sparrow	19	24	11	22
p ≤	.2012	.0019	.2012	.0176

388.	Aliveness	Embodiment	Purposiveness	Activity
glacier	17	19	18	9
owl	13	11	12	21
p ≤	.5839	.2012	.3613	.0446

389.	Aliveness	Embodiment	Purposiveness	Activity
air	12	4	26	22
swan	18	26	4	8
p ≤	.3613	.0001	.0001	.0176

390.	Aliveness	Embodiment	Purposiveness	Activity
untraveled river	28	24	24	27
untraveled road	2	6	6	3
p ≤	.0001	.0019	.0019	.0001

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391.	Aliveness	Embodiment	Purposiveness	Activity
stone	10	23	3	2
electromagnetism	20	7	27	28
p ≤	.1003	.0062	.0001	.0001

392.	Aliveness	Embodiment	Purposiveness	Activity
distance	10	5	11	12
glacier	20	25	19	18
p ≤	.1003	.0005	.2012	.3613

393.	Aliveness	Embodiment	Purposiveness	Activity
kangaroo	11	18	9	8
waterfall	19	12	21	22
p ≤	.2012	.3613	.0446	.0176

394.	Aliveness	Embodiment	Purposiveness	Activity
equivalence	0	4	9	1
wind	30	26	21	29
p ≤	.0001	.0001	.0446	.0001

395.	Aliveness	Embodiment	Purposiveness	Activity
you	17	24	21	22
your head	13	6	9	8
p ≤	.5839	.0019	.0446	.0176

396.	Aliveness	Embodiment	Purposiveness	Activity
hippopotamus	25	27	7	9
electromagnetism	5	3	23	21
p ≤	.0005	.0001	.0062	.0446

397.	Aliveness	Embodiment	Purposiveness	Activity
gnat	8	3	5	15
adult human	22	27	25	15
p ≤	.0176	.0001	.0005	1.0000

398.	Aliveness	Embodiment	Purposiveness	Activity
gravity	11	8	26	14
raccoon	19	22	4	16
p ≤	.2012	.0176	.0001	.8551

399.	Aliveness	Embodiment	Purposiveness	Activity
daylight	15	7	2	7
sun	15	23	28	23
p ≤	1.0000	.0062	.0001	.0062

400.	Aliveness	Embodiment	Purposiveness	Activity
sparrow	19	24	19	29
daisy	11	6	11	1
p ≤	.2012	.0019	.2012	.0001

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401.	Aliveness	Embodiment	Purposiveness	Activity
swan	24	19	16	17
possum	6	11	14	13
p ≤	.0019	.2012	.8551	.5839

402.	Aliveness	Embodiment	Purposiveness	Activity
spider	20	21	6	16
air	10	9	24	14
p ≤	.1003	.0446	.0019	.8551

403.	Aliveness	Embodiment	Purposiveness	Activity
thunder	19	14	18	17
beetle	11	16	12	13
p ≤	.2012	.8551	.3613	.5839

404.	Aliveness	Embodiment	Purposiveness	Activity
adult human	27	26	20	28
distance	3	4	10	2
p ≤	.0001	.0001	.1003	.0001

405.	Aliveness	Embodiment	Purposiveness	Activity
glacier	12	17	17	4
honeybee	18	13	13	26
p ≤	.8551	.5839	.5839	.0001

406.	Aliveness	Embodiment	Purposiveness	Activity
deaf artist	13	22	28	9
hearing artist	17	8	2	21
p ≤	.5839	.0176	.0001	.0446

407.	Aliveness	Embodiment	Purposiveness	Activity
gnat	11	3	10	16
kangaroo	19	27	20	14
p ≤	.2012	.0001	.1003	.8551

408.	Aliveness	Embodiment	Purposiveness	Activity
thunder	28	21	4	21
gravity	2	9	26	9
p ≤	.0001	.0446	.0001	.0446

409.	Aliveness	Embodiment	Purposiveness	Activity
waterfall	27	20	19	30
largeness	3	10	11	0
p ≤	.0001	.1003	.2012	.0001

410.	Aliveness	Embodiment	Purposiveness	Activity
elephant	22	23	18	15
swan	8	7	12	15
p ≤	.0176	.0062	.3613	1.0000

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411.	Aliveness	Embodiment	Purposiveness	Activity
air	15	10	25	14
thunder	15	20	5	16
p ≤	1.0000	.1003	.0005	.8551

412.	Aliveness	Embodiment	Purposiveness	Activity
kangaroo	20	21	5	25
daylight	10	9	25	5
p ≤	.1003	.0446	.0005	.0005

413.	Aliveness	Embodiment	Purposiveness	Activity
raccoon	20	13	0	25
sun	10	17	30	5
p ≤	.1003	.5839	.0001	.0005

414.	Aliveness	Embodiment	Purposiveness	Activity
gravity	13	5	27	19
elephant	17	25	3	11
p ≤	.5839	.0005	.0001	.2012

415.	Aliveness	Embodiment	Purposiveness	Activity
wind	12	12	25	16
hawk	18	18	5	14
p ≤	.3613	.3613	.0005	.8551

416.	Aliveness	Embodiment	Purposiveness	Activity
spider	21	28	24	17
gnat	9	2	6	13
p ≤	.0446	.0001	.0019	.5839

417.	Aliveness	Embodiment	Purposiveness	Activity
tiger	23	28	15	30
equivalence	7	2	15	0
p ≤	.0062	.0001	1.0000	.0001

418.	Aliveness	Embodiment	Purposiveness	Activity
redwood tree	17	16	26	4
hippopotamus	13	14	4	26
p ≤	.5839	.8551	.0001	.0001

419.	Aliveness	Embodiment	Purposiveness	Activity
thickness	10	6	14	1
sparrow	20	24	16	29
p ≤	.1003	.0019	.8551	.0001

420.	Aliveness	Embodiment	Purposiveness	Activity
spider	19	20	19	28
daisy	11	10	11	2
p ≤	.2012	.10003	.2012	.0001

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421.	Aliveness	Embodiment	Purposiveness	Activity
redwood tree	14	21	13	0
waterfall	16	9	17	30
p ≤	.8551	.0446	.5839	.0001

422.	Aliveness	Embodiment	Purposiveness	Activity
glacier	10	17	25	8
possum	20	13	5	22
p ≤	.1003	.5839	.0005	.0176

423.	Aliveness	Embodiment	Purposiveness	Activity
possum	11	22	6	3
honeybee	19	8	24	27
p ≤	.2012	.0176	.0019	.0001

424.	Aliveness	Embodiment	Purposiveness	Activity
hawk	20	22	6	23
air	10	8	24	7
p ≤	.1003	.0176	.0019	.0062

425.	Aliveness	Embodiment	Purposiveness	Activity
productive person	26	24	27	30
unproductive person	4	6	3	0
p ≤	.0001	.0019	.0001	.0001

426.	Aliveness	Embodiment	Purposiveness	Activity
glacier	9	20	27	7
gnat	21	10	3	23
p ≤	.0446	.1003	.0001	.0062

427.	Aliveness	Embodiment	Purposiveness	Activity
thickness	9	10	12	2
raccoon	21	20	18	28
p ≤	.0446	.1003	.3613	.0001

428.	Aliveness	Embodiment	Purposiveness	Activity
owl	25	23	5	19
air	5	7	25	11
p ≤	.0005	.0062	.0005	.2012

429.	Aliveness	Embodiment	Purposiveness	Activity
daylight	14	9	25	7
swan	16	21	5	23
p ≤	.8551	.0446	.0005	.0062

430.	Aliveness	Embodiment	Purposiveness	Activity
honeybee	22	19	12	21
wind	8	11	18	9
p ≤	.0176	.2012	.3613	.0446

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431.	Aliveness	Embodiment	Purposiveness	Activity
thunder	14	22	8	15
wind	16	8	22	15
p ≤	.8551	.0176	.0176	1.0000

432.	Aliveness	Embodiment	Purposiveness	Activity
sparrow	12	4	11	27
elephant	18	26	19	3
p ≤	.3613	.0001	.2012	.0001

433.	Aliveness	Embodiment	Purposiveness	Activity
lightning	21	18	23	27
barnacle	9	12	7	3
p ≤	.0446	.3613	.0062	.0001

434.	Aliveness	Embodiment	Purposiveness	Activity
stone	1	14	8	3
owl	29	16	22	27
p ≤	.0001	.8551	.0176	.0001

435.	Aliveness	Embodiment	Purposiveness	Activity
elephant	15	23	12	15
owl	15	7	18	15
p ≤	1.0000	.0062	.3613	1.0000

436.	Aliveness	Embodiment	Purposiveness	Activity
gravity	7	6	28	11
swan	23	24	2	19
p ≤	.0062	.0019	.0001	.5839

437.	Aliveness	Embodiment	Purposiveness	Activity
beaver	14	16	4	23
sun	16	14	26	7
p ≤	.8551	.8551	.0001	.0062

438.	Aliveness	Embodiment	Purposiveness	Activity
thunder	20	12	21	23
hippopotamus	10	18	9	7
p ≤	.1003	.3613	.0446	.0062

439.	Aliveness	Embodiment	Purposiveness	Activity
largeness	12	9	20	15
stone	18	21	10	15
p ≤	.3613	.0446	.1003	1.0000

440.	Aliveness	Embodiment	Purposiveness	Activity
elephant	13	23	5	6
wind	17	7	25	24
p ≤	.5839	.0062	.0005	.0019

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441.	Aliveness	Embodiment	Purposiveness	Activity
blind person	16	18	19	7
sighted person	14	12	11	23
p ≤	.8551	.3613	.2012	.0062

442.	Aliveness	Embodiment	Purposiveness	Activity
stone	1	15	3	1
waterfall	29	15	27	29
p ≤	.0001	1.0000	.0001	.0001

443.	Aliveness	Embodiment	Purposiveness	Activity
tiger	20	17	3	27
sun	10	13	27	3
p ≤	.1003	.5839	.0001	.0001

444.	Aliveness	Embodiment	Purposiveness	Activity
equivalence	12	9	15	7
largeness	18	21	15	23
p ≤	.3613	.0446	1.0000	.0062

445.	Aliveness	Embodiment	Purposiveness	Activity
glacier	3	15	15	4
adult human	27	15	15	26
p ≤	.0001	1.0000	1.0000	.0001

446.	Aliveness	Embodiment	Purposiveness	Activity
gravity	10	21	24	11
electromagnetism	20	9	6	19
p ≤	.1003	.0446	.0019	.2012

447.	Aliveness	Embodiment	Purposiveness	Activity
air	6	9	26	26
daisy	24	21	4	4
p ≤	.0019	.0446	.0001	.0001

448.	Aliveness	Embodiment	Purposiveness	Activity
thickness	8	5	8	0
waterfall	22	25	22	30
p ≤	.0176	.0005	.0176	.0001

449.	Aliveness	Embodiment	Purposiveness	Activity
thunder	26	25	12	25
distance	4	5	18	5
p ≤	.0001	.0005	.3613	.0005

450.	Aliveness	Embodiment	Purposiveness	Activity
100 MPH wind	8	3	13	3
100 MPH cyclone	22	27	17	27
p ≤	.0176	.0001	.5839	.0001

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451.	Aliveness	Embodiment	Purposiveness	Activity
stone	23	11	13	18
brick	7	19	17	12
p ≤	.0062	.2012	.5839	.3613

452.	Aliveness	Embodiment	Purposiveness	Activity
kangaroo	25	21	12	23
owl	5	9	18	7
p ≤	.0005	.0446	.3613	.0062

453.	Aliveness	Embodiment	Purposiveness	Activity
hawk	22	27	19	23
spider	8	3	11	7
p ≤	.0176	.0001	.2012	.0062

454.	Aliveness	Embodiment	Purposiveness	Activity
sun	12	20	28	11
beetle	18	10	2	19
p ≤	.3613	.1003	.0001	.2012

455.	Aliveness	Embodiment	Purposiveness	Activity
beaver	14	20	9	10
wind	16	10	21	20
p ≤	.8551	.1003	.0446	.1003

456.	Aliveness	Embodiment	Purposiveness	Activity
equivalence	6	3	10	1
adult human	24	27	20	29
p ≤	.0019	.0001	.1003	.0001

457.	Aliveness	Embodiment	Purposiveness	Activity
spider	13	10	16	11
kangaroo	17	20	14	19
p ≤	.5839	.1003	.8551	.2012

458.	Aliveness	Embodiment	Purposiveness	Activity
fire	19	18	26	30
barnacle	11	12	4	0
p ≤	.2012	.3613	.0001	.0001

459.	Aliveness	Embodiment	Purposiveness	Activity
equivalence	4	4	20	5
hippopotamus	26	26	10	25
p ≤	.0001	.0001	.1003	.0005

460.	Aliveness	Embodiment	Purposiveness	Activity
gnat	11	0	6	10
hawk	19	30	24	20
p ≤	.2012	.0001	.0019	.1003

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461.	Aliveness	Embodiment	Purposiveness	Activity
sparrow	27	17	20	30
stone	3	13	10	0
15P ≤	.0001	.5839	.1003	.0001

462.	Aliveness	Embodiment	Purposiveness	Activity
beetle	5	15	2	5
honeybee	25	15	28	25
p ≤	.0005	1.0000	.0001	.0005

463.	Aliveness	Embodiment	Purposiveness	Activity
largeness	3	11	15	5
beaver	27	19	15	25
p ≤	.0001	.2012	1.0000	.0005

464.	Aliveness	Embodiment	Purposiveness	Activity
relative met once	25	22	17	21
nonrelative met once	5	8	13	9
p ≤	.0005	.0176	.5839	.0446

465.	Aliveness	Embodiment	Purposiveness	Activity
beetle	12	8	12	24
possum	18	22	18	6
p ≤	.3613	.0176	.3613	.0019

466.	Aliveness	Embodiment	Purposiveness	Activity
electromagnetism	10	3	12	23
redwood tree	20	27	18	7
p ≤	.1003	.0001	.3613	.0062

467.	Aliveness	Embodiment	Purposiveness	Activity
honeybee	14	12	24	28
hippopotamus	16	18	6	2
p ≤	.8551	.3613	.0019	.0001

468.	Aliveness	Embodiment	Purposiveness	Activity
beaver	29	23	20	30
thickness	1	7	10	0
p ≤	.0001	.0062	.1003	.0001

469.	Aliveness	Embodiment	Purposiveness	Activity
tiger	22	24	6	25
daylight	8	6	24	5
p ≤	.0176	.0019	.0019	.0005

470.	Aliveness	Embodiment	Purposiveness	Activity
tiger	23	22	18	30
largeness	7	8	12	0
p ≤	.0062	.0176	.3613	.0001

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471.	Aliveness	Embodiment	Purposiveness	Activity
redwood tree	18	27	29	11
daisy	12	3	1	19
p ≤	.3613	.0001	.0001	.2012

472.	Aliveness	Embodiment	Purposiveness	Activity
possum	13	11	8	4
raccoon	17	19	22	26
p ≤	.5839	.2012	.0176	.0001

473.	Aliveness	Embodiment	Purposiveness	Activity
distance	12	6	20	4
beaver	18	24	10	26
p ≤	.3613	.0019	.1003	.0001

474.	Aliveness	Embodiment	Purposiveness	Activity
electromagnetism	21	12	24	29
thickness	9	18	6	1
p ≤	.0446	.3613	.0019	.0001

475.	Aliveness	Embodiment	Purposiveness	Activity
redwood tree	9	23	19	2
honeybee	21	7	11	28
p ≤	.0446	.0062	.2012	.0001

476.	Aliveness	Embodiment	Purposiveness	Activity
bicycle	18	14	24	15
moped	12	16	6	15
p ≤	.3613	.8551	.0019	1.0000

477.	Aliveness	Embodiment	Purposiveness	Activity
daylight	23	20	28	27
thickness	7	10	2	3
p ≤	.0062	.1003	.0001	.0001

478.	Aliveness	Embodiment	Purposiveness	Activity
daisy	6	5	4	3
adult human	24	25	26	27
p ≤	.0019	.0005	.0001	.0001

479.	Aliveness	Embodiment	Purposiveness	Activity
raccoon	6	7	1	7
adult human	24	23	29	23
p ≤	.0019	.0062	.0001	.0062

480.	Aliveness	Embodiment	Purposiveness	Activity
electromagnetism	9	6	23	20
elephant	21	24	7	10
p ≤	.0446	.0019	.0062	.1003

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481.	Aliveness	Embodiment	Purposiveness	Activity
glacier	6	8	20	7
raccoon	24	22	10	23
p ≤	.0019	.0176	.1003	.0062

482.	Aliveness	Embodiment	Purposiveness	Activity
sparrow	19	26	7	11
wind	11	4	23	19
p ≤	.2012	.0001	.0062	.5839

483.	Aliveness	Embodiment	Purposiveness	Activity
glacier	9	4	15	9
elephant	21	26	15	21
p ≤	.0446	.0001	1.0000	.0446

484.	Aliveness	Embodiment	Purposiveness	Activity
gnat	5	2	3	18
raccoon	25	28	27	12
p ≤	.0005	.0001	.0001	.3613

485.	Aliveness	Embodiment	Purposiveness	Activity
redwood tree	8	7	21	4
owl	22	23	9	26
p ≤	.0176	.0062	.0446	.0001

486.	Aliveness	Embodiment	Purposiveness	Activity
electromagnetism	8	6	24	13
gnat	22	24	6	17
p ≤	.0176	.0019	.0019	.5839

487.	Aliveness	Embodiment	Purposiveness	Activity
gravity	5	5	24	10
possum	25	25	6	20
p ≤	.0005	.0005	.0019	.1003

488.	Aliveness	Embodiment	Purposiveness	Activity
largeness	6	4	13	2
spider	24	26	17	28
p ≤	.0019	.0001	.5839	.0001

489.	Aliveness	Embodiment	Purposiveness	Activity
smoke	9	19	5	19
thunder	21	11	25	11
p ≤	.0446	.2012	.0005	.2012

490.	Aliveness	Embodiment	Purposiveness	Activity
hawk	14	14	19	26
swan	16	16	11	4
p ≤	.8551	.8551	.2012	.0001

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491.	Aliveness	Embodiment	Purposiveness	Activity
bowling ball	11	21	16	23
balloon	19	9	14	7
p ≤	.2012	.0446	.8551	.0062

492.	Aliveness	Embodiment	Purposiveness	Activity
swan	17	24	6	5
waterfall	13	6	24	25
p ≤	.5839	.0019	.0019	.0005

493.	Aliveness	Embodiment	Purposiveness	Activity
beaver	20	20	22	25
swan	10	10	8	5
p ≤	.1003	.1003	.0176	.0005

494.	Aliveness	Embodiment	Purposiveness	Activity
wind	6	4	22	24
owl	24	26	8	6
p ≤	.0019	.0001	.0176	.0019

495.	Aliveness	Embodiment	Purposiveness	Activity
beetle	25	28	12	23
distance	5	2	18	7
p ≤	.0005	.0001	.3613	.0062

496.	Aliveness	Embodiment	Purposiveness	Activity
sparrow	19	25	17	21
spider	11	5	13	9
p ≤	.2012	.0005	.5839	.0446

497.	Aliveness	Embodiment	Purposiveness	Activity
gnat	22	19	3	18
sun	8	11	27	12
p ≤	.0176	.2012	.0001	.3613

498.	Aliveness	Embodiment	Purposiveness	Activity
adult human	23	28	29	29
stone	7	2	1	1
p ≤	.0062	.0001	.0001	.0001

499.	Aliveness	Embodiment	Purposiveness	Activity
air	8	3	18	27
redwood tree	22	27	12	3
p ≤	.0176	.0001	.3613	.0001

500.	Aliveness	Embodiment	Purposiveness	Activity
swan	29	30	13	30
equivalence	1	0	17	0
p ≤	.0001	.0001	.5839	.0001

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501.	Aliveness	Embodiment	Purposiveness	Activity
stone	8	21	12	15
moss	22	9	18	15
p ≤	.0176	.0446	.3613	1.0000

502.	Aliveness	Embodiment	Purposiveness	Activity
distance	5	2	23	10
gnat	25	28	7	20
p ≤	.0005	.0001	.0062	.1003

503.	Aliveness	Embodiment	Purposiveness	Activity
thickness	7	1	12	0
hawk	23	29	18	30
p ≤	.0062	.0001	12	.0001

504.	Aliveness	Embodiment	Purposiveness	Activity
river current	10	11	20	13
whirlpool	20	19	10	17
p ≤	.1003	.2012	.1003	.5839

505.	Aliveness	Embodiment	Purposiveness	Activity
sparrow	3	3	6	14
tiger	27	27	24	16
p ≤	.0001	.0001	.0019	.8551

506.	Aliveness	Embodiment	Purposiveness	Activity
waterfall	12	9	24	27
beetle	18	21	6	3
p ≤	.3613	.0446	.0019	.0001

507.	Aliveness	Embodiment	Purposiveness	Activity
elephant	19	26	23	27
daisy	11	4	7	3
p ≤	.2012	.0001	.0062	.0001

508.	Aliveness	Embodiment	Purposiveness	Activity
hail	4	21	18	26
moss	26	9	12	4
p ≤	.0001	.0446	.3613	.0001

509.	Aliveness	Embodiment	Purposiveness	Activity
daylight	8	5	21	5
hawk	22	25	9	25
p ≤	.0176	.0005	.0446	.0005

510.	Aliveness	Embodiment	Purposiveness	Activity
possum	21	26	8	17
electromagnetism	9	4	22	13
p ≤	.0446	.0001	.0176	.5839

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511.	Aliveness	Embodiment	Purposiveness	Activity
adult human	20	29	28	21
beetle	10	1	2	9
p ≤	.1003	.0001	.0001	.0446

512.	Aliveness	Embodiment	Purposiveness	Activity
barnacle	25	23	5	12
daylight	5	7	25	18
p ≤	.0005	.0062	.0005	.3613

513.	Aliveness	Embodiment	Purposiveness	Activity
beaver	17	27	16	9
honeybee	13	3	14	21
p ≤	.5839	.0001	.8551	.0446

514.	Aliveness	Embodiment	Purposiveness	Activity
kangaroo	20	9	22	28
hippopotamus	10	21	8	2
p ≤	.1003	.0446	.0176	.0001

515.	Aliveness	Embodiment	Purposiveness	Activity
raccoon	23	25	8	12
wind	7	5	22	18
p ≤	.0062	.0005	.0176	.3613

516.	Aliveness	Embodiment	Purposiveness	Activity
thunder	30	27	20	29
equivalence	0	3	10	1
p ≤	.0001	.0001	.1003	.0001

517.	Aliveness	Embodiment	Purposiveness	Activity
largeness	7	5	12	2
honeybee	23	25	18	28
p ≤	.0062	.0005	.3613	.0001

518.	Aliveness	Embodiment	Purposiveness	Activity
largeness	22	23	12	7
distance	8	7	18	23
p ≤	.0176	.0062	.3613	.0062

519.	Aliveness	Embodiment	Purposiveness	Activity
daisy	12	3	17	4
possum	18	27	13	26
p ≤	.3613	.0001	.5839	.0001

520.	Aliveness	Embodiment	Purposiveness	Activity
tiger	21	29	29	15
gnat	9	1	1	15
p ≤	.0446	.0001	.0001	1.0000

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521.	Aliveness	Embodiment	Purposiveness	Activity
daisy	16	14	3	11
sun	14	16	27	19
p ≤	.8551	.8551	.0001	.2012

522.	Aliveness	Embodiment	Purposiveness	Activity
waterfall	30	27	19	30
equivalence	0	3	11	0
p ≤	.0001	.0001	.2012	.0001

523.	Aliveness	Embodiment	Purposiveness	Activity
moss	20	10	4	5
glacier	10	20	26	25
p ≤	.1003	.1003	.0001	.0005

524.	Aliveness	Embodiment	Purposiveness	Activity
kangaroo	22	24	29	27
possum	8	6	1	3
p ≤	.0176	.0019	.0001	.0001

525.	Aliveness	Embodiment	Purposiveness	Activity
waterfall	9	5	19	23
tiger	21	25	11	7
p ≤	.0446	.0005	.2012	.0062

526.	Aliveness	Embodiment	Purposiveness	Activity
smoke	10	24	4	17
air	20	6	26	13
p ≤	.1003	.0019	.0001	.5839

527.	Aliveness	Embodiment	Purposiveness	Activity
stone	1	12	12	9
barnacle	29	18	18	21
p ≤	.0001	.3613	.3613	.0446

528.	Aliveness	Embodiment	Purposiveness	Activity
daisy	22	26	11	22
distance	8	4	19	8
p ≤	.0176	.0001	.2012	.0176

529.	Aliveness	Embodiment	Purposiveness	Activity
redwood tree	5	8	23	2
swan	25	22	7	28
p ≤	.0005	.0176	.0062	.0001

530.	Aliveness	Embodiment	Purposiveness	Activity
heat	15	11	20	11
thunder	15	19	10	19
p ≤	1.0000	.2012	.1003	.2012

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531.	Aliveness	Embodiment	Purposiveness	Activity
largeness	4	15	7	4
gravity	26	15	23	26
p ≤	.0001	1.0000	.0062	.0001

532.	Aliveness	Embodiment	Purposiveness	Activity
thunder	3	7	19	9
raccoon	27	23	11	21
p ≤	.0001	.0062	.2012	.0446

533.	Aliveness	Embodiment	Purposiveness	Activity
electromagnetism	2	4	22	10
beetle	28	26	8	20
p ≤	.0001	.0001	.0176	.1003

534.	Aliveness	Embodiment	Purposiveness	Activity
moss	20	22	5	11
daylight	10	8	25	19
p ≤	.1003	.0176	.0005	.2012

535.	Aliveness	Embodiment	Purposiveness	Activity
cat	21	29	19	24
cat's ear	9	1	11	6
p ≤	.0446	.0001	.2012	.00019

536.	Aliveness	Embodiment	Purposiveness	Activity
kangaroo	21	23	9	27
glacier	9	7	21	3
p ≤	.0446	.0062	.0446	.0001

537.	Aliveness	Embodiment	Purposiveness	Activity
gravity	9	6	23	9
glacier	21	24	7	21
p ≤	.0446	.0019	.0062	.0446

538.	Aliveness	Embodiment	Purposiveness	Activity
tiger	23	26	21	14
kangaroo	7	4	9	16
p ≤	.0062	.0001	.0446	.8551

539.	Aliveness	Embodiment	Purposiveness	Activity
hawk	20	19	16	24
beaver	10	11	14	6
p ≤	.1003	.2012	.8551	.0019

540.	Aliveness	Embodiment	Purposiveness	Activity
beaver	17	4	16	27
elephant	13	26	14	3
p ≤	.5839	.0001	.8551	.0001

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541.	Aliveness	Embodiment	Purposiveness	Activity
stone	8	7	6	8
redwood tree	22	23	24	22
p ≤	.0176	.0062	.0019	.0176

542.	Aliveness	Embodiment	Purposiveness	Activity
waterfall	4	10	27	29
daisy	26	20	3	1
p ≤	.0001	.1003	.0001	.0001

543.	Aliveness	Embodiment	Purposiveness	Activity
adult human	29	25	21	28
redwood tree	1	5	9	2
p ≤	.0001	.0005	.0446	.0001

544.	Aliveness	Embodiment	Purposiveness	Activity
air	23	14	15	17
electromagnetism	7	16	15	13
p ≤	.0019	.8551	1.0000	.5839

545.	Aliveness	Embodiment	Purposiveness	Activity
hippopotamus	27	27	17	29
largeness	3	3	13	1
1P ≤	.0001	.0001	.5839	.0001

546.	Aliveness	Embodiment	Purposiveness	Activity
owl	29	26	23	28
daisy	1	4	7	2
p ≤	.0001	.0001	.0062	.0001

547.	Aliveness	Embodiment	Purposiveness	Activity
hawk	14	8	18	28
elephant	16	22	12	2
p ≤	.8551	.0176	.3613	.0001

548.	Aliveness	Embodiment	Purposiveness	Activity
sparrow	20	11	12	26
owl	10	19	18	4
p ≤	.1003	.2012	.3613	.0001

549.	Aliveness	Embodiment	Purposiveness	Activity
thickness	3	6	20	2
beetle	27	24	10	28
p ≤	.0001	.0019	.1003	.0001

550.	Aliveness	Embodiment	Purposiveness	Activity
daylight	7	10	14	5
wind	23	20	16	25
p ≤	.0062	.1003	.8551	.0005

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551.	Aliveness	Embodiment	Purposiveness	Activity
beetle	21	22	17	27
stone	9	8	13	3
p ≤	.0446	.0176	.5839	.0001

552.	Aliveness	Embodiment	Purposiveness	Activity
hippopotamus	23	24	6	24
sun	7	6	24	6
p ≤	.0062	.0019	.0019	.0019

553.	Aliveness	Embodiment	Purposiveness	Activity
sun	4	7	24	8
spider	26	23	6	22
p ≤	.0001	.0062	.0019	.0176

554.	Aliveness	Embodiment	Purposiveness	Activity
owl	12	7	19	25
hippopotamus	18	23	11	5
p ≤	.3613	.0062	.2012	.0005

555.	Aliveness	Embodiment	Purposiveness	Activity
person who is idle	12	7	3	2
person with a project	18	23	27	28
p ≤	.3613	.0062	.0001	.0001

556.	Aliveness	Embodiment	Purposiveness	Activity
swan	25	25	21	27
stone	5	5	9	3
p ≤	.0005	.0005	.0446	.0001

557.	Aliveness	Embodiment	Purposiveness	Activity
air	15	14	18	17
heat	15	16	12	13
p ≤	1.0000	.8551	.3613	.5839

558.	Aliveness	Embodiment	Purposiveness	Activity
honeybee	28	27	20	30
thickness	2	3	10	0
p ≤	.0001	.0001	.1003	.0001

559.	Aliveness	Embodiment	Purposiveness	Activity
spider	28	28	16	30
equivalence	2	2	14	0
p ≤	.0001	.0001	.8551	.0001

560.	Aliveness	Embodiment	Purposiveness	Activity
perpendicularity	17	7	23	6
flag pole	13	23	7	24
p ≤	.5839	.0062	.0062	.0019

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561.	Aliveness	Embodiment	Purposiveness	Activity
beaver	13	12	16	11
kangaroo	17	18	14	19
p ≤	.5839	.3613	.8551	.2012

562.	Aliveness	Embodiment	Purposiveness	Activity
honeybee	13	1	7	20
adult human	17	29	23	10
p ≤	.5839	.0001	.0062	.1003

563.	Aliveness	Embodiment	Purposiveness	Activity
waterfall	26	25	18	26
air	4	5	12	4
p ≤	.0001	.0005	.3613	.0001

564.	Aliveness	Embodiment	Purposiveness	Activity
sun	14	9	25	5
honeybee	16	21	5	25
p ≤	.8551	.0446	.0005	.0005

565.	Aliveness	Embodiment	Purposiveness	Activity
distance	1	4	21	3
possum	29	26	9	27
p ≤	.0001	.0001	.0446	.0001

566.	Aliveness	Embodiment	Purposiveness	Activity
gravity	8	5	23	5
beaver	22	25	7	25
p ≤	.0176	.0005	.0062	.0005

567.	Aliveness	Embodiment	Purposiveness	Activity
possum	18	22	4	27
sun	12	8	26	3
p ≤	.3613	.0176	.0001	.0001

568.	Aliveness	Embodiment	Purposiveness	Activity
sparrow	15	9	6	15
hawk	15	21	24	15
p ≤	1.0000	.0446	.0019	1.0000

569.	Aliveness	Embodiment	Purposiveness	Activity
daylight	8	5	25	5
hippopotamus	22	25	5	25
p ≤	.0176	.0005	.0005	.0005

570.	Aliveness	Embodiment	Purposiveness	Activity
redwood tree	29	27	13	12
daylight	1	3	17	18
p ≤	.0001	.0001	.5839	.3613

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571.	Aliveness	Embodiment	Purposiveness	Activity
elephant	26	25	11	18
thunder	4	5	19	12
p ≤	.0001	.0005	.2012	.3613

572.	Aliveness	Embodiment	Purposiveness	Activity
spider	13	2	14	14
raccoon	17	28	16	16
p ≤	.5839	.0001	.8551	.8551

573.	Aliveness	Embodiment	Purposiveness	Activity
gravity	22	27	25	27
equivalence	8	3	5	3
p ≤	.0176	.0001	.0005	.0001

574.	Aliveness	Embodiment	Purposiveness	Activity
teenager	23	9	11	28
adult	7	21	19	2
p ≤	.0062	.0446	.2012	.0001

575.	Aliveness	Embodiment	Purposiveness	Activity
one thinking to himself	10	16	24	4
one speaking out loud	20	14	6	26
p ≤	.1003	.8551	.0019	.0001

576.	Aliveness	Embodiment	Purposiveness	Activity
tiger	28	28	11	16
wind	2	2	19	14
p ≤	.0001	.0001	.2012	.8551

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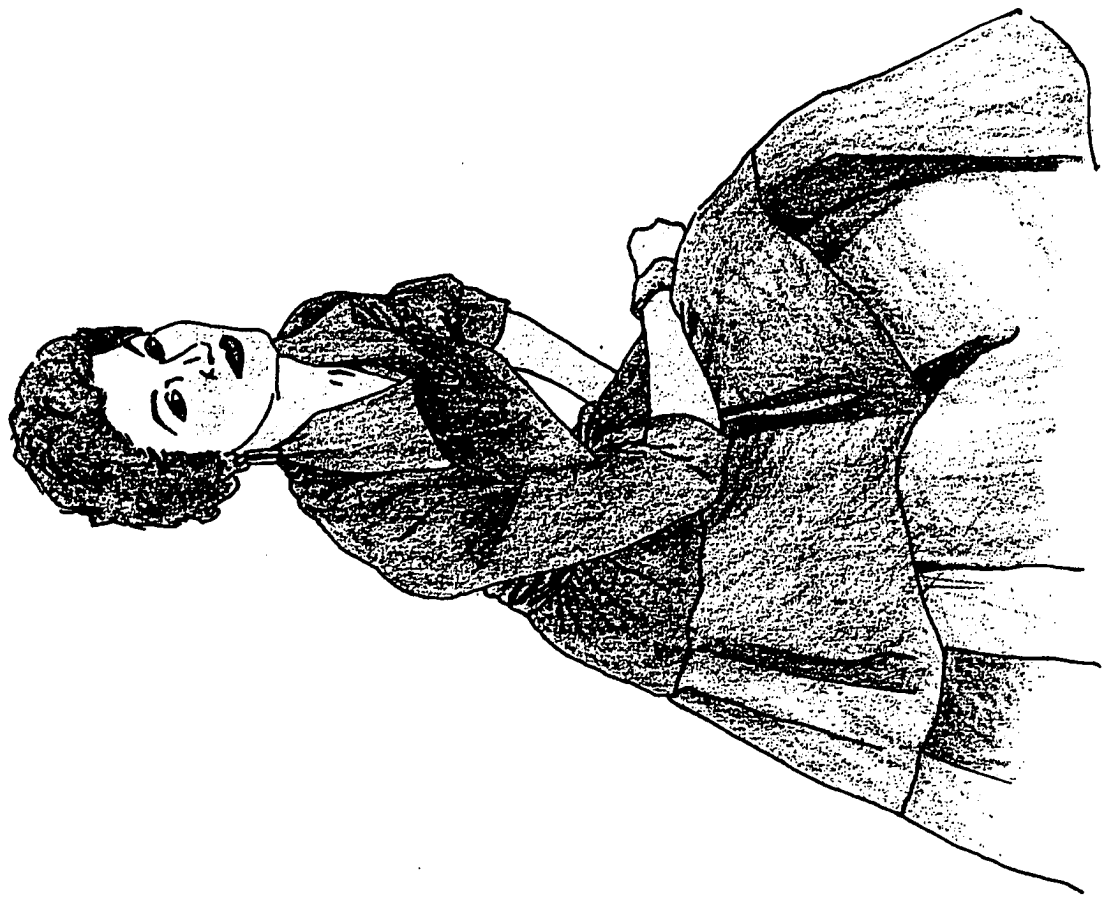
APPENDIX C

PICTORIAL MATERIALS FOR STUDY 3 (PRESCHOOLERS)

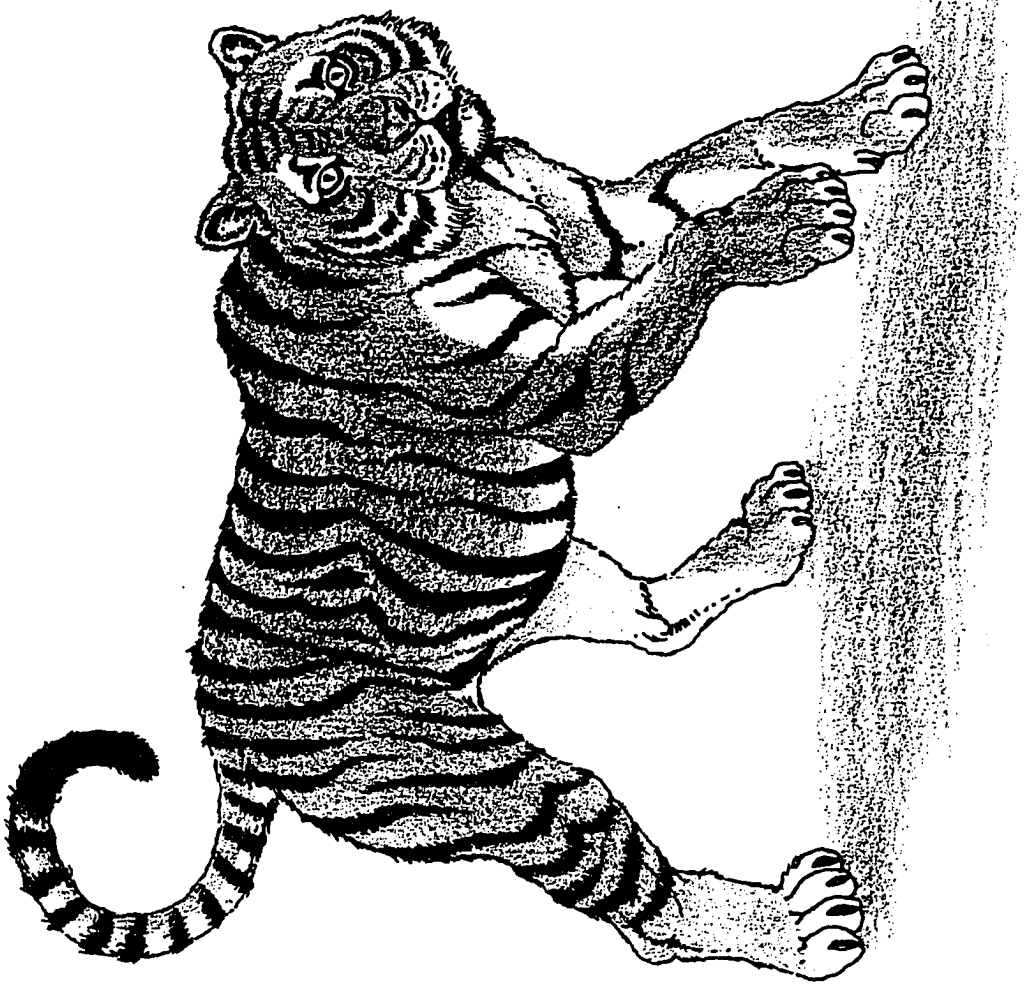
Following, xerographically reduced reproductions of the seven ink and colored pencil drawings employed in Study 3 (preschoolers). The original drawings were on 8-1/2" x 12" white paper mounted on slightly larger pieces of white foam board. The artist was Ronald Tweedy. The drawings depicted:

a lady
a tiger
a spider
a tree
the sun
the wind
a stone

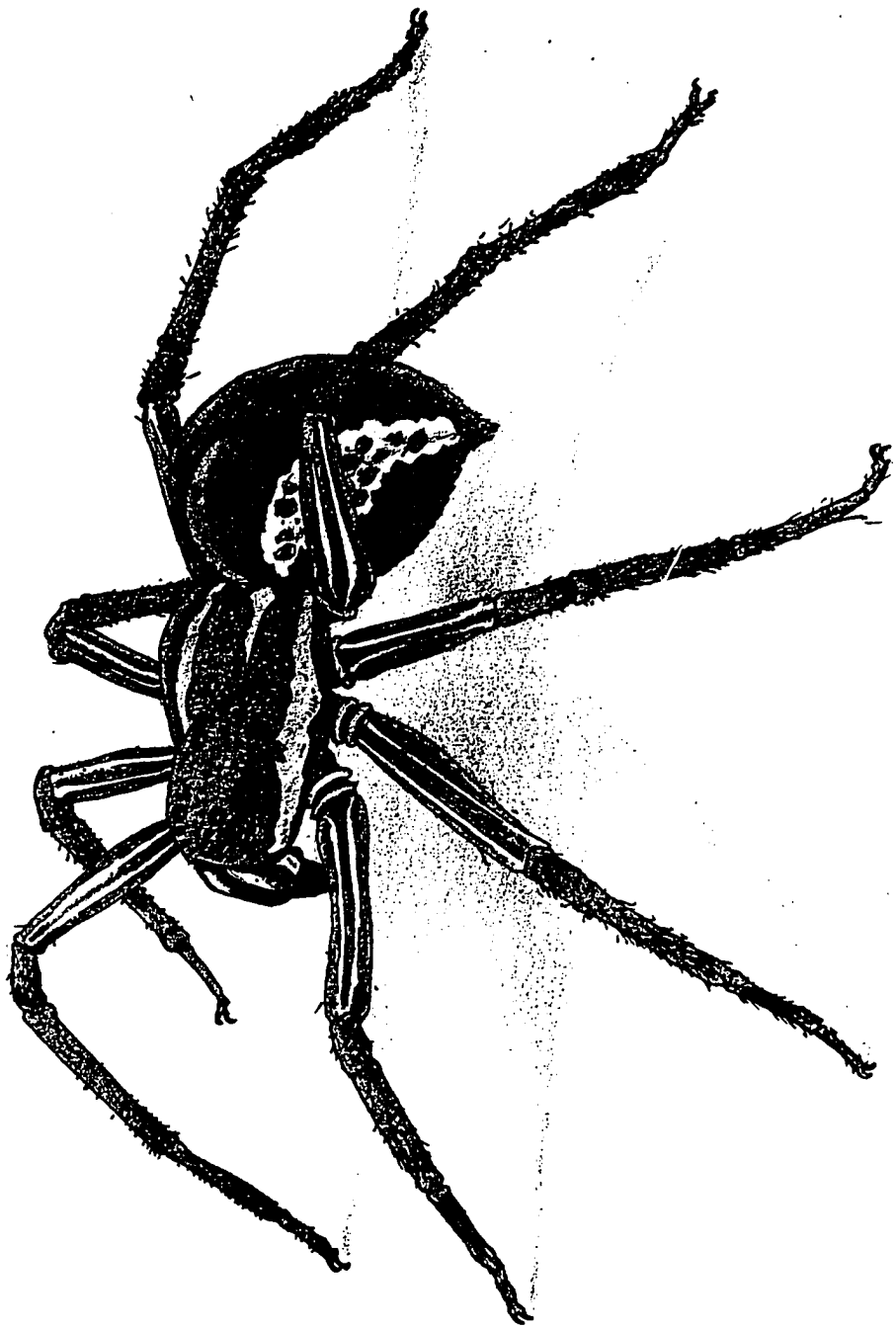
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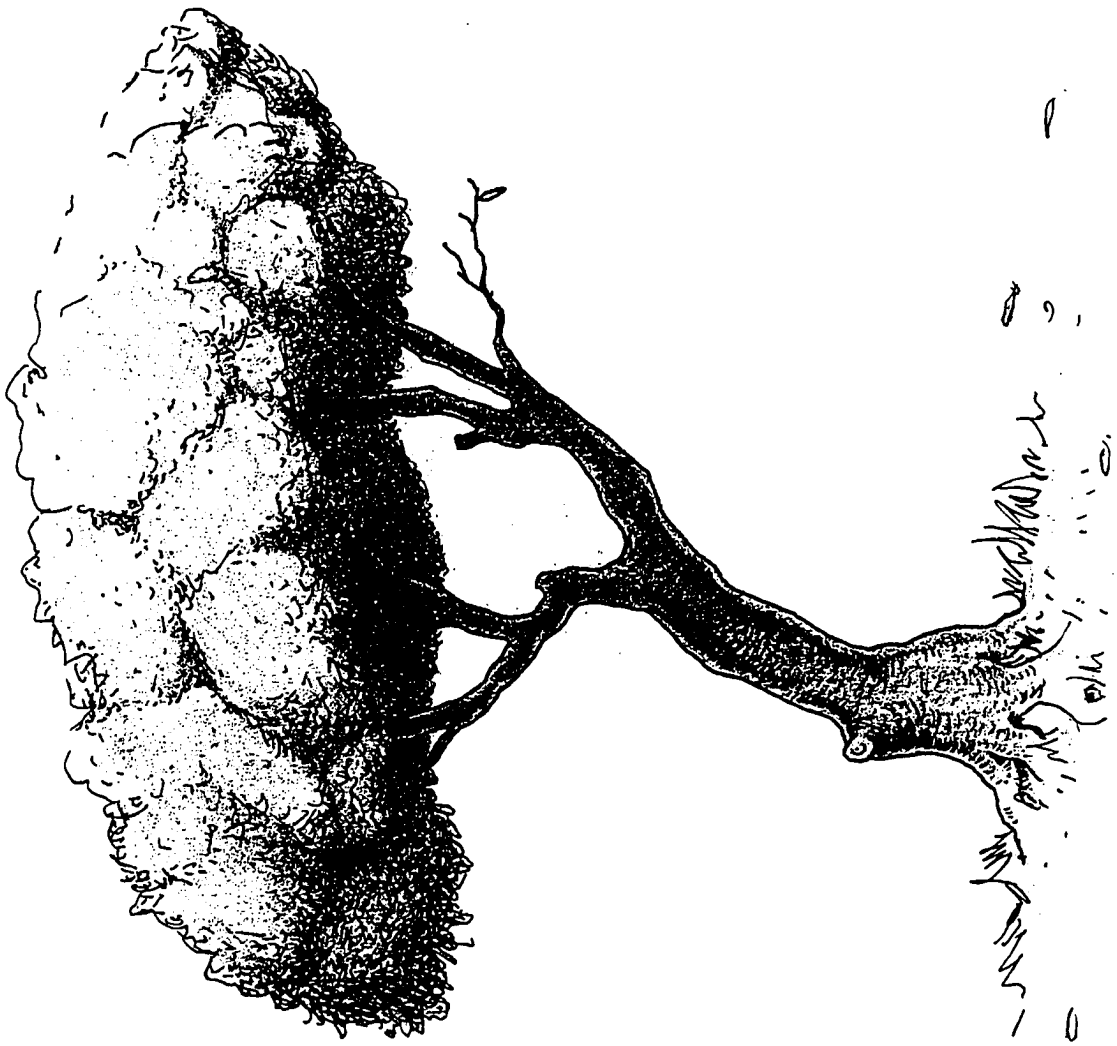
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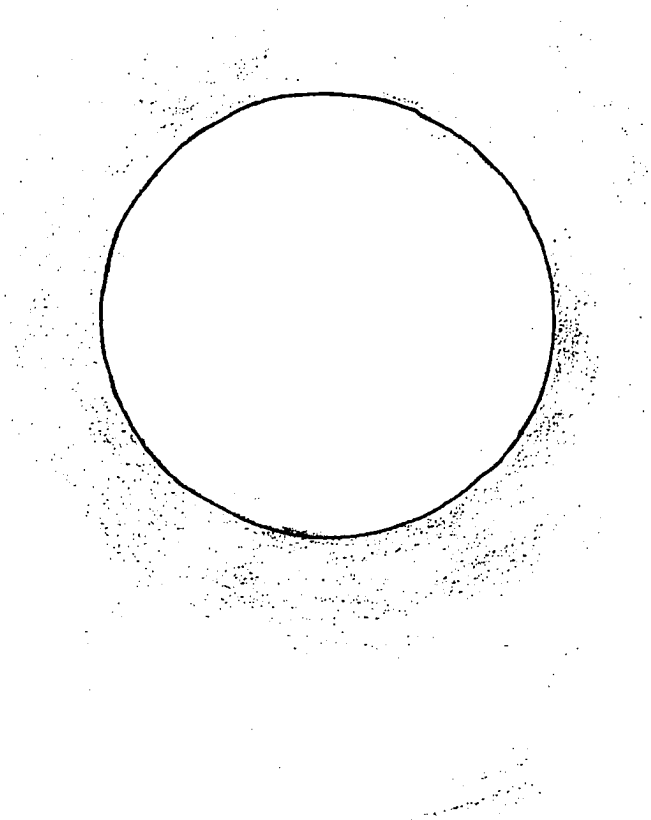
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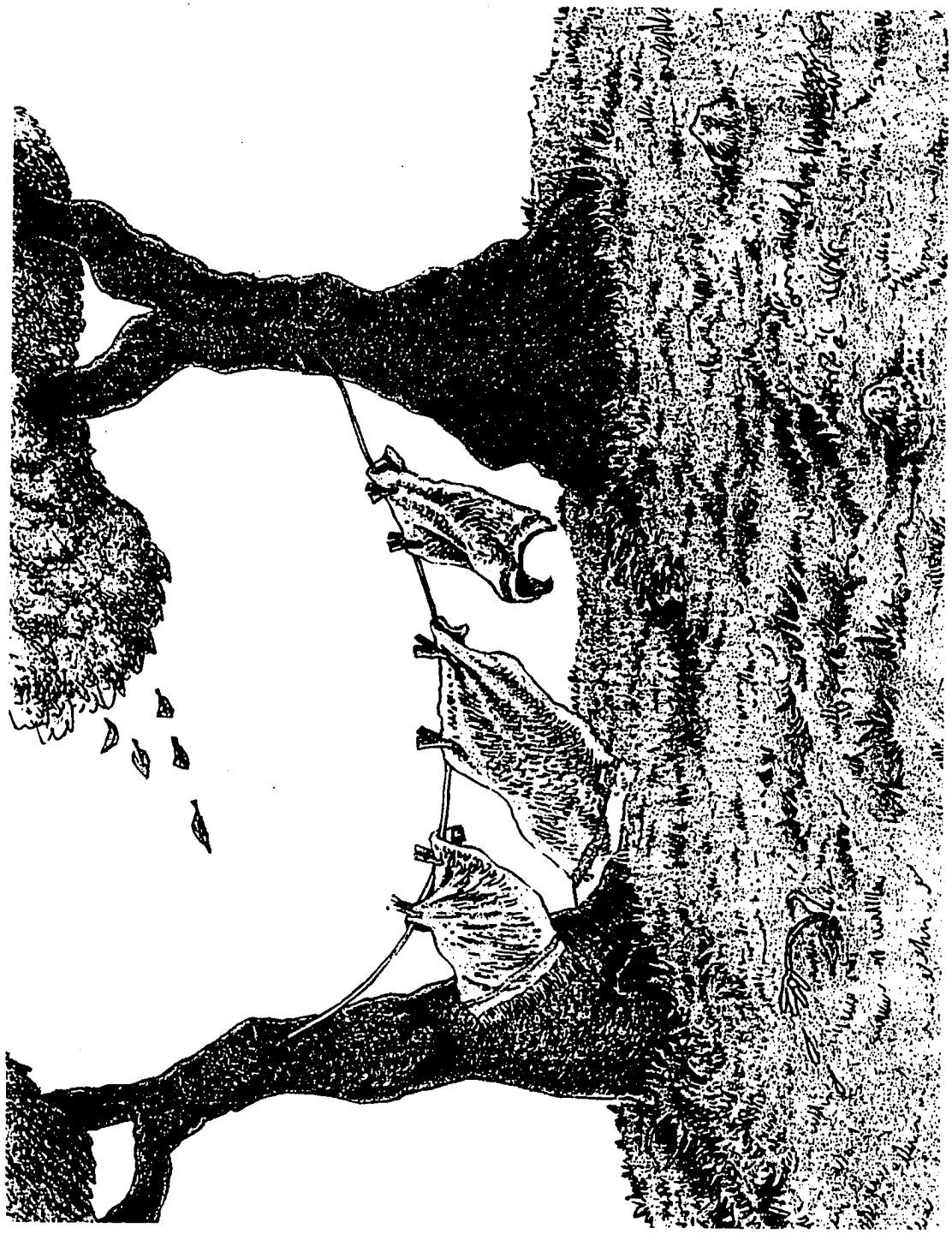
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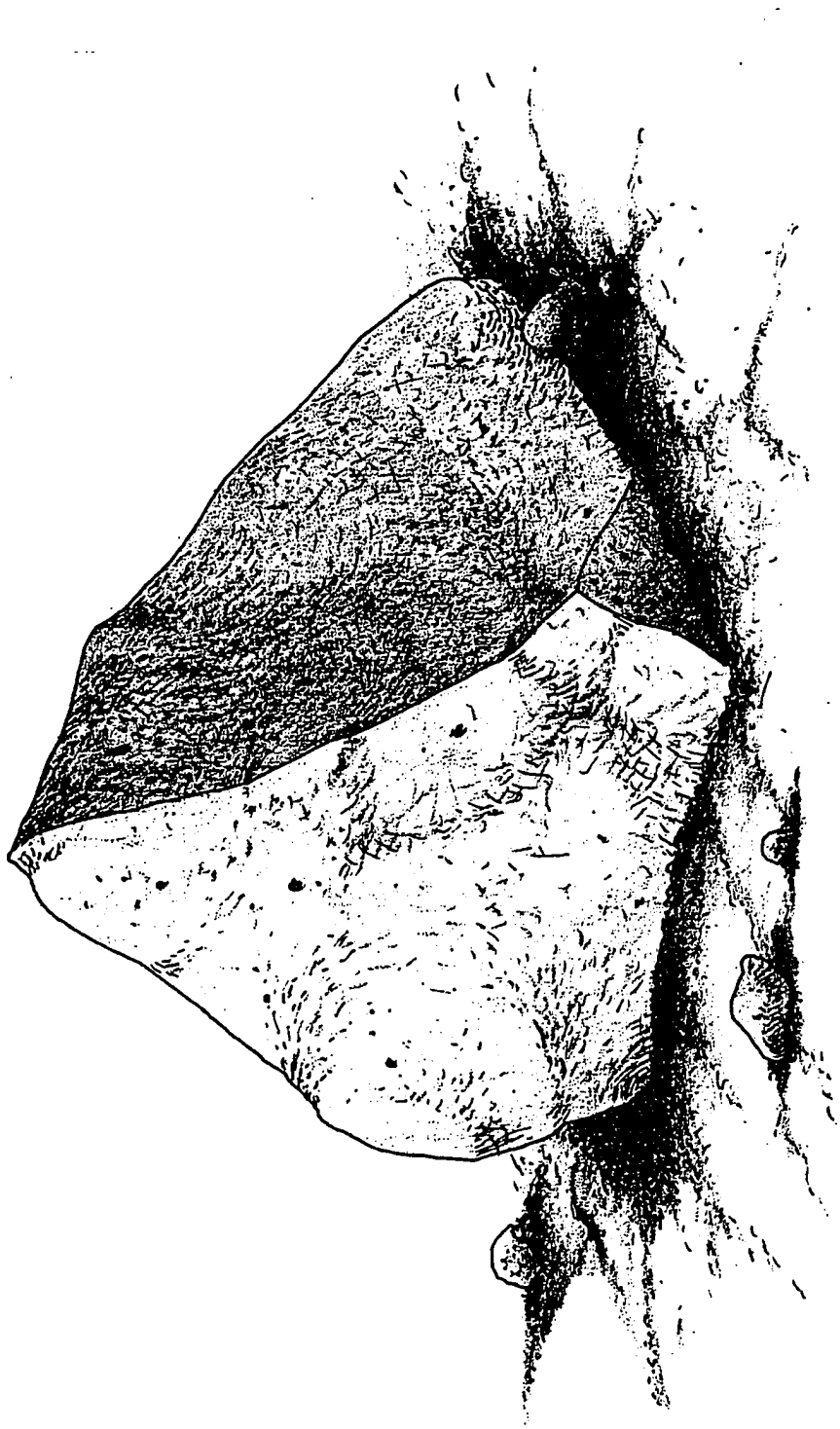
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APPENDIX D

PRESCHOOLERS' RATIONALES FOR SIMPLE AND RELATIVE ATTRIBUTIONS OF LIFE

Below, rationales elicited from preschoolers asked to judge whether an entity was alive, or asked to choose which of two entities was more alive or more like a living thing. These field notes are ordered from the youngest subject in the lowest stage of animism to the oldest subject in the highest stage of animism. For each subject, rationales for simple judgments are listed first, followed by rationales for relative judgments, and then by some summary remarks. These are not the full field notes from the interview sessions.

INDEX OF RESPONSE TYPES

Inability to express rationales

I don't know:	S15, Stage 2, 4:3
	S24, Stage 3, 4:5
	S30, Stage 3, 4:10
	S21, Stage 3, 4:11
I just know:	S19, Stage 3, 4:3
	S29, Stage 4, 4:6
	S11, Stage 4, 5:4

Observations that some things seem alive but aren't

Wind:	S19, Stage 3, 4:3
	S2, Stage 4, 4:7
	S25, Stage 4, 4:8
Rain:	S1, Stage 3, 4:4
	S23, Stage 3, 5:4
Rolling marble:	S29, Stage 4, 4:6

Inconsistent stances on life status or relative aliveness

S4, Stage 1, 4:3
S5, Stage 3, 4:5
S3, Stage 4, 5:0

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Ambivalent regard for the life status of plants

S5, Stage 3, 4:5
S30, Stage 3, 4:10
S2, Stage 4, 4:7
S3, Stage 4, 5:0

Rationales showing anthropocentric bias

S5, Stage 3, 4:5
S9, Stage 3, 4:9
S3, Stage 4, 5:0

Utilization of a class inclusion formula; category-based attribution

Animal:	S1, Stage 3, 4:4
	S9, Stage 3, 4:9
	S21, Stage 3, 4:11
	S8, Stage 4, 5:0
Plant:	S28, Stage 4, 4:10

Rationales citing movement, walking, running, flying, blowing

S22, Stage 1, 3:11	S19, Stage 3, 4:3	S29, Stage 4, 4:6
S26, Stage 1, 4:0	S1, Stage 3, 4:4	S2, Stage 4, 4:7
S6, Stage 1, 4:2	S5, Stage 3, 4:5	S25, Stage 4, 4:8
S4, Stage 1, 4:3	S24, Stage 3, 4:5	S28, Stage 4, 4:10
S13, Stage 1, 5:3	S9, Stage 3, 4:9	S8, Stage 4, 5:0
	S20, Stage 3, 5:1	S11, Stage 4, 5:4
S12, Stage 2, 4:10	S14, Stage 3, 5:2	
	S23, Stage 3, 5:4	

Rationales citing the capacity to grow

S26, Stage 1, 4:0	S19, Stage 3, 4:3	S2, Stage 4, 4:7
S4, Stage 1, 4:3	S1, Stage 3, 4:4	S25, Stage 4, 4:8
S13, Stage 1, 5:3	S5, Stage 3, 4:5	S28, Stage 4, 4:10
	S27, Stage 3, 4:9	S3, Stage 4, 5:0
S7, Stage 2, 3:10	S21, Stage 3, 4:11	S8, Stage 4, 5:0
S15, Stage 2, 4:3	S20, Stage 3, 5:1	
S12, Stage 2, 4:10	S14, Stage 3, 5:2	
	S23, Stage 3, 5:4	

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Rationales citing eating or drinking

S22, Stage 1, 3:11
S26, Stage 1, 4:0
S7, Stage 2, 3:10
S16, Stage 2, 4:5
S14, Stage 3, 5:2
S30, Stage 3, 4:10
S20, Stage 3, 5:1

Rationales citing breathing

S7, Stage 2, 3:10
S30, Stage 3, 4:10
S3, Stage 4, 5:0

Rationales citing reproductive capacity

S10, Stage 3, 4:0

Rationales citing longevity

S12, Stage 2, 4:10
S30, Stage 3, 4:10

Rationales citing talking, vocalization, or autonomous soundmaking

S6, Stage 1, 4:2
S13, Stage 1, 5:3
S15, Stage 2, 4:3
S30, Stage 3, 4:10
S23, Stage 3, 5:4
S11, Stage 4, 5:4
S25, Stage 4, 4:8
S8, Stage 4, 5:0

Rationales citing body parts

S10, Stage 3, 4:0
S17, Stage 3, 4:6
S27, Stage 3, 4:9
S9, Stage 3, 4:9
S14, Stage 3, 5:2
S23, Stage 3, 5:4
S2, Stage 4, 4:7

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References to the compositional character of nonliving things

S15, Stage 2, 4:3
S1, Stage 3, 4:4
S29, Stage 4, 4:6
S27, Stage 3, 4:9
S8, Stage 4, 5:0
S21, Stage 3, 4:11
S14, Stage 3, 5:2

Rationales citing solidity or stability of form

S27, Stage 3, 4:9
S3, Stage 4, 5:0

Rationales citing size

S16, Stage 2, 4:5
S3, Stage 4, 5:0

Rationales citing power relations or the ability to exert force

S6, Stage 1, 4:2
S27, Stage 3, 4:9
S29, Stage 4, 4:6
S4, Stage 1, 4:3
S9, Stage 3, 4:9
S2, Stage 4, 4:7
S14, Stage 3, 5:2

Rationales citing personal reactions or general salience

S15, Stage 2, 4:3
S10, Stage 3, 4:0
S29, Stage 4, 4:6
S12, Stage 2, 4:10
S19, Stage 3, 4:3
S28, Stage 4, 4:10
S27, Stage 3, 4:9
S8, Stage 4, 5:0
S21, Stage 3, 4:11
S11, Stage 4, 5:4

References to usefulness or purposiveness; user-used confusion

S22, Stage 1, 3:11

References to matters of religion

S9, Stage 3, 4:9
S14, Stage 3, 5:2

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INDIVIDUAL RESPONSES

Stage 1; 3:11; S22:

crayons are alive "because they draw"
a spoon is alive "because it eats"
a butterfly is alive "because it flies"
rain is alive "because it rains"
grass is not alive "because it doesn't move"
puddles are not alive "because they don't move"
a car is alive "because it moves"
flowers are not alive "because they don't move"
JC: are clouds alive? "no" However, S22 then allows that he saw one cloud move. JC: uh-huh. was it alive? "yes"

JC: is one of these [a lady and a tiger] more alive? "yes" JC: which one? "this one's alive and this one's alive" JC: uh huh. is one more alive? is one of these more alive than the other? "umm. this is alive, and this is alive. they move, 'cause they — both have gotta move."
JC which one is more alive [between the sun and the wind]? "two of the one more alive" JC: two of them are more alive? "yeah"

For S22, anything moving or engaged in an activity is alive. The wielded crayon or spoon is as living as the person who uses them. S22 demonstrates that he understands that his blowing causes the whistling and movement of the toy train (JC: Who made the train move? "me"), yet he maintains that it is alive when it moves.

In a follow-up session, S22 began to think hard about the life status of plants. I pointed out to him that plants grow. S22 seems to be questioning whether plants ought to be considered alive, but he formulates this question in a form which reflects his use of a motion criterion for establishing life: "Do plants move?" he asks.

Questions such as "Which one is more alive?" were construed to mean "Which one is alive?"

Stage 1; 4:0; S26:

trees are alive because they grow with the aid of water
birds are alive "because they drink water from the sky"
sand is not alive "because it doesn't have any water"
puddles are alive "because they drink water"

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butterflies are alive: "they drink water from the sky"
flowers are alive "because they have water"
the wind is alive "because wind flies out, and goes"

lady over tiger "because she drinks water"
when asked Q3 re sun and stone: sun "because when the sun and water mix together it grows a beautiful rainbow and so the sun is more alive"
re spider v. tiger: "they are both alive" JC: is one more alive? "they are both more alive" later, "they are both more same"

S26 is further on his way to restricting life to animals and plants than his highly animistic performance might seem to suggest. The emphasis on drinking water is an ingenious early attempt to find a rationale for including animals and plants in a single category.

The rationales for relative judgments of aliveness echoed those offered for simple judgments of life status. Questions such as "Which one is more alive?" were sometimes construed to mean "Which one is alive?"

Stage 1; 4:2; S6:

crayons are not alive "because they don't move"
a butterfly is alive "because it flaps its wings and flies"
grass is not alive "because it doesn't move"
JC: is a car alive? "no" JC: when it moves is it alive? "yeah, when it drives it's alive." JC: okay. who drives the car? "people" JC: oh. okay. what makes the car go? do you know what makes the car go? "gasoline"
rain is alive "when it falls down"
a tricycle is alive "when you ride it"
a bird is alive "because it flies and [tweets]"
clouds are alive "when they move"
sand is alive "when you dig it" [and, presumably, the sand flies in the air]
flowers are ordinarily not alive, but "when they blow they're alive"
a tree is alive "when it blows [and, presumably, the leaves are rustled]"
in follow-up, regarding the sun: first no, then yes because "it moves slowly"

tree over stone "because it blows"
tiger over lady "because it can run real fast and it growls"

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tree over wind and sun "because it [the tree] blows, and shakes all the leaves ... and the leaves fly off the tree"

Primary criterion for being alive: movement, autonomous or otherwise. When a thing ceases to move, it ceases to be alive. Hence, rain is alive, but puddles are not. Some consideration of vocal capacity (i.e., the tweeting of birds, the growling of tigers), which could be primarily viewed as a kind of movement or activity.

The rationales for relative judgments of aliveness echoed those offered for simple judgments of life status.

Stage 1; 4:3; S4:

the rain is alive "because it's going this way" [i.e., coming down at a slant]
bicycles are not alive "because you have to pedal them"
birds are alive "because they move their necks"
a butterfly is alive "because it moves its wings"
grass is not alive "because it isn't moving"
puddles are "just water." They are not alive: "they just move around from the other puddles" [i.e., they do not move themselves.]
clouds are alive "because they move in different directions"
cars are not alive: "you only could drive them" [i.e., they do not move themselves.]
JC: are flowers alive? "no, only if you want it to grow you give it sun and water" JC: how do we know that flowers are not alive? "because they're not moving"
on a subsequent day: trees are alive because they grow and their leaves move; sun and wind are alive because they move; a stone is alive when it rolls.
the toy train is alive because it moves around, in spite of the fact that S4 realizes that it is his own blowing which causes the train to move and whistle. clock is alive because second hand moves.

lady over tiger "because she moves more"
spider over wind "because the spider walks"
wind over sun "because the sun moves and this [the wind] moves more"
wind over tree "because the wind shakes [the tree]"
spider over tiger "because it [the spider] moves more"

For S4, life is crucially associated with movement, autonomous or otherwise: animals and some moving inanimates are considered

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alive but plants are not. There is evidence of some concern that the movement of the living be autonomous, but this concern is not yet decisive in every case.

Inanimates may be viewed as merely compositional (e.g., "just water"); similarly, the growth process of plants may be viewed as merely a compositional process ("if you want it to grow you give it sun and water").

The rationales for relative judgments of aliveness echoed those offered for simple judgments of life status.

Stage 1; 5:3; S13:

rain is not alive "because it doesn't talk"
a bird is alive "because it moves"
sand is not alive: "sand doesn't move if you don't move it around"
a butterfly is alive "because it flies"
grass is not alive "because it doesn't move"
"it's hard to read this [i.e., to decide whether clouds are alive] because it's up in the sky — it doesn't move so it looks like it's not alive ... but it's kind of hard [to decide]."
when a car goes it has drivers, so it's not alive.
when a ball bounces, it is alive; when it is still, it is not alive.
the toy train is not alive — it is "not a real thing" — but it would be alive "if it was big" [and presumably self-locomoting]
a rock is alive "because it tumbles when it's — uh — when someone walks [and kicks the rock], it tumbles. however, in follow-up, S8 affirms that a rock, generally speaking, is not alive.

tree over stone "because it grows"
lady over tiger "because she talks and the tiger doesn't talk"
spider over wind "because it walks"
wind over sun "because the wind moves and the sun doesn't"
tree over spider "because it grows and the spider doesn't grow"
spider over tiger "because it moves a lot and the tiger doesn't move as much as the spider"
when asked Q3, tree over stone "because it grows sometimes"

Life is restricted to animals, principally on the basis of movement, though linguistic capacity is also cited. There is some concern that movement be autonomous, but it is not yet a decisive concern. The single mention of growth would seem to be more of a reference to movement than to biology.

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The rationales for relative judgments of aliveness echoed those offered for simple judgments of life status.

Stage 2; 3:10; S7:

flowers are alive "because they grow. they have water to drink and dirt to eat [laughs]."
"trees are alive: they eat. and they grow. they drink and they eat dirt. they drink water and eat dirt."
sand is not alive "because it doesn't grow"
clouds are alive "because they get bigger"
puddles are not alive "because they don't grow"
crayons are not alive: "they don't breathe"
spoons are not alive: "they don't eat"
cars are not alive: "they don't eat." JC: even when they are moving, are they alive? "no, that's just their motor"
the sun is not alive; neither does it grow
the wind is not alive: "no, the winds don't breathe"
in follow-up, S7 claims that both sun and wind do grow and are alive.

lady over tiger "because she breathes"
spider over sun because "it breathes and it grows"
sun over wind "because it breathes" [S7 goes back and forth on whether the sun breathes and grows and is alive.]
spider over tree "because it breathes" JC: does the tree breath "no" JC: does it drink? "yeah" JC: is it alive "yeah"
re spider and tiger: "they're both alive" is one of them more alive? "no, only two of them" oh, they're both the same? "uh huh"
JC: which one is more alive, the tiger or the tree? "both of them are more alive"

S7 shows some good humored awareness of the problem of combining plants and animals into a single category of alive things. She laughs at her own statement that plants 'eat dirt'.

For S7, life is primarily determined by the ability to grow (although the difference between growing and physically increasing in size is not well understood). Associated activities of living things include eating and drinking and breathing. These criteria do not quite enable her to limit life to biologically alive entities. Because she does not understand the true nature of the sun and wind and clouds, she thinks that these too may grow and/or breathe. She is very undecided about the life status of the sun, and claims that clouds are

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alive. For this reason she is classified as Stage 2, even though she is right on the verge of Stage 4. One has the feeling with S7 that the real criterion for ascribing life is autonomous movement, rephrased in biological terms as 'growing' and 'breathing.'

The rationales for relative judgments of aliveness echoed those offered for simple judgments of life status. Concern for breathing and growing reappears, even though these are not wholly lefitimate rationales: a lady is judged to be more alive than a tiger "because she breathes," but S7 knows perfectly well that a tiger breathes too.

Stage 2; 4:3; S15:

flowers are alive: "they grow"
puddles are not alive: "they don't talk or they don't grow"
butterflies are alive: "it came out of a coccoon. I have a book on butterflies."
clouds are not alive "because they are just white [stuff?]"
a woodpecker is alive: "he pecks"
grass is alive because "it grows from seeds"
the sun is alive: "it's bright and sunshiny"

sun over spider "well, because it's bright and shinier"
tiger over spider because spiders get killed easily because people step on them
when asked Q3: wind over stone, but S15 cannot produce a reason

S15 has some appreciation that living things develop from some germ and, once alive, they may talk and grow and be active. Nonliving things are merely composed of inert material. However, it doesn't hurt to be bright and shiny — perhaps because being shiny is conceived of as a kind of sending-forth-light activity (cf. S12).

There was some echo of the rationales given for simple judgments of life status in those offered for relative judgments of aliveness. In the latter rationales, there was an appreciation for the power relations between spiders and people.

Stage 2; 4:5; S16:

grass is alive: "it drinks"
rain is not alive "because it just sprinkles"
flowers are alive: "they drink water"
a car is not alive: "it has gasoline, Silly" [i.e., that's what makes it go]

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JC: What does it mean to be alive? "it means we have to drink water and we have to eat food"
the sun is alive "because it's up above" later, when asked how we know the sun is alive, S16 refers to its hanging in the sky. perhaps the sun is thought to fly or hold itself up by an act of will.

tree over stone: "it's a tree and it has roots" — presumably for drinking
tiger over lady "because it drinks more water and [eats] more food"
sun over tree "because it's very big"

Primary criteria: drinking and eating. Also, concern for autonomous and volitional movement, and for power relations between entities of different size or capacities.

The actually quite reticent rationales for relative judgments of aliveness echoed those offered for simple judgments of life status.

Stage 2; 4:10; S12:

rain is not alive "because it doesn't grow"
birds are alive "because they can fly"
grass is alive: "it grows tall"
a tree is alive "because it grows"
a butterfly is alive: "it can fly"
is the sun alive? "well, it can turn around ... I think it's alive"

lady over tiger "because it can stay alive longer. but a tortoise can live longer." JC: a tortoise can live longer? is a tortoise more alive than a lady? "uh huh, 'cause it can live longer"
sun over spider "because it can shine"
wind over tiger "because it can blow", though later S12 comes to favor the tiger.
when asked Q3: wind over stone because "the wind can blow and the stone can't"

Primary criteria: growth and autonomous movement. Again, shining seems to be regarded as a kind of activity (cf. S15).

The rationales for relative judgments of aliveness echoed those offered for simple judgments of life status.

Stage 3; 4:0; S10:

grass is not alive "because it doesn't have a face"

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a spoon is not alive: "it's something that you eat with"
the flowers are not alive, even though they look like they have eyes, "because they have petals"
birds are alive "because they have eyes"
a butterfly is alive : "I just know" "I saw [unintelligible] the hungry caterpillar turns into a beautiful butterfly, and I saw his eyes."

tree over rock "because it could be the mama tree [unintelligible]
lady over tiger "because I see her eyes better" JC: you see her eyes better? "even [though] they're little"
tree over wind "because it has leaves"
sun over tree "because it's hot"

Primary criteria: having body parts; particularly, a face and eyes. As parts go, leaves seem to regarded more highly than petals, since life was attributed to the tree but not to the flower. There may be some appreciation of the fact that living things may be related in a familial or reproductive way.

The rationales for relative judgments of aliveness echoed those offered for simple judgments of life status.

Stage 3; 4:3; S19:

JC: What do you think it means to be alive? S19: "It means you have to grow."
a butterfly is alive "because it moves". later, S19 says "anything that moves is alive." but when a ball bounces it is not alive: "no, it is just bouncing." neither are a river or rain alive. is the wind alive? "no, it just looks alive"
in both sessions and in follow-up, S19 affirmed that trees were not alive. How do we know it's not alive? "it just isn't"

tiger over lady/spider "because it's fierce"
Q1 and Q4 re stone and tree: "no"
Q1 re wind and tree: "no"
Q1 re sun and tree: "none"
Q1 re wind and sun: unresponsive "I'm getting tired of talking"
when asked Q3 re other pairs, S19 was nonresponsive.

S19's crucial criterion is autonomous motion (though it didn't hurt to be "fierce").

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Questions such as "Which one is more alive?" were construed to mean "Which one is alive?" in connection with nonliving-nonliving pairs.

Stage 3; 4:4; S1:

a bird or a butterfly is alive "because it's a animal"
rain is not alive but "it's alive to rain"
flowers are alive "because they grow"
a puddle is not alive: "it's just water"
grass is not alive "because it [just?] sticks up"

S1 affirms that the tree is not alive, but notes that the leaves at least grow, and cites this as a reason that the tree is more alive than the stone.
wind over tree "because it blows"
spider over tiger "because he moves"

S1 has not quite extended her animal-centered concept of living things to include all plants. It may be that the growth of grass and plants is not obvious to her. She cites inclusion formulas to assert that birds and butterflies are alive by virtue of their being animal. Nonliving things are viewed as compositional and inert.

The rationales for relative judgments of aliveness echoed those offered for simple judgments of life status.

Stage 3; 4:5; S5:

birds are alive "because they move"
a butterfly is alive "because it flies"
grass is not alive "because it never comes off of the ground ... all by itself [laughs]."
a bicycle being ridden is not alive
a bouncing ball is not alive: "it's people that's moving it"
JC: What do you think it means to be alive? "that they move"
JC: does the sun move by itself? "yes" is the sun alive? "no"
JC: does the wind move by itself? "yes" is it alive "no"
a tree is alive "because it grows" so, says S5, are flowers — though she has previously denied life to flowers.

lady over tiger "because, well, it's a person"
wind over sun "because it blows"
when asked Q3: sun over stone because "it moves"

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S5 would seem to be a brand new Stage 3. She cites autonomous movement as her primary rationale for judging a thing to be alive, yet denies life status to the sun and wind, reserving it for animals only. The life status of plants is up for grabs, depending on whether S5 is thinking about the fact that they grow, or thinking about the fact that they fail to autonomously move.

The rationales for relative judgments of aliveness echoed those offered for simple judgments of life status.

Stage 3; 4:5; S24:

grass is not alive "because it doesn't move — only when the wind is blowing it"
a car is not alive: "you *drive* it to work"

Q1 re tiger and lady: "I don't know"
Q3 re sun and stone "I don't know"
Q1 re tiger and spider "I don't know"
Q3 re sun and wind: "no"
Q1 re sun and wind: "no"

S24 doesn't know why tiger is more alive than spider. Among living things, S24 will allow that the tiger and the lady are more alive than the spider; however, the tiger and the lady are not judged to be alive to different degrees. Among nonliving things, no gradations of similarity to living things are advanced. S24 interprets the question "which is more alive?", when applied to one living and one nonliving entity, to mean "which is living?": hence, an entity judged to be alive always beats an entity judged to be nonliving.

Stage 3; 4:6; S17:

sand is not alive because it doesn't have a head
butterfly is alive because it has a head

S17 restricts life to animals.

Stage 3; 4:9; S27:

clouds are not alive "because I don't see their face"
grass is not alive "because I don't see its eyes." on a subsequent day, grass, like all plants, is said to be alive because it grows and has roots.

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flowers are alive "because each day if you look at them they get bigger and bigger and bigger"
a butterfly is alive "because it flies around"
a car is not alive "because it [just] has electricity in it"
a puddle is not alive "because they [just] have water in 'em"

tiger over woman "because he has sharp teeth"
spider over wind "because it has longer legs"
wind over tiger "because it is stronger"
sun over stone (Q3) "because it's brighter"
stone over wind (Q3) "because it's hard"

S27 restricts life to animals and to plants, but is ambivalent about including grass. Living things are seen as having bodies and powers of growth and of locomotion, while nonliving things are seen as merely compositional. Living things move volitionally; nonliving things are powered by some aid such as electricity. Because of S27's ambivalence about the life status of grass, and because his reasons for attributing life are animal oriented, he has been classified as Stage 3, even though he has very nearly made a secure transition to Stage 4.

In the attention paid to body parts, the rationales for relative judgments of aliveness echoed those offered for simple judgments of life status.

Stage 3; 4:9; S9:

"they [puddles] are not alive: they don't have nose. either eyes. [Or] mouths."
"on the TV sometimes it's [cars] alive. they have eyes and [other features]." JC: is that real or is that pretend? "pretend"

"[a lady is more alive than a tiger] because she's a people"
"[the wind is more alive than a tree] because the wind could blow the tree off"
"[the sun is more alive than a spider] because the sun is really — Jesus made the sun. ... Jesus is really, really — he's a really good guy. If some people die, Jesus make 'em alive again."
"[the tiger is more alive than a spider] because he's an animal and the spider is just a creature."
"[the sun is more alive than the wind] because [it's circular and] a little bit hot." [perhaps a reference to how the warming power of the sun can overcome the cooling power of the wind]

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"[the spider is more alive than the wind] because this is a creature and this is [merely] the wind. because the spider walks with eight legs."

Rationales for aliveness: particular emphasis on having (human-style) body parts — a serviceable criterion for restricting aliveness to animals.

Rationales for relative aliveness: being human rather than animal; being animal rather than 'creature'; being able to use one's body to locomote; being able to exert control or express superior force.

Religious influence re the sun's connection with Jesus (cf. S14).

Stage 3; 4:10; S30:

JC: What does it mean to be alive? "It means that ...." JC: Well, it's hard to pin it down. "yeah"
grass is not alive "because it doesn't breathe and it doesn't talk — [laughing] that's not unusual."
rain is not alive: "it doesn't breathe, it doesn't talk"
re flowers: "wellllll, they're ... alive and they're not alive." JC: oh, how do you mean? "well, they don't breathe and they don't eat — well [laughing] they do eat — and they do drink, buuut they don't breathe."

tree over stone because "lots of animals live in it. ... but animals can't give trees breath."
tiger over spider: "spiders die very quickly"
JC: Which is more like a living thing: the sun or a stone? "a star" S30 gives some fantastic reason for this choice.
JC: Which is more like a living thing: the wind or a stone? "the wind" S30 cannnot think of a reason for this choice.
when asked Q3: sun over stone for fantastic reason; wind over stone with no reason given

Life is restricted to animals, though S30 does accord plants a quasi-alive status. Criteria: breathing and, to a lesser degree, eating and talking. S30's relative judgments were more ad hoc than her simple judgments.

Stage 3; 4:11; S21:

JC: what does it mean to be alive? "I don't know"
"clouds are not supposed to be alive"

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we know a tree is alive "because it's growing"

tiger over lady "because it's my favorite"
why tiger over tree? "I don't know"

S21 basically restricts life to animals, though he allows that the tree is alive. He is not eloquent about how he decides these matters.

Stage 3; 5:1; S20:

JC: Do you know what the word *alive* means? "Yeah, it means you're not dead."
a puddle is not alive: "it's only water"
a bird is alive "because it flies and walks"
a butterfly is alive: "it flies"
sand is not alive "because it doesn't move"
flowers are not alive: "they don't move"
grass is alive because "it grows"
rain is not alive "because it doesn't eat"
the sun is not alive "because it doesn't move"
the wind is not alive "because it doesn't walk or eat" later, "it moves but it doesn't walk or eat"

re stone and tree, JC: Is one of these more alive than the other? "A rock's not alive and a tree *is* alive."
re lady and sun, JC: Which one is more alive? "the lady" JC: Why is the lady more alive? "because the sun *isn't* alive."
When asked Q3: sun over stone "because it moves"; wind over stone "because it moves"

S20 restricts life to animals and plants, though the inclusion of plants is somewhat tentative. S20's primary criterion for life is movement. However, he will resort to other criteria if necessary to get the job done. Since plants don't move and yet are alive, he will mention that they grow. Since the sun and wind and rain move and yet are not alive, he will deny the movement of the sun, and mention that the wind fails to walk, and that the wind and the rain fail to eat. His concept of life is clearly centered around the idea of animal life, and may be influenced by formal class inclusion considerations.

Questions such as "Which one is more alive?" were regarded alternately as awkward and trivial in connection with a living-nonliving pair, but were readily accepted with pairs of nonliving entities.

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The rationales for relative judgments of aliveness echoed those offered for simple judgments of life status.

Stage 3; 5:2; S14:

trees are first held to be nonliving because they do not have faces; then held to be alive because they have mouths to suck up water (see below). in follow-up, S14 again affirms that trees are alive, and that grass is alive because it grows.
a tricycle is not alive "because it doesn't have a face and it doesn't have a mouth"
a puddle is not alive "because it's water — it doesn't have a face or a mouth"
a bird is alive "because it eats bird food and it flies"
butterflies are alive "because they fly like birds"
crayons are not alive. we know "because you color with them and they don't have a face; they don't have a mouth and eyes. or hair."
JC: are flowers alive? "no, but they're beautiful" we know they are not alive "because they don't have faces, they don't have ears and they don't have hair, they don't have a mouth"
a bouncing ball is not alive "because it doesn't have a mouth or a face. or a neck."

tiger over lady because "it can kill people and it has sharp teeth"
tree over stone "because you plant trees. and they suck up water. and they have mouthses [sic]." JC: is that how they suck up the water? "yeah. you put them on the ground and underneath the dirt it soaks up and it comes underneath."
sun over wind "because it [the sun] been born." later S14 affirms that we know that the sun is alive because "it was born for Jesus." this belief is reiterated two weeks later, to justify again that the sun is alive (cf. S9).
tiger over spider "because the tiger could step on the spider"
wind over tree "because it can blow the leaves off the tree"
tree over wind "because it has a mouth"
in follow-up, wind over stone because "it blows things"

Primary criterion for life: having a face/mouth and, to a much less critical degree, other body parts. There is a nice articulation between saying that living things have faces and saying that drinking water helps to establish positive life status. Recall other interviews where it is affirmed that plants and animals are alive because they drink water, and that plants have mouths because they drink

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water. Having a mouth also articulates with communicatory capacity, so that a nice animistic cluster of life-bestowing properties results.

Other rationales for life: eating, flying.

Nonliving things lack the appropriate body features, and may be viewed as merely compositional (e.g., made of water).

Religious influence regarding sun's connection with Jesus (cf. S9).

The rationales for relative judgments of aliveness echoed those offered for simple judgments of life status.

Stage 3; 5:4; S23:

crayons are not alive "because they don't move"
butterflies are alive "because they fly"
grass is not alive because "it doesn't move"
cars are alive when they move "because that's when people drive them" [an odd affirmation, given the following remarks on rain]
the rain is not alive "because it doesn't move" JC: doesn't it fall down? "uh huh, but that's not alive"
a bird is alive "because it flies"
flowers are not alive "because they don't talk"

lady over tiger "because she doesn't have a tail"
spider over sun "because he moves"
tree over wind "because they grow"
tree over tiger "because it can grow" JC: does the tiger grow "no"

S23 restricts life to animals.

Rationales for judging alive: ability to move autonomously, ability to talk.

Rationales for judging more alive: ability to move; ability to grow; having a more lavishly appointed body.

The rationales for relative judgments of aliveness echoed those offered for simple judgments of life status.

Stage 4; 3:11; S18:

No tape available.

Stage 4; 4:6; S29:

JC: how do we know that grass is alive? "I know"

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a bicycle is not alive because "it's just metal — it's made out of metal or plastic, with rubber wheel tires"
butterflies and birds are alive because they fly
neither a car nor a spoon is alive: : "it's just metal"
a marble is not alive, even when rolling because "it's not moving [i.e., it's not really moving by itself]; it's not alive because it's just made out of plastic" JC: okay S29: "it doesn't seem to be alive" JC: uh huh, even when it moves? S29: "the moves are alive; what it does is alive, but it's not alive"

re sun v. stone: JC: is one of these more alive than the other? "no" JC: if you had to choose one as more alive, which one would you choose? S29: "If they were alive [yes, he used the subjunctive], I would choose the sun because it's so hot." in follow-up, sun is favored because "it's lighter"
re wind and sun: "they aren't alive, but if they were alive I would choose the wind because it's so fast."
tiger over tree "because it moves"
tiger over lady because "it's so active"
tiger over spider "because it's [more] active"

Life is restricted to animals and to plants. Volitional movement is an important consideration in establishing life. Inanimate objects are seen as being merely compositional.

S29 is definitely disinclined to view nonliving things as gradably nonliving, and may be slightly disinclined to view living things as gradably living.

The rationales for relative judgments of aliveness to some degree echoed those offered for simple judgments of life status.

Stage 4; 4:7; S2:

rain is not alive "because it doesn't have eyes"
a bird is alive "because it has a heart, and because it eats. I know that because I have a bird book. And it shows what some birds look like inside. There are like hearts and other stuff."
S2 thinks at length about whether grass is alive. "It's kinda hard to answer that question because grass can grow but it doesn't have a mouth."
flowers are alive "because they can grow" JC: is it the same as grass? "well, almost"
a tree is alive "because it can grow just like flowers"

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crayons are not alive "because in order for them to move you would have to pick it up and draw [with] it"
wind is not alive "but it can blow"

in response to Q1 re lady and tiger: "they're both the same amount"
in response to Q1 re tiger and spider: "same amount"
JC: what about the tree and grass? Do you think that one is more alive than the other? "grass is probably because sometimes trees can fall down because some [trees] are very high"
spider over tree "because every day it can get like bigger, like people can"
JC: Is one of these [sun and wind] more alive than the other? "[laughing] they're not alive at all"

Roughly, animal life (including insects) are judged to be equally alive, and superior to plant life. Primary rationales for attributing life: having animal body parts and, for plants, the ability to grow. There is also concern for autonomous motion, and for expressions of power and control (wind not alive "but it can blow"; trees less alive than grass because "sometimes trees can fall down"). S2 does not really prefer to view life or nonlife as a graded status. Even though grass doesn't get treated with quite the same respect as flowers and trees, S2 is certainly Stage 4.

The rationales for relative judgments of aliveness echoed those offered for simple judgments of life status in an appreciation for the ability to grow.

Stage 4; 4:8; S25:

a bike is not alive "because you just ride on it, and it doesn't say anything"
grass is alive "because it can grow"
birds are alive "because they fly around and take worms"
crayons are not alive because we just write with them: "they don't really move"
a car is not alive "because you can just drive it" i.e., it does not move by itself
flowers are alive "because they grow"
a butterfly is alive "because they fly around a lot"
wind is not alive because "it just goes whoosh"
sun is alive because it moves from place to place in the sky

a tree is more alive than a stone "because it grows"

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the tiger is more alive than the spider "because the tiger runs around more"
the spider is more alive than the sun because "because it moves and the sun doesn't" — though S later notes that the sun is first in one place and then in another, and that as a result of this locomotion should be considered alive.
When asked Q3: wind over stone "because it moves around"

Life is restricted to animals and plants. Rationales include autonomous motion, power of speech, ability to grow, and, perhaps, ability to impose control (birds "take worms").

Rationales for relative aliveness: differential ability to grow or to move about.

The rationales for relative judgments of aliveness echoed those offered for simple judgments of life status.

Stage 4; 4:10; S28:

"people are [alive]"
butterflies are alive "because they fly and move"
grass is alive "because it grows"
when accompanying S11, S28 pipes up that grass is alive "because it's a plant"
spider is alive "because it crawls — that's how you can tell it is alive"
tree is alive "because it grows ... it starts out as a seed and it turns into a tree"

JC: Why is the wind more alive than the spider? "I don't know"
when accompanying S11, S28 pipes up that he picked the tiger all the time in the comparisons because he liked it the best. JC: but the question is not which one you like the best: the question is which one is more alive. "And what does that mean?" asks S28.
When asked Q3: wind over stone "because it moves"; sun over stone "because it moves"

S28 restricted life to animals and plants. His reasons were sometimes biological (starts out as a seed and grows) and sometimes psuedobiological (crawls, flies, moves).

There is some evidence that S28 used principles of class inclusion to establish life status (grass alive because it's a plant).

The rationales for relative judgments of aliveness echoed those offered for simple judgments of life status.

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Stage 4; 5:0; S3:

plants are alive because they grow and breathe
a bird is alive because it breathes
the sun is alive "because it's hot and makes heat" "the sun is always happy"
the wind, on sum, is not alive: "sort of, but you can't see it"
rain is not alive "because it just falls"
JC: what does it mean to be alive? "to breathe" Yet, even after saying this, S3 reaffirms that the sun is alive.
On a subsequent day, JC: what do you think it means to be alive? "to grow"
S3, thinking carefully, judges the sun to be nonliving. JC: How do we know it's not alive? "because it's [just?] hot" [note that the sun's heat was previously mentioned in connection with it's being alive]
JC: Are trees alive? "Uhhh, they growww ... but they're ..." S3 then indicates that he does judge them to be alive, however tentative their status as living things.

JC: Which do you think is more like a living thing: the sun or the wind? "not sun and not wind" JC: uh huh. is one of them more like a living thing? "both of them are not, alike" ... JC: Is one of these [sun & stone] more like a living thing? "Not exactly" ... JC: Do you think one of these [stone & wind] is more like a living thing? "Not the wind, or the sun, or the stone."
spider over tree "because it lives ...."
re spider and tiger: "a tiger is alive, but a spider is little"
JC: Well, look: here's a picture of a lady. "Yeah, a lady is a person, so that's much alive."

S3 restricts life to animals and to plants. However, plants are felt to be somewhat intermediate in life status between animals and nonliving entities. The sun (and, to a lesser degree, the wind) just narrowly misses being judged alive.

The question "Which of these is more like a living thing?" receives the same answers as would "Which of these is a living thing?"

Stage 4; 5:0; S8:

clouds are not alive "because they're up in the sky and they're really made out of ice"

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birds are alive "because they can move and they make a tweet-tweet noise kinda"
sand is not alive "because it is from ground up rocks"
a puddle is not alive "because water is not alive"
grass is alive "because if you plant a grass seed it will grow and grow"
a butterfly is alive because "it flies and it's got wings"
crayons are not alive "because they're made of wax"
flowers are alive "they grow like grass"
a car is not alive even when it is moving: "machines inside make it move"
a trike is not alive: "you pedal it"

asked Q1 re lady and tiger: "I don't think so: I think they're both the same amount alive" if forced to pick between lady and tiger, S8 would pick the tiger "because it is faster"
JC: Would you say that one of these [the sun and the wind] is more alive? "yeah, I think the sun ... the sun is really made out of fire." JC: okay, you pick the sun. "I like that [one] a lot."
spider over wind "because it can move." JC: But doesn't the wind move? "Yes, but the wind is not an animal."
tree over sun "because it grows"
S8 likes the picture of the rock the best "because it's such a weird shape"
When asked Q3: wind over stone "because it moves, while the rock only moves if it is tumbling down"; sun over stone "because it moves"

S8 restricts life to animals and plants. Things are alive because of biological reasons (growing) and psuedo-biological reasons which emphasize the actional and 'linguistic' ways in which animals are designed for life (has wings, goes tweet, can fly or move). S8 seems to feel that inanimate objects are in some sense merely compositional, made up from simple inert substances. S8 is sensitive also to causal chains, so that the movement of cars and trikes is understood to be produced rather than the result of an internal act of volition.

Rationales for aliveness: autonomous movement; growing or developing from seed; vocal capacity; having appropriate body parts rather than being composed of inert materials.

Rationales for relative aliveness: being faster; being able to move; being able to move autonomously; being an animal; growing.

The rationales for relative judgments of aliveness echoed those offered for simple judgments of life status.

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Stage 4; 5:4; S11:

various things are alive or not alive "because I know"

sun over the wind "because its brighter"
tiger over the sun "because its louder"
When asked Q3: wind over sun "because it moves"
When asked Q3: unresponsive to sun v. stone

S11 restricts life to animals and plants. He does not show marked conviction in the session. The session is just acceptable.

Rationales for judging more alive: greater salience or power.

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