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Title

Evolution and Value

Permalink

<https://escholarship.org/uc/item/5pv2r4hx>

Journal

Expositions, 8(1)

ISSN

1747-5376

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Publication Date

2014

Peer reviewed

Evolution and Value

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“Man is an ethical animal; in fact he is *the* ethical animal. His ethicizing is a biological adaptation necessary to success in his way of life.”

G.G. Simpson, *Biology and Man*¹

Values are a universal attribute of humankind. All humans have moral values; that is, they accept standards according to which their conduct is judged right or wrong, good or evil. People have also other sorts of values: economic, aesthetic, gastronomic, and so on.

Where do moral values come from? Some moral values are widespread and perhaps universal, like not to kill, not to steal, and to honor one’s parents. But the moral values by which people judge their behavior vary at present from culture to culture and have changed in important ways through historical times. Different ethnic groups, different nationalities, different tribes, and even different individuals exhibit different moral values and different norms by which they evaluate their actions. Think of the difference between a modern American and an Islamic fundamentalist with respect to the rights of women, or between most modern Americans and the official doctrine of the current Russian government concerning homosexuality.² Darwin expressed horror at the burning of widows by Hindus and thought absurd the proscription of Muslim women to expose their faces.

Diversity of values occurs also among individuals within a single country or a single cultural group. Among modern Americans as well as among individuals in other Western countries, there is considerable variation, for example, concerning the rights of homosexuals. Even with respect to seemingly universal values, there is variation among cultural groups and among individuals when we get down to specifics. The value of human life and the commandment “Thou shall not kill” would seem at first universal, but abortion will be accepted by some and not others. When a newborn will face a life of misery because of physical handicaps, or when a child is unwanted by the mother, it would seem, to many but not to all, that abortion is the more ethical option. Withdrawing life-support machinery from an unconscious or intensely suffering terminal patient will be judged by many as an act of mercy, not a crime. Killing the enemy is perceived as a duty for a soldier engaged in war.

Ethical values have substantially changed through history and continue to change in recent times. *Apartheid* was the official policy of the government of South Africa, and variations of *apartheid* were practiced for centuries until recently in the South of the United States. Our individual and collective responsibility towards nature as a whole has become accepted by people only recently. The philosopher Peter Singer has argued that people have gradually over

the course of history enlarged the range of beings whose interests they value as they value their own.³ And as Steven Pinker has written,

Much of our recent social history [...] consists of the moralization or amoralization of particular kinds of behavior [...]. For example [...], smoking is now treated as immoral [...]. At the same time, many behaviors have been ammoralized, switched from moral failings to lifestyle choices. They include divorce, illegitimacy, working mothers, marijuana use and homosexuality.⁴

Where do moral values come from? I will, first, explore the origins of language, another human universal. All humans, and only humans, communicate by means of symbolic, creative language. Animals phylogenetically close to us, for example chimpanzees, communicate by gestures and sounds. Humpback whales communicate by seemingly specific sounds. The “language” of the bees and other social insects, as well as the chemical communication of other insects, is symbolic, but it is genetically determined, not creative.

It seems that when we consider the origins of human language we may refer to either one of two different issues. One issue concerns the origin of the human capacity for symbolic language. The other issue is the origin of specific languages, such as English, Spanish, or Chinese. The human capacity for language required the evolution of three novel features that happened in humans and only in humans. First, in order to have human language we need an organ able to produce sounds capable of modulating vowels and consonants; second, humans need to have the means of phonetic and semantic identification so as to associate meaning with specific combinations of vowels and consonants; and third, human language requires the combination of phonetic and semantic units capable of generating an unlimited number of messages subjected to syntactic rules. Human language is creative in two different ways. We combine basic sounds, phonemes, to form words; and we combine words to form sentences.⁵

The second question about the origins of language concerns the origin of particular languages, something that grammarians and other linguists have been investigating for decades. French and Spanish are phylogenetically closely related, having a common origin in Latin. They are less related to Greek languages modern or classic, and still less to Persian or ancient Sanskrit. Darwin saw an analogy between the evolution of languages and the evolution of species:

The formation of different languages and of distinct species, and the proofs that both have been developed through a gradual process, are curiously the same... We find in distinct languages striking homologies due to community of descent and analogies due to a similar process of formation... Languages, like organic beings, can be classed in groups under groups; and they can be classed... naturally according to descent. Dominant languages and dialects spread widely and lead to the gradual extinction of other tongues.⁶

In summary, the human capacity for language is an outcome of biological evolution, depending on the evolution of certain anatomical and physiological attributes associated with the ability to produce precise sounds, but also depending in a most fundamental way on the

evolution of the advanced intelligence that is distinctively associated with human nature. The origin of particular languages is determined not by biological evolution but by cultural evolution, the preferences and experience of human societies, which are different in different human groups and which change through times.

Similarly as in the origin of language, the origin of ethical values refers to two different questions. The first question is more fundamental; it asks whether or not human nature is such that we are necessarily inclined to have values, including ethical values, by which (the “moral sense”) we identify our actions as either right or wrong. Affirmative answers to this first question do not necessarily determine what values we may have. Even if we conclude that people cannot avoid having values, including moral standards of conduct, it might be that the choice of the particular standards used for judgment would be arbitrary. The propensity for having values does not necessarily determine what these values should be, similarly as the capacity for language does not determine which language we shall speak.

I propose that humans are value-prone beings by their biological nature. Humans make value choices, evaluate their behavior as either right or wrong, moral or immoral, as a consequence of their eminent intellectual capacities that include self-awareness and abstract thinking. These intellectual capacities are products of the evolutionary process, but they are distinctively human.

Secondly, I argue that the values we have, including the moral norms according to which we evaluate particular actions as either morally good or morally bad (as well as the grounds that may be used to justify the values) are products of cultural evolution, not of biological evolution. The values preferred, including the norms of morality, belong, in this respect, to the same category of phenomena as the languages spoken by different peoples, their political and religious institutions, as well as the arts, sciences, and technology.

The existence of values depends on the existence of human biological nature. Moreover, the choice and persistence of values is facilitated whenever they are consistent with biologically conditioned human attributes and behaviors. But the values are independent of such attributes and behaviors in the sense that some values may not favor, and may hinder, the survival and reproduction of the individual and its genes, which survival and reproduction are the targets of biological evolution. Discrepancies between accepted values and biological survival are, however, necessarily limited in scope or would otherwise lead to the extinction of the individuals and populations accepting such discrepant rules.

The existence of values depends on the ability of humans to anticipate the consequences of their own actions. Pulling the trigger, eating vegetables, or taking care of the sick have human value only if I can anticipate their consequences. Only if I can anticipate that pulling the trigger will shoot the bullet, which in turn will strike and kill my enemy, can the action of pulling the trigger be evaluated as nefarious. Pulling a trigger is not in itself a moral action; it becomes so by virtue of its relevant consequences. I choose to eat vegetables for reasons of health and I help a sick person because this will improve that person’s well-being.

The ability to anticipate the consequences of one’s actions is closely related to the ability to establish the connection between means and ends: that is, of seeing a mean precisely as mean, as

something that serves a particular end or purpose. This ability to establish the connection between means and their ends requires the ability to anticipate the future and to form mental images of realities not present or not yet in existence.

The ability to establish the connection between means and ends happens to be the fundamental intellectual capacity that has made possible the development of human culture and technology. The evolutionary roots of this capacity may be found in the evolution of the erect position, which transformed the anterior limbs of our ancestors from organs of locomotion into organs of manipulation. The hands thereby gradually became organs adept for the construction and use of objects for hunting and other activities that improved survival and reproduction, i.e., that increased the reproductive fitness of their carriers. The construction of tools depends not only on manual dexterity, but in perceiving them precisely as tools, as objects that help to perform certain actions, that is, as means that serve certain ends or purposes: a knife for cutting, an arrow for hunting, an animal skin for protecting the body from the cold. Natural selection promoted the intellectual capacity of our biped ancestors, because increased intelligence facilitated the perception of tools as tools, and therefore their construction and use, with the ensuing amelioration of biological survival and reproduction.

The development of the intellectual abilities of our ancestors took place over two million years or longer, gradually increasing the ability to connect means with ends and, hence, the possibility of making ever more complex tools serving remote purposes. The ability to anticipate the future, essential for ethical behavior, is therefore closely associated with the development of the ability to construct tools, an ability that has produced the advanced technologies of modern societies and that is largely responsible for the success of mankind as a biological species. From its obscure beginnings in Africa, mankind has spread over the whole earth except the frozen wastes of Antarctica, and has become the most numerous species of mammal. Numbers may not be an unmixed blessing, but they are a measure of biological success.⁷

In addition to being able to anticipate the consequences of our actions, values require the capacity to make value judgments, to perceive certain objects or deeds as more desirable than others. Only if I can see the death of my enemy as preferable to his survival (or vice versa) can the action leading to his demise be thought as valuable. If the alternative consequences of an action are neutral with respect to value, the action obviously cannot be characterized as valuable. The ability to make value judgments depends on the capacity for abstraction, i.e., on the capacity to perceive actions or objects as members of general classes. This makes it possible to compare objects or actions with one another and to perceive some as more desirable than others. The capacity for abstraction requires an advanced intelligence such as it exists in humans and apparently in them alone, and it is, therefore, also an outcome of human evolution.

There is a third requirement for attributing value to a particular behavior or object; namely, the ability to choose between alternative courses of actions. Pulling the trigger can be a value action only if I have the option not to pull it. A necessary action beyond our control is not a value, even if it may be good for us. The circulation of the blood or the process of food digestion are not value actions.

Whether there is free will is a question much discussed by philosophers and this is not the appropriate place to review the arguments. I only will advance two considerations which are common sense evidence of the existence of free will. One is our personal experience, which indicates that the possibility to choose between alternatives is genuine rather than only apparent. The second consideration is that when we confront a given situation that requires action on our part, we are able mentally to explore alternative courses of action, thereby extending the field within which we can exercise our free will. In any case, if there were no free will, there would be no ethical behavior; morality would only be an illusion. The point that I want to make here is, however, that free will is dependent on the existence of a well-developed intelligence, which makes it possible to explore alternative courses of action and to choose one or another in view of the anticipated consequences.

In summary, values are attributes of the biological make-up of humans and, hence, they exist as consequences of biological evolution.⁸

Now I turn to the second question: whence do our values come? Are they determined by our human nature, that is, are they necessary consequences of biological evolution? The answer is no. Human values are not determined by biological evolution, but by cultural evolution. Values differ among human societies and even among human individuals, even within the same human population or human social group; and human values change through time, that is, not only in the scale of human evolution (hundreds of thousands or millions of years), but in the scale of human history (hundreds or thousands of years), and even in the scale of a human life (tens of years).

Religious beliefs, social and political institutions, family traditions and education, all impact the values we hold, and of course we have our own preferences and make our individual choices. In particular, it is often the case that the value systems held by many individuals derive from their religious convictions. There is no necessary, or *logical*, connection between religious faith and moral principles and other values, although there usually is a motivational or psychological connection. Religious beliefs do explain why people accept particular values, because they are motivated to do so by their religious convictions. But in following the moral and other dictates of one's religion, an individual is not rationally justifying the moral norms that he or she accepts. It may well be that the motivational connection between religious beliefs and ethical norms and other values is the decisive one for the religious believer. But this is true in general: most people, religious or not, accept a particular set of values for social reasons, without trying to justify it rationally by means of a theory from which the moral norms can be logically derived. People accept the values that prevail in their societies, because they have learned such norms from parents, school, or other authorities.⁹

I should add, however, that value systems, like any other cultural activities, cannot long survive if they run outright contrary to our biology. Our values must be consistent with biological nature, because values can only exist in human individuals and in human societies. One might therefore also expect, and it is the case, that accepted values will often promote behaviors which increase the biological adaptation of those who behave according to them. But this is neither necessary nor indeed always the case.

Notes

1. Simpson 1969, 137.
2. As late as 1969, homosexuality was illegal in the United States in every state except Illinois. “Today homosexuality has been legalized in almost 120 countries, though laws against it remain on the books of another 80, mostly in Africa, the Caribbean, Oceania, and the Islamic world. Worse, homosexuality is punishable by death in Mauritania, Saudi Arabia, Sudan, Yemen, parts of Nigeria, parts of Somalia, and all of Iran.” See Pinker 2011, 449–450.
3. Singer 1981/2011.
4. Pinker 2008, 34.
5. See, for example, Cela-Conde and Ayala 2007, particularly chapter 10.
6. Darwin 1871, I, 60.
7. See Ayala 2010.
8. Thomas Nagel in his *Mind and Cosmos* (2012, 66 and elsewhere) argues that the explanation of conscious life, and indeed of biological evolution on the whole, requires that “there are natural teleological laws governing the development of organization over time [...] *In spite of the exclusion of teleology from contemporary science*, it shouldn’t be ruled out a priori” (emphasis added). First, let me make it clear that teleology has *not* been excluded from contemporary science. I will adduce as, I hope, definitive exhibit my own extensive writings on the subject; for example Ayala 1968, 1970, 1974, 1998, 1999, 2008. Teleology and teleological explanations are used by evolutionary biologists in order to account for the functional features of organisms, their “design,” in terms of the goals or purposes they serve. Physical scientists do not face similar demands. The configuration of sodium chloride depends on the structure of sodium and chlorine, but no chemist is likely to write that sodium chloride has been *designed* for certain purposes, such as tasting salty. The revolution of the earth around the sun results from the laws of gravity, but astrophysicists do not state that this happens *in order to* produce the seasons. An object or behavior can be said to be teleological, or telic, when it gives evidence of design or appears to be directed towards certain ends, goals, or purposes. For example, the behavior of human beings is often teleological. A person who buys an airplane ticket, reads a book, or cultivates the earth is trying to achieve a certain goal: getting to a given city, acquiring knowledge, or getting food. Objects and machines made by people also are usually teleological: a knife is made for cutting, a clock is made for telling time, a thermostat is made to regulate temperature. In a similar fashion, I argue, features of organisms have come to be because they serve certain purposes or functions, and in this

sense they can be said to be teleological: a bird's wings are for flying, eyes are for seeing, and kidneys are constituted for regulating the composition of the blood. The features of organisms that may be said to be teleological are those that can be identified as adaptations, whether they are structures like a wing or a hand, processes like the regulation of temperature in mammals, or behaviors like the courtship displays of a peacock. Adaptations are features of organisms that have come about by natural selection because they increase the reproductive success of their carriers. Teleological explanations apply only to features or behaviors that would not have come about were it not for the particular end or purpose they serve. The end, goal, or purpose served is, therefore, the explanatory reason for the existence of the feature or behavior and its distinctive characteristics. A teleological hypothesis purports to identify the function or purpose that accounts for the evolution of a particular feature.

Of course, teleology and teleological explanations as used by biologists are very different notions from the vague, universal teleology offered by Nagel "as possibilities, without positive conviction" (2012, 124). According to him, "If evolutionary biology is a physical theory—as it is generally taken to be—then it cannot account for the appearance of consciousness and of other phenomena that are not physically reducible" (Nagel 2012, 14–15). It is apparent in this quote, and indeed throughout the whole chapter on "Antireductionism and the Natural Order," that Nagel fails to distinguish between two kinds of reductionism: ontological reductionism and epistemological reductionism. Evolutionists, myself included, and most biologists sustain ontological reductionism, but not epistemological reductionism—a distinction that I explain in the ensuing two paragraphs.

Organisms are complex self-organizing entities made up of parts: organs, tissues, cells, organelles, and ultimately molecules and atoms. Issues about the relationship between organisms and their physical components, or between biology and the physical sciences, arise in at least two domains. Reduction questions arise, first, in a domain that may be called ontological, structural, or constitutive. The issue here is whether or not physicochemical entities and processes underlie all living phenomena. Are organisms constituted of the same components as those making up inorganic matter? Or, do organisms consist of other entities besides molecules and atoms? Ontological reductionism claims that organisms are exhaustively composed of nonliving parts; no substance or other residue remains after all atoms making up an organism are taken into account. Ontological reductionism also implies that the laws of physics and chemistry fully apply to all biological processes at the level of atoms and molecules.

A different reduction question concerns issues that may be called epistemological, theoretical, or explanatory. The fundamental issue here is whether or not the theories and laws of biology can be derived from the laws and theories of physics and chemistry. Epistemological reductionism is concerned with the question of whether biology may be ignored as a separate science because it represents simply a special case of physics and

chemistry. When philosophers of science speak of reductionism, they generally refer to epistemological reduction. In biology, the question of epistemological reduction is whether or not the laws and theories of biology can be shown to be derived as special cases from the laws and theories of the physical sciences, which I contend they are not (Ayala 1968 and 1987). Nagel's mistake is to conclude from the fact that evolutionists are (ontological) reductionists that they therefore cannot explain human behavior (and much else) with their theories. But this does not follow, since evolutionary theories are epistemologically *antireductionist*. Evolutionists use distinctive theories and laws that cannot be reduced to, or explained by, the laws of physics and chemistry.

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