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Psychology, Meaning Making and the Study of Worldviews: Beyond Religion and Non-Religion

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Abstract:
To get beyond the solely negative identities signaled by atheism and agnosticism, we have to conceptualize an object of study that includes religions and non-religions. We advocate a shift from "religions" to "worldviews" and define worldviews in terms of the human ability to *ask* and *reflect on* "big questions" ([BQs], e.g., what exists? how should we live?). From a worldviews perspective, atheism, agnosticism, and theism are competing claims about one feature of reality and can be combined with various answers to the BQs to generate a wide range of worldviews. To lay a foundation for the multidisciplinary study of worldviews that includes psychology and other sciences, we ground them in humans' evolved world-making capacities. Conceptualizing worldviews in this way allows us to identify, refine, and connect concepts that are appropriate to different levels of analysis. We argue that the language of enacted and articulated worldviews (for humans) and worldmaking and ways of life (for humans and other animals) is appropriate at the level of persons or organisms and the language of sense making, schemas, and meaning frameworks is appropriate at the cognitive level (for humans and other animals). Viewing the meaning making processes that enable humans to generate worldviews from an evolutionary perspective allows us to raise news questions for psychology with particular relevance for the study of nonreligious worldviews.

Keywords: worldviews, meaning making, religion, nonreligion

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Psychology, Meaning Making, and the Study of Worldviews: Beyond Religion and Non-Religion

Recent interest in studying atheism and agnosticism and, by extension, nonreligion has challenged researchers to specify their object of study in positive terms. In characterizing our object of study as *nonreligion*, we are indicating that we want to think about it – whatever it is -- in relation to *religion.* In effect, the juxtaposition sets up a comparison without specifying the overarching framework in which both religion and nonreligion fit or identifying the features that we want to compare. The shift from "religions" to "worldviews" in the call for this special issue tacitly provides such a framework. To investigate non-religious worldviews, however, we need to begin by clarifying the worldview concept, which has been extensively discussed in the humanities, and connecting it to research in psychology in order to suggest how psychologists can contribute to its study.

The concept of a "worldview" has been traced back to Kant and is extensively elaborated in philosophy and the social sciences (Naugle, 2002). Within religious studies, some have advocated studying religions *as* worldviews (Juergensmeyer, 2010; Paden, 2006; Smart, 2000) and others a shift from studying religions to studying worldviews more generally (Droogers, 2014). Within psychology, Koltko-Rivera (2004) proposed a definition of worldviews and a research agenda for a social psychology of worldviews. Although Koltko-Rivera's definition (p. 4) is compatible with the definition adopted here, his "collated model" of worldview dimensions lacks theoretical grounding. In contrast, we take a building block approach that situates worldviews in a comparative evolutionary perspective. Doing so allows us to identify a core set of world-and-self-making capacities that humans share with other animals and upon which the

human ability to elaborate worldviews rests. Even in their most basic form, these world-and-self-making capacities enable organisms to "make sense" of their environment and, thus, represent primitive versions of the meaning making abilities that humans use to make sense of situations and events.

Researchers have struggled with the question of whether worldviews are limited to humans or extend in some form to other animals as well. In what follows, we will introduce terminology that allows us to both connect humans and other animals (ways of life and "big questions") and also distinguish them (conventional affordances, cultural schemas, and transcendental social worlds). More nuanced comparisons of similarities and differences will not only facilitate research at different levels of analysis, but also a better understanding of the role of cultural content in the meaning making processes associated with humans. Overall, we will argue that "worldviews" and "worldview dynamics" (Droogers, 2014) are appropriately discussed at the level of persons, groups, and human interactions and that sense making is an inherently multi-level *cognitive process* that provides a framework for understanding the mechanisms we rely on to generate worldviews.

Worldviews Defined

We begin with the approach to worldviews studies outlined by cultural anthropologist André Droogers (2014), which makes three important contributions to the study of non-religious worldviews. (1) It allows researchers to study the entire range of worldviews without worrying about whether they are religious or not. (2) It allows scholars to focus on both the explicit, highly rationalized attempts to address ultimate questions often studied by philosophers and scholars of religion and the answers implicit in the taken-for-granted ways of life more

commonly studied by anthropologists. (3) It allows us to explore worldview "dynamics" as an interactive process embedded in social relations. Like Vidal (2008), Droogers (2014), Koltko-Rivera (2004), and many others, we understand worldviews as a complex set of representations related to "big questions" (BQs), such as (1) ontology (what exists, what is real), (2) epistemology (how do we know what is true), (3) axiology (what is the good that we should strive for), (4) praxeology (what actions should we take), and (5) cosmology (where do we come from and where are we going), that define and govern a way of life. As we explain later on, we emphasize the process of *questioning* and *revising* information relevant to these domains – rather than having stable and coherent answers – as the salient feature of worldviews.

From a worldviews perspective, atheism, agnosticism, and theism are competing claims about one feature of reality, i.e., "do deities exist?" If we situate atheism and agnosticism within a worldviews framework, it is clear that they can be combined with various answers to the other "big questions" to generate a wide range of nontheistic worldviews. A broad range of worldviews, (often referred to as "ideologies") from nationalism and neoliberalism to humanism and deep ecology, may or may not come with gods as part of the package, while delivering on axiology, cosmology, and praxeology. Locating atheism and agnosticism as partial answers to the big question of "what exists" allows us to ask to what extent the worldviews of atheists and agnostics otherwise overlap with the worldviews of theists (and vice versa), and what the implications of these worldview differences might be. How does the presence or absence of "gods" (to stick with a strict definition of a/theism) relate to other aspects of the worldview? What difference does it make for people's way of life and well-being?

Toward a Shared Conceptual Foundation

To create a shared framework for investigating worldviews that is neither culture-bound nor arbitrary, we take a building block approach, grounded in a comparative evolutionary perspective, which situates worldviews in relation to "ways of life" and "world-making." Like the aforementioned worldview scholars, we will limit worldviews – but not "ways of life" and "world-making" (Paden, 2006) – to species with the capacity to create what anthropologist Maurice Bloch (2008) characterizes as "transcendental" social worlds, that is, worlds that go beyond face-to-face transactions. Although this restriction most likely limits worldviews to humans, we highlight the continuities between human worldviews and the world-making abilities of other animals. While we recognize the differences, we think that the scientific study of worldviews will be more parsimonious if we generate an understanding of worldviews from the bottom up. We thus start from the premise that both (1) the explicitly articulated, reflective, logically coherent worldviews that have been of particular interest to philosophers and scholars of religion and (2) the ways of life that have long interested anthropologists are reliant on (a) evolved self-and-world making capacities of interest to evolutionary psychologists and (b) the implicit, intuitive, nonlinguistic and nonconscious processes of making sense of "the world" of interest to cognitive anthropologists (Strauss & Quinn, 1999) and psychologists of meaning (Proulx & Inzlicht, 2012; Martela & Steger, 2016).

We contend that humans are not the only organisms that generate *answers* to the big questions. Even simple organisms with the most basic world-and-self modeling capacities enact implicit answers to some of the BQs, such as what exists, and which actions are preferable in given situations. In enacting implicit answers, organisms tacitly "make sense" of situations (what is) and events (what is happening). Humans differ from other animals in their capacity to

articulate and reflect on the BQs – that is, to approach them *as* questions – and to offer narrative descriptions of, and links between, situations and events.

World, Self-and-World-Modeling, and Affordances

By "world" we refer to a relationship between an individual organism and its environment - roughly, what phenomenologists refer to as an organism's "life-world" (*Lebenswelt*). In the language of predictive processing (e.g. Clark, 2016), the organism's world-model is its *embodied and enacted predictive model of its environment*. The world in this context is indexical, that is, constituted from the point of view of the organism. As such, generating a world-model co-constitutes a self-model: a set of expectations about its bodily extension, reach, needs, and so on (cf. Metzinger, 2003, 2007).

We can cast this organism-environment relationship in terms of the ecological concept of "affordances" (Gibson, 1986). An affordance is a possibility for action provided to an organism by things and creatures in its environmental niche, given the organism's particular sensorimotor, perceptual, and cognitive abilities (cf. Ramstead, Veissière, & Kirmayer, 2016, p. 3). An environmental *niche* can be defined as the totality of affordances available to a particular population in a particular environment, a "landscape of affordances" (Ramstead, Veissière, & Kirmayer, 2016, p. 3). An individual organism's world emerges from the local and situated attempt to leverage immediately available ensembles of affordances in the niche.

All organisms build worlds from affordances, but we can distinguish between two *types* of affordance: "natural" and "conventional" (Ramstead, Veissière, & Kirmayer, 2016). Natural affordances are "possibilities for action, the engagement with which depends on an organism or agent exploiting or leveraging reliable correlations [between things, organisms, agents] in its

environment with its set of abilities" (p. 2). An open plain affords running for humans, a tree affords climbing for sloths, and worms afford eating for robins. *Conventional* affordances are, by contrast, possibilities for action that depend on "agents' skillfully leveraging explicit or implicit *expectations, norms, conventions, and cooperative social practices*" (p. 2, our emphasis). Thus, a credit card affords purchasing for agents familiar with the contemporary economic system, and a passport affords crossing borders. Human worlds are populated with conventional affordances, relying to a large extent on *what we expect others to expect us to do* in specific situations (cf. ibid., p. 5). In contrast to natural affordances, which generate action based solely on environment-organism relationships, conventional affordances depend on *cultural schemas* that provide shared expectations relative to specific things, persons, places, or events.

Ways of Life: Selves Acting in Worlds

A way of life designates the organism's habitual patterns of interaction with affordances in its world. The possibilities for interaction are, as we have seen, premised on the nature and complexity of the organism's sensory and cognitive abilities. Since an organism's predictive models of itself and its environment are generated from interacting with its niche, world-and-self models are *co-constructed* in ways of life. These interactions are goal-directed and thus already concerned with values and appraisals, albeit on a very rudimentary, automatic, and local level. In this sense, as Vidal (2008) indicates, even a bacterium has what we would call a self- and world-model. Simple robots capable of navigating independently through space and modifying their actions in light of sensory inputs are also members of the self-and-world-modeling club (Metzinger, 2007). Depending on the complexity of the organism, these ways of life may be transmitted through various combinations of genetics, imitation, and learning. As Ramstead,

Veissière, & Kirmayer (2016) argue, evolutionary pressures apply precisely to organisms' probabilistic models of self and world because organisms *embody* and *enact* these models in their ways of life. Because natural selection favors organisms that generate the best models of their environments, we can trace the development of this capacity over phylogenetic and ontogenetic timescales (ibid., p. 11).

Big Questions: The Thread that Connects Ways of Life and Worldviews

It is from this perspective, in which organisms are viewed as embodying and enacting models of self-and-world as the basis for goal directed action and, thus, ways of life, that we suggest that all living organisms embody answers – in the shape of affordance-based world-and-self models – to at least some of the BQs (what exists, what is good to strive for, how to get it). Although we usually think of ontology, axiology, praxeology, and epistemology as questions that philosophers spend their lives pondering, the concepts of self- and world-modeling and ways of life make it possible to translate the BQs into the language of predictive processing (see Table 1). Insofar as our translation is persuasive (Taves & Asprem, 2018), it suggests that the BQs are basic questions posed by natural selection, which all living organisms *must* answer in order to survive.

Table 1: Big Questions in the Language of (Evolutionary) Predictive Processing

Big Question	**Language of (Evolutionary) Predictive Processing**
Ontology What exists?	Organisms actively select and appraise incoming information against top-down predictions (based in genetics and/or prior experience) in order to guess "what is". In doing so, they create self- and world-models.
Axiology What is good and bad?	Ultimate preferences (good and bad) are built into the organism's world-and-self models through a natural selection of goals: organisms embodying models that strive for survival-enhancing uses of available affordances (food, mating, avoidance of predators and environmental dangers) prevail.
Praxeology What does the organism do? How does it act?	Best available actions in a situation are determined from an organism's best prediction of what is (ontology) in accord with the affordance-based goals and values embodied in its self-model (axiology).
Epistemology How does it know what is true about the world?	Organisms embody a Bayesian epistemology that constantly tests "what is true" through probability-based interactions with the environment constrained by survival pressures. Revising the models can be very slow and often work on the population rather than the individual level through natural selection.

To clarify why organisms must answer these basic questions, we need to ask what role they play in an organism's life. Bearing in mind that the organism's world is not static, that situations change and events happen, the organism must continually make sense of, and adapt to, situations (what is) and events (what is happening). Viewed from an evolutionary perspective, everything revolves around the *praxeology question*: how should the organism act in any given situation? The organism's action is determined from its best prediction of *what is* (ontology) in accord with *the affordance-based goals and values embodied in its self-model* (axiology). These goals and ontologies, however, are constrained by praxeology, because they only stabilize to the extent that they provide actions that are effective and contribute to long-term survival.

Worldviews

Although we contend that all beings capable of leveraging natural affordances have a way of life and thus generate implicit answers to at least some of the BQs, we do not think that all organisms have a worldview. Developing a worldview, as defined here, requires the cognitive ability to *ask* as well as answer the BQs; it thus presupposes sophisticated forms of social cognition and self-representation, the ability to engage in imaginative "mental time travel" (MTT; Suddendorf & Corballis, 1997, 2007), and the capacity to represent the world through symbols and narrative. Thus, we limit worldviews proper to those social animals -- primarily humans -- who have the cognitive ability to develop and use *conventional* as well as natural affordances (Ramstead, Veissière, & Kirmayer, 2016) and to imagine alternative scenarios.

Conventional affordances require making inferences about the intentions and expectations of other agents and regulating one's own and others' behaviors accordingly (Ramstead, Veissière, & Kirmayer, 2016). The extent to which humans share this ability (theory

of mind) with other social species is a matter of debate (Tomasello et al., 2005). Other cognitive abilities - including self-reflection, prospection (imagining the future), and narrative synthesis - are more clearly limited to humans. Together, these abilities allow humans to turn the implicit and embodied *answers* to BQs into *questions* that enable them to consider alternatives and make connections: Could the world be other than what it seems? Are there alternative ways of finding out? Would it be better if we lived differently than we do? The cosmology question – where do we come from and where are we going – is *premised* on mental time travel and narrative synthesis (imagining past and future events, allowing for the discovery of beginnings and endings, e.g., death and procreation), which is why we left it out of Table 1.

Posing such questions not only provides humans with a remarkable ability to adapt to changing environments, but also to create entirely new environments. Humans are able to combine theory of mind with mental time travel to create a new kind of social world that is not found in other animals. This is what anthropologist Maurice Bloch (2008) characterizes as "transcendental social worlds" and contrasts with the "transactional" social worlds of other animals. In transactional social worlds, animals assume roles and produce groups based on "a process of continual manipulation, assertions and defeats" (p. 2056). Humans do this as well, but they add to it the ability to form essentialized roles and groups, that is roles and communities that *exist in the imagination*, independent of the individuals that comprise them. Roles are socially shared expectations, which produce conventional affordances. Thus, humans may treat an aged person incapable of leadership with deference or even reverence due to their status as an "elder", and recognize total strangers as members of their own "imagined community" (Anderson 1983), such as a nation or, indeed, a religion. Worldviews, in our understanding, emerge together with this "transcendental social" and are an integral part of its organization.

Worldview expression. Although the capacity to *enact* worldviews may not differ too much from enacting a way of life (which all organisms do), the capacity to articulate, memorize, and textualize worldviews is evolutionarily novel. In contrast to outmoded theories of cultural evolution, we stress that, as with all evolved capacities, these too are layered upon one another, such that all these modes of expression are present in all literate cultures.

Enacted worldviews: Enacted or *implicit worldviews* are worldviews *as they are acted out in practice*. People typically enact taken-for-granted aspects of their worldview without articulating them. At the same time, novel answers to questions about how to act, what to strive for, or how to settle matters of fact, are often developed in response to some problem posed by the environment, rather than through articulated, philosophical reflection. Encounters with alternate behaviors, views, or customs lead people to surface and articulate elements of their enacted worldview that they had not previously thought about. Researchers can often infer an implicit worldview from observing people's patterns of behavior.

Articulated worldviews: Articulated worldviews are worldviews expressed in language. An articulated worldview may or may not reflect the worldview that the person enacts in their daily life. Mismatches between the two resemble the well-documented discrepancy between reflective and intuitive beliefs that scholars refer to as "theological incorrectness" (e.g. Slone 2004). Ironically, the very articulation of a worldview makes intricate forms of social manipulation possible (e.g., the "wolf in sheep's clothing"), precisely because articulated worldviews afford the regulation of behaviors on a broad scale through the sharing of cultural schemas (Roepstorff & Frith, 2004; Strauss & Quinn 1997). Viewed from an evolutionary perspective, the articulation of worldviews likely served social (Donald, 1991; Norenzayan et al.,

2016; Paloutzian & Mukai, 2017) and psychologically palliative functions (Park, 2010; Proulx & Inzlicht, 2012), rather than reliably conveying the contents of enacted worldviews.

Memorized and textualized worldviews. Humans have a long history of memorizing narratives that recount their answers to the BQs and, more recently, using writing and other tools to *reflect on* and *systematize* their views. Such lasting articulations of worldviews allow people to spread doubts about extant worldviews and ways of life (turning implicit answers into questions), generate alternatives and thus choices that, again, afford new *enacted* and *articulated* worldviews.

Worldview dynamics. Worldview dynamics, as Droogers (2014, pp. 24-26) contends, should include both the study of worldviews (as constructed) at any given point in time and the meaning-making processes through which people create and develop worldviews over time. Building on Berger and Luckmann's (1967) account of the social construction of reality through processes of internalization and externalization, Droogers encourages us to theorize about both the emergence of new worldviews and the maintenance of established ones. While historians and social scientists have devoted much attention to the rise, development, and transmission of worldviews, these processes take on additional complexity when viewed in light of the underlying cognitive mechanisms that enable their production.

In distinguishing between articulated and enacted worldviews embedded in ways of life, we want to highlight the extent to which people (and peoples) may develop world models without reflecting on the fact that they are doing so. As Berger and Luckmann were well aware, we typically do not recognize the extent to which we are internalizing a sense of reality that has been socially constructed. At the same time, however, we typically fail to recognize the extent to

which our minds have evolved to learn to make predictions based on the information in our environments. To understand the proximate mechanisms through which humans make sense of situations (what is) and events (what is happening), we need to understand how we "make sense" or *meaning* out of the flow of information we have evolved the ability to process and how we *cognize an event*.

Cognitive Foundations of Worldviews

The ability to cognize events by chunking the flow of information and modeling the chunks in light of prior experience allowed humans and other animals to make increasingly nuanced sense of situations. In this section, we will approach the literature on event cognition from an evolutionary perspective in order to situate human event cognition in relation to the self-and-world making capacities we share with other organisms and consider the implications of this perspective for understanding the meaning making processes that give rise to worldviews. Doing so will allow us to turn to the psychological research on meaning making and narrative identity with a series of questions that hold particular relevance for the study of nonreligious worldviews.

Event Cognition in Evolutionary Perspective

Research on event cognition, which integrates a broad body of research covering perception, reading comprehension, attention, memory, and problem solving (see Radvansky & Zacks, 2014), provides a framework that allows us to understand how humans and other animals chunk the flow of information into events and, in doing so, "make sense" of them (Taves & Asprem, 2017). Following Zacks and Tversky (2001), an "event" can be defined simply as "a segment of time at a given location that is perceived by an observer to have a beginning and an

end." Event cognition refers to a set of mechanisms that allow humans not only to form mental representations of what is going on around us and segment it into discrete, bounded events, but also to identify and store knowledge about specific types of events, predict what will happen next, and use these models to regulate action – from basic motor control to complex intentional action sequences (Radvansky & Zacks, 2014). Event cognition is intimately bound up with both episodic and semantic memory. Episodic memory stores representations of *personally experienced events*. Semantic memory stores general knowledge about *types* of events, which cognitive psychologists refer to as *event schemas.* We draw on our general and specific semantic knowledge of events when we segment the flow of information to create a mental model of "what is happening now," which Radvansky and Zacks refer to as *working models* of events.

Modeling Events. While the most important type of event model is the *working model*, which simulates what is going on in the here-and-now, *any* mental simulation of an event generates an event model: we use them when we forecast future events, imagine hypothetical events, understand events that are narrated to us, and reconstruct memories of past events. Working models are partial and incomplete representations of a situation constrained by criteria of relevance as perceived by the subject. They are rough-and-ready maps of unfolding events, containing only what the subject needs for grasping and navigating in the terrain, and little else. Thus, the working model will typically represent relevant entities and agents, the causal and intentional links between them, and the place and time in which the event takes place. In light of our previous discussion, "relevance" in an event model is determined by affordances for action.

From an event cognition perspective, the key components that interact to model (and thus, make sense of) events are (1) sensory input from the environment and the body and (2)

predictions about what is happening derived from prior experience (e.g., event schemas). In predictive coding terms, event schemas and other background knowledge (e.g., about specific entities and relations represented in the model) provide Bayesian priors by which the event model can begin to make predictions about outcomes. The model's active predictions are tested against incoming sensory inputs from the body and the environment. Mismatches between input and predictions generate error signals that lead to the updating or replacement of the working model and, thus, segmenting the flow of information into subevents, if the model is updated, or new events, if the model is replaced.

Event cognition, which allows action to be guided by complex environmental contingencies, is not limited to humans. The working model that forms the basis of event cognition clearly relies on the self-and-world modeling capacities we share with other organisms. As animals develop more complex perceptual abilities, they develop the ability to perceive more complex events (Donald, 1991, pp. 153-157). Although some other large brained animals are likely able to encode fairly complex events, their cognition is largely limited to specific events unfolding in the present - in other words, it is episodic (ibid., p. 155). To organize behavior over long spans of time and across large social groups, humans utilize a unique set of cognitive systems that allow greater levels of synthesis, abstraction, imagination, and social cognition. These systems are built on the cognitive foundations of our primate ancestors, but go beyond them in several important ways.

The Role of Culture. The emergence of culture, defined as the invention and social transmission of behavioral practices and technologies (de Waal, 1999), changed the cognitive landscape, putting novel evolutionary pressures on our hominid ancestors that eventually gave

rise to the capacities underlying worldviews (Humphrey, 1976; Turner et al., 2018). The demands of increasingly complex cultural practices favored individuals with certain social, cognitive, and linguistic abilities, which in turn facilitated the development of more advanced cultural forms (Donald, 1991; Deacon, 1997). World-making abilities, thus, co-evolved with complex cultural practices to generate the capacity to produce worldviews. These expanded cognitive abilities included (1) theory of mind (ToM), (2) self-reflection, (3) "mental time travel" (MTT), (4) narrative synthesis, and (5) symbolic representation.

While chimpanzees have some capacity to infer the intentions and mental states of others, they lack certain mindreading abilities that humans possess. For instance, humans are unique in our ability to represent the *false beliefs* of others (Call & Tomasello, 2008). That is, people can predict another person's behavior based on their belief in information that they know to be false. The human capacity for ToM is developed through early social interactions with parents and peers, and in turn it enables developing humans to navigate the complex landscape of conventional affordances that is associated with the enactment of worldviews.

Imagining the mental states of others is related to reflecting on one's own mental states. Self-reflection and ToM have a common neural basis in the default mode network (DMN; Spunt et al., 2015), which consists of cortical midline structures and temporo-parietal regions that were initially discovered based on their activation during task-independent thought and the "resting state" (Raichle et al., 2001). The DMN has since been shown to play a broader role in self-referential thought, internally-generated thought, and social cognition (Amft et al., 2014; Mittner et al., 2016). The overlap in neural activation during self-reflection and ToM has inspired *simulation theory*, which holds that ToM is facilitated by imagining one's own reaction if put in a similar situation (Spunt et al., 2015).

The ability to reconstruct past events (episodic memory) and imagine future ones (prospection), known as "mental time travel" (MTT; Tulving, 1983; Ingvar, 1985), is another cognitive faculty that is crucial for asking and providing explicit answers to the BQs. The degree to which non-human animals are capable of MTT is a matter of debate, complicated by the fact that language is required to describe mental contents (Schacter, Addis, & Buckner, 2007). Neuroimaging studies suggest a shared neural basis for episodic memory and prospection involving key nodes of the DMN, leading Schacter and Addis (2007) to propose the *episodic simulation hypothesis*: future episodes are simulated by recombining the features of past episodes. However, even patients with episodic amnesia are capable of generating future plans and scenarios, indicating that prospection is a form of event modelling that draws on both episodic and semantic memory (Klein, 2012).

Narrative Synthesis. While the neurocognitive systems underlying event cognition have been the subject of much research, less is known about the processes that synthesize event-specific information into the broader conceptual and narrative representations that constitute worldviews. Merlin Donald (2007) refers to this process of narrative synthesis as the "slow process," in contrast to the fast, transient operations of working memory. The hypothetical slow process is effectively an extension of working memory, integrating episodic and semantic content over longer spans of time in order to guide long-term patterns of behavior across changing contexts. Neuroimaging studies suggest that narrative synthesis is mediated by major hubs of the DMN, including the medial prefrontal cortex, posterior cingulate/precuneus, and temporo-parietal junction, which integrate multisensory information across medium-to-long spans of time (Tylen et al., 2015; Lerner et al., 2011).

The emergence and development of ToM, MTT, and the "slow process" of narrative synthesis all reflect a more basic cognitive shift in the nature of representation, from concrete to abstract (Donald, 1991; Deacon, 1997). The objects of cognition are no longer bound to physical referents in the present situation, but include counterfactual worlds and abstract concepts that can be shared through language. This enables humans to ask the Big Questions, and hold and share explicit worldviews that provide a framework for individual and collective behavior.

Implications. The evolutionary perspective on event cognition and narrative synthesis we have sketched here highlights the layers of development that enable humans to ask the Big Questions and hold and share articulated worldviews. Grounding worldview expression in an evolutionary perspective upends the usual top-down approaches that assume that the highly developed and systematized worldviews of philosophers and theologians are the standard from which "lived worldviews" have departed. Working from the bottom up, it makes more sense to think of worldviews as explicitly articulated and elaborated on a need-to-know basis not only in response to "crises of meaning," but also in light of local views of what should be passed on to whom and in what manner. If this is the case, then lived worldviews may be more fragmentary, episodic, and situation dependent than formal, systematized worldviews would lead us to expect.

This shift in perspective, if justified, has implications for research on the meaning making processes that give rise to worldviews. If, as we have argued, organisms answer the BQs (based on their evolved cognitive abilities) in the context of situations and the BQs are prioritized in relation to praxeology, then sense making is intimately bound up with goal directed action. An implicit sense of purpose and meaning is built into goal directed action. This would suggest that, as evolved animals, *we would "generally experience life as meaningful without reflecting on the*

fact or trying to express why we feel it to be so" (Taves, 2017, p. 19, emphasis added). If it is only when "this sense of purpose or direction crumbles -- when we feel uncertain, lose our sense of direction, or feel there is no point in going on -- that life feels meaningless" (p. 20), then the basic human question shifts, as humanist philosopher Richard Norman (2015) has suggested, from "what is the meaning of life?" to "what makes life meaningful?" (p. 377).[1]

New Questions. This possibility raises a number of critical questions that we can address to the research on meaning making and narrative identity as it relates to both the definition and formation of worldviews. With respect to defining worldviews, we debated whether we should distinguish "worldviews" from "ways of life" in terms of coherence, either between answers to the BQs in a given situation, or across situations. While the capacities we have described above clearly *do* allow for the creation of conceptual coherence between answers (and doing so is often at the core of the highly formalized worldviews debated by philosophers and theologians), *defining* worldviews in these terms would, in our view, run counter to the theory we have proposed for how and why worldviews arise. If, as we have suggested, answers to the BQs are largely *situation driven* and enactive, then the opportunity to try out alternatives that *break* with what is already assumed is the driving (and, we suggest, adaptive) function. The degree to which, and under what circumstances, humans seek to forge coherence between old and new answers should be treated as an open empirical question rather than a *definiens* of worldviews as a whole.

In addition to *conceptual* coherence, we can also ask whether enacted worldviews cohere *across situations* (that is, diachronically). This latter issue parallels debates over identity in

[1] Speed, Coleman, and Langston (in press) make an important distinction between exogenous (provided by others) and endogenous (self-produced) meaning. Both, however, respond to the question, "What is the meaning of life?" and imply that meaning must be supplied in order to be present. Asking "what makes life meaningful" suggests that this may not always be the case.

psychology and anthropology. Psychologists who focus on narrative identity debate whether people construct integrated and relatively stable life stories that persist over the life course or perform multiple narrative identities in response to particular social situations (McAdams, 2011, pp. 103-104). Anthropologists debate whether identities are predetermined and fixed or completely constructed and fluid (Strauss & Quinn, 1997, p. 9). We anticipate that enacted worldviews occupy a middle ground that is neither completely episodic (situation dependent) nor completely coherent (situation independent) with considerable variation between these extremes.

Keeping our definition open on this point allows us to formulate three sets of questions: (1) To what extent are enacted worldviews made in the moment or generated on the basis of relatively stable sets of schemas that generate some degree of coherence across situations? Although we have limited worldviews to those who can *ask* the BQs and thus are in principle capable of generating coherence across episodes, this question asks to what extent people *actually* ask the questions and seek to generate coherence between their answers.

(2) In terms of physical and psychological health, is it better to have a more complex, systematized worldview or are lived worldviews of a fragmentary and episodic sort sufficient to generate a sense of meaning and purpose in life, make sense of stressful situations, and support physical and psychological health? If there is evidence that coherence (both conceptual and diachronic) matters, what does that mean? Are the worldviews of "religious" and "nonreligious" people – or theists and non-theists – equally coherent, conceptually and across people's life stories? If not, does that matter in terms of physical and psychological health?

(3) What gives life meaning and a sense of purpose? To what extent does a sense of purpose in life depend on a sense of connection to others and the world around us, which we share with other animals, and to what extent on learned beliefs and practices, which are distinctly

human? Is meaning largely derived from non-reflective processes and only articulated and elaborated when these subconscious (bottom-up) meaning making processes break down? In short, to what degree do highly rationalized and elaborated worldviews matter, psychologically speaking, apart from those who find their meaning and purpose in life in developing and/or pursuing them? Finally, can highly systematized answers to the BQs, fully internalized by expert practitioners as complex sets of schemas, replace evolved, episodically mobilized schemas or will they continue to compete with one another?

The Psychology of Meaning

Psychologists traditionally viewed "meaning" as too difficult to operationalize and devoted little explicit attention to meaning making processes (Leontiev, 2013). That has begun to change, however, as researchers in a range of different psychological disciplines are "comprehending themselves as working toward a common understanding of how it is that people come to understand themselves, their environment, and their relationship to their environment" in terms of "sense making" (Markman, Proulx, & Lindberg 2013, p. 4).

Although this psychological literature generally defines meaning in relation to humans, the definitions are in many cases congruent with the framework we have laid out here. Thus, for example, Baumeister (1991, 15, quoted in Leontiev, 2013, p. 466), defines meanings as "mental representations of possible relationships among things, events, and relationships." This suggests that *sense making* at its most basic involves the establishment of linkages or relationships between things and that established meanings or *meanings made* are "*expected* relationships" (or schemas). According to Proulx and Inzlicht (2012, p. 320), these expected relationships generate "a sense of what is going on [ontology], and a sense of why it should be so [epistemology,

cosmology]" that in turn provide a "guide for action [praxiology]." These can easily be translated into BQs, as our insertions suggest.

Psychologists use "meaning frameworks" or "meaning systems" as generic terms that encompass beliefs, worldviews, and expectations (Park, 2005; George and Park, 2016). In the terms we have been using, meaning frameworks range from simple schemas to sets of propositions that explicitly answer big questions. As an umbrella concept, it conflates many levels of complexity that must be specified more precisely if we are to understand the processes that give rise to worldviews. Psychologists of meaning are now actively researching these processes under three broad headings: meaning in life, meaning making and maintenance, and narrative identity theory -- each of which we can consider in light of the questions raised above.

Meaning in Life. One of the most reliable findings in social psychology is that humans are motivated to maintain frameworks that afford a sense of personal agency and value within a comprehensible world (Leary, 2005; Landau et al., 2015). These beliefs underpin the subjective sense of *meaning in life* (MIL), which may be regarded as a subjective indicator of a "properly tuned" worldview, in the sense that they represent the world as a place for goal-directed action (Peterson, 1999). In support of this view, a recent review suggests that experiencing MIL predicts physical and psychological health, perhaps in part by enhancing self-regulation (Hooker, Masters, & Park, 2017).

Although this research is attempting to explain why MIL predicts physical and psychological health, it has not explained why some have a greater sense of meaning in life than others. Hooker, Masters, and Park (2017, p. 6) suggest that meaning salience may be the crucial variable that links "the somewhat abstract and distal concept of meaning in life and the actual

influence of that meaning on daily choices, behaviors, and responses to the environment." If meaning salience does mediate health outcomes, and this remains to be tested, it suggests that the ability to maintain a sense of meaning across situations is critical to a sense of well-being and predicts that those with more fragmented or episodic sense of meaning will be less resilient in the face of setbacks.

If, as they suggest, individuals differ in their ability to make meaning salient, researchers can probe these variables more deeply. To what extent are variations in awareness due to differences in personality, environmental or situational stressors, or learned practices? If learned practices play a significant role, what practices and how are they learned? Do theists and non-theists differ in their ability to make meanings salient? Are people with more highly developed "meaning frameworks" better prepared or better able to make meaning salient than those with less developed frameworks?

Meaning Maintenance and Meaning Making. There are two major models that connect the sense of meaning in life with meaning frameworks: the meaning maintenance model (Heine et al., 2006) and the meaning making model (Park & Folkman, 1997). Although they have different intellectual roots and draw on different research methods, both focus on what happens when people's meaning frameworks are disrupted.

The meaning maintenance model (Heine, Proulx, & Vohs, 2006) describes the compensatory strategies that are used to restore a sense of familiarity and consistency in the event of a "meaning violation," when events violate expectations. Proulx & Inzlicht (2012) describe three mechanisms by which meaning violations may be addressed: (1) resolving or masking the meaning violation itself; (2) fluid compensation, or looking for meaning elsewhere;

and (3) "meaning making," or assembling new meaning frameworks. Minor meaning violations can be resolved implicitly, without explicit awareness or conscious effort. In the absence of meaning violations, the presence of meaning is often implicit, or taken for granted.

The meaning making model (Park & Folkman, 1997) focuses on the challenge that traumatic events can pose to a person's meaning framework and the ways in which they subsequently reappraise either the meaning of the situation or their sense of global meaning. The MMM distinguishes between global and situational meaning. *Global meaning systems* are meaning frameworks that include beliefs (related to world, self, and self-in-world), goals, and subjective sense of meaning or purpose. *Situational meaning* refers to the appraisals of specific events, which are interpreted in the light of global meaning systems. Familiar situations pose no challenge to global meaning; incoming information is incorporated into existing schemas in a process of *assimilation* (Piaget & Inhelder, 1966). However, in the case of traumatic events, situational meaning may conflict with global meaning, in which case either the situation must be reappraised, or existing schemas must be updated through a process of *accommodation*.

The success of meaning-making attempts following traumatic events is generally associated with psychological health, and even post-traumatic growth (Joseph & Linley, 2005). Silver and Updegraff (2013), however, found that pragmatically oriented persons, who may not feel compelled to search for meaning even in the wake of trauma, often fare better than those who are compelled to find meaning in difficult events. When Schnell and Keenan (2011) used the Sources of Meaning and Meaning in Life Questionnaire (SoMe) to compare representative samples of German-speaking religionists, "nones," and atheists, they found little difference between groups in terms of their response to "crises of meaning," but they did find within group differences among atheists in terms of their susceptibility to crises of meaning. These mixed

findings suggest the importance of further research on global meaning systems *per se.* Park (2005) explicitly discusses "religious worldviews" as a global meaning system, but we know little about the degree to which frameworks with and without theistic ontologies vary in their level of coherence, elaboration, and salience and what role those differences make in the way people appraise situations.

Pöhlmann, Gruss, & Joraschky (2006) offer a promising method for investigating personal meaning systems (PMS) using a 12-minute writing exercise in which the participants were asked to list, rank, and reflect on the connections between the things that made their lives meaningful. The authors assigned the elements to meaning domains in order to assess the structural properties between them. When they used this method to collect data on the PMS of theology, science, and engineering students, they found that the meaning systems of theology students were more elaborated, differentiated, and coherent than those of science and engineering students and that the structural properties between domains, such as differentiation (the number of distinct domains), elaboration (number of connections between domains), and coherence (degree of integration and consistency between domains), predicted both psychological well-being and physical health.

In comparing theology students and STEM students, however, they failed to distinguish between time spent deliberating on worldviews and proxies for theism/non-theism. Future studies might give the writing exercise to "naïve" theists and non-theists (i.e., with enacted worldviews) and then offer both a "worldview development workshop" in which they can elaborate their worldview, followed by a post-test. This is one obvious way in which a distinction between enacted and articulated worldviews would enable more nuanced research.

We also know relatively little about the neurocognitive process of meaning making. Given that the dynamics of accommodative and assimilative meaning-making bear at least a superficial similarity to the processes involved in maintaining and updating predictive models of events (Friston, 2009; Radvansky & Zacks, 2014), future research should examine the extent to which the neurocognitive processes of meaning-making are continuous with those of lower-level predictive modeling of world-and-self and the extent to which such processes generate a taken-for-granted sense of meaning.

Narrative Identity Theory. A person's life story is a high-level meaning framework, tying life events together into a coherent and meaningful narrative structure (McAdams, 1985, 2011; Martela & Steger, 2016). Narrative identity theory draws from earlier approaches to the structure of identity (e.g., Murray, 1938; Erikson, 1963) and holds that identity is comprised of the "internalized and evolving story of the self." The life narrative connects major life events to broader themes, situating individuals within a meaningful context and providing a cognitive and motivational basis for goal-directed action. Life stories contain explicit and implicit answers to the BQs relevant to worldviews: they explore questions of praxeology, axiology, and epistemology within an ontological and cosmological framework.

Humans develop the cognitive capacities underlying narrative identity, including autobiographical memory, self-reflection, ToM, and narrative comprehension throughout childhood, adolescence, and adulthood (McAdams, 2011). Their development is mediated by webs of social interaction within specific cultural contexts. Individuals, as a result, draw on prototypical life stories embedded in larger cultural stories (or myths) when developing their own. For instance, North Americans tend to model their life stories after the prototypical

narrative of the "redemptive self," which involves a specific narrative sequence of overcoming hardship by adherence to a strong value system (McAdams, 2006). Narrative identity theory, along with other approaches to meaning frameworks (Martela & Steger, 2016), constitutes a rich body of theory and findings about the psychological basis of worldviews, and a set of methods for operationalizing their content and structure. Building on this literature, we can ask to what extent all North Americans appropriate these cultural myths regardless of whether their ontologies are theistic, atheistic, or agnostic, and to what extent such myths supply coherence across situations. For example, widely assumed cultural myths may be more important for generating a sense of coherence across situations than whether or not one accepts or rejects particular "theistic" worldview notions, such as divine agency or salvation through grace.

This general review of research on the psychology of meaning from a worldviews perspective suggests that the theism/non-theism distinction, upon which most definitions of religion rely, is less relevant with respect to questions of meaning than the nexus between axiology and praxiology. Taken together with the cosmological dimension, which includes narrative identity, we would predict that the ability to set and achieve appropriate goals in concrete situations correlates most strongly with the experience of meaning in life. The development of this ability, we have suggested, has driven the evolution of meaning making processes. As such it is the "proper domain" of human "worldviewing" and the basis on which humans generate the spandrels of high metaphysics.

Conclusion

Freed from a need to define religion, psychologists interested in meaning are using questionnaires and surveys to investigate the extent to which the worldviews of self-described

religious and nonreligious people overlap. While such studies will give us a better understanding of meaning making processes among religious and nonreligious persons, they will most likely provide only "thin" descriptions of nonreligious worldviews. To get "thicker" descriptions of worldviews, researchers will need to integrate meaning making and worldview studies. Although researchers are increasingly calling for integration along these lines (Murphy, 2017; Paloutzian and Park 2013; Taves, 2016; Taves & Asprem, 2018), the actual work of integration remains to be done. Since most humanists realize that meaning making plays a critical role in worldview dynamics and psychologists of meaning acknowledge that people have meaning frameworks, we suggest that a practical route to integration lies through greater use of the BQs to frame inquiry. Doing so would require researchers in the humanities to use the BQs as a basis for investigating the enacted, articulated, memorized, and textualized worldviews and ways of life of historical and contemporary individuals, groups, and traditions. It would require psychologists of meaning to elaborate their surveys and questionnaires in light of the BQs. If formulated in similar ways, the survey data could be used to supplement ethnographic and historical data and vice versa.

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