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Explanation and the Study of Religion

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Introduction

The rise of the evolutionary and cognitive science of religion in the last two decades has sparked a resurgence of interest in explaining religion. Predictably, these efforts have prompted rehearsals of longstanding debates over whether religious phenomena can or should be explained in nonreligious terms. Little attention has been devoted to the nature of explanation, methods of explanation, or what should count as an adequate explanation.

The lack of attention to explanation is further aggravated by a concomitant lack of attention to what we mean by theory in the study of religion. As has been the case in anthropology (Ellen 2010), we routinely discuss theories of religion without discussing what counts as a theory. For some, theory is associated with the range of classical and contemporary theories of religion included in introductory texts (see for example, Pals 2014 or Stausberg 2009). For others, including many in the humanities, theory is associated with "critical theory," of either the literary or social science variety.

As Stausberg (2009, 2-3) indicates, there are, however, many competing views of and controversies over the meaning of theory in the different sciences and disciplines. For our purposes, it is enough to note (1) the distinction between the colloquial and scientific definitions of the term and (2) the intimate connection between scientific theories and explanation. The *American Heritage Dictionary* (1970, as cited by Reznick 2010, 220) makes the basic distinction we will presume here. Colloquially, theory typically refers to abstract reasoning, speculation, hypothesis or supposition. In the sciences, however, it refers to "systematically organized knowledge applicable in a relatively wide variety of circumstances; especially, a system of assumptions, accepted principles, and rules of procedure divided to analyze, predict, or otherwise explain the nature or behavior of a specified set of phenomena." Scientific theories, in other words, seek to "explain the nature or behavior of a specified set of phenomena … [in light of] a system of assumptions, accepted principles, and rules of procedure." Whether the theories have been viewed as scientific or not, much of the debate regarding explanation in religious studies has centered on two issues, one explicit and the other not: (1) the debate over reductionism, i.e., whether theories of religion can or should explain religion in nonreligious terms, and (2) a tacit debate over "scientism," i.e., over whether anything resembling scientific methods and lines of theorizing is desirable or possible in the humanities (see e.g. Stenmark 1997).

In what follows, we assume the legitimacy of attempts to explain religious phenomena in nonreligious terms in light of the assumptions, principles and rules of procedure in the social and natural sciences. Building on Proudfoot's (1985) distinction between descriptive and

explanatory reduction, we presuppose the legitimacy and importance of the latter. We will directly engage the issue of "scientism," which we view as a dismissive term typically directed at perceived over-extensions of scientific inquiry, through our discussion of historical and contemporary explanation in the philosophy of science. In doing so, we want to make the point that there are various views of explanation in the sciences, some of which we consider more appropriate for explaining socioculturally-informed human behavior than others. Specifically, we argue that the **new mechanistic-causal approach** commonly presupposed in the "special sciences" (biology, the neurosciences, and psychology), referred to by philosophers of science as "**the new mechanism**," can be extended to the study of religion following the lead of researchers who are extending it to the social sciences.

Our aim in making this case is, first, to move the discussion in religious studies beyond general worries about "reductionism" and "scientism" (or "positivism") and, second, to ground theorizing about human experience in a broadly evolutionary base. We do so recognizing that any discussion of mechanisms in the social sciences and history must take account of complexities typically not encountered (or dealt with) in the natural sciences. Our goal, in other words, is not to subsume or subordinate the humanities to the natural and social sciences, but to connect them in a spirit of consilience (Slingerland and Collard eds. 2011).

In the sections that follow, we will discuss explanation in theories of religion (Part I), the nature and limitations of the "old mechanism" and other older approaches to explanation in the philosophy of science (Part II), how the "new mechanism" overcomes these difficulties (Part III), and the complexities that will need to be addressed in extending it to the humanistic social sciences (Part IV).

Part I: Explanation in Theories of Religion

"Explanation" has several different meanings in ordinary English (Craver 2014, 30-35). (1) It can refer to a communicative act. The professor explained (communicates) the material to her students. The text explains (communicates) what you need to know. (2) It can refer to a cause or a factor that produces a phenomenon. (3) It can refer to a mental representation or model of the causes that produce a phenomenon. The model explains (represents) the (causal) explanation.

Explanations in the first and third senses are known as *epistemic* explanations. They involve humans or other intentional creatures trying to communicate ("explain") something to an audience. Explanations in the second sense are known as *ontic* explanations. They presuppose a view of reality (an ontology) which assumes that certain entities and processes exist in the world "whether or not anyone discovers or describes them" (Salmon 1989, 133, quoted in Craver 2014, 31), and assumes that there exist ontic structures (e.g. mechanisms and causes) that explain the production and behavior of various phenomena.

1.1 Theories of Religion: Explanation in the second sense allows us to distinguish between phenomenological and explanatory models. Phenomenological models describe or redescribe

(i.e., interpret) a phenomenon "without revealing the ontic structures that produce it" (Craver 2014, 40). We can distinguish three broad types of theories:

1. Phenomenological theories of religion
2. Supernaturalistic causal theories of religion
3. Naturalistic causal theories of religion

Phenomenological theories of religion, associated historically with figures such as Chantepie de la Saussaye, Otto, Kristensen, van der Leeuw and, more recently, with Ninian Smart and Mircea Eliade, are only loosely connected with philosophical phenomenologists, such as Husserl, Heidegger, Sartre, and Merleu-Ponty. All, however, give priority to human experience from the first person point of view (Smith 2013). Some who hold to this approach bracket their own ontological views and limit themselves to describing or interpreting the ontological claims of their subjects. Such theories, typically characterized as **phenomenological or interpretive (hermeneutical)**, describe the causal explanations of those they study, but refrain from offering causal explanations (i.e., ontic claims) of their own.

Phenomenological bracketing has given rise to "methodological agnosticism" (see e.g. Porpora 2006), which we, like others (Martin, forthcoming), find problematic. We do however endorse the idea of a first step in which researchers *temporarily* hold back their own explanations in order to describe the phenomenon one wants to explain and avoid descriptive reduction (see discussion of Proudfoot below).

In so far as the phenomenological is construed as the *only step*, however, it is tied to the notion of religion as a sui generis phenomenon. This view holds that to the extent that religion *can* be explained, it must be explained "on its own terms," that is, it cannot be reduced to something that is not religion. The simplest version of sui generis theorizing holds simply that, in Daniel Pals' words, "one ought to accord them [religious phenomena] a certain independence" from other human activities and experiences (Pals 1987: 259). Thus one can explain religious phenomena in terms presumed to be internal to the religious field – e.g., "the holy", "the sacred", "mana", or "power" – but not in terms of "external" factors, such as social alienation, latent neuroses, or evolved cooperative strategies. We question whether such internal explanations are explanations at all. Worse still, as it seeks such "internal" explanations, the sui generis approach has often developed into forms of crypto-theology that essentially produce supernaturalistic causal explanations.

Supernaturalistic causal theories of religion are premised on the idea that not only is religion a thing apart, but this thing is ultimately rooted in an ontologically real dimension of sacrality, transcendence, or the supernatural. In so far as phenomenological theorists of religion (e.g., Otto, van der Leeuw, Eliade) *embrace* the ontological claims they are describing as sui generis, their theories take on an implicit or explicit supernaturalist quality. These theories postulate the existence of an ontologically real religious reality that humans respond to but do not create. These theories implicitly or explicitly include this ontological reality as a potential factor in their *causal explanations* of events. In a sense, they reverse the order of explanation: Instead of

mundane events in the material world explaining the emergence and activities of "religions", the manifestation of "religious" power explains events in the mundane world such as revelations, sacred place, or charismatic authority.

Naturalistic causal theories of religion offer (reductionistic) explanations based on language or discourse (literary and cultural theories), collective processes (social theories), mental processes (cognitive theories), and/or biological processes (evolutionary theories). Some theorists want to limit their explanations to one type of cause or privilege one type of cause over the others. Others view these causes as interacting and want to figure out how they are related. In current practice, however, the boundary between phenomenological and naturalistic causal theories of religion is blurry because, on the one hand, scholars are not clear on the distinction between description, interpretation, and explanation and are worried about appearing reductionistic, scientistic, or positivist, on the other.

Ontologically, there is a divide between those who view (scientific) explanations as being grounded in mind- and language-independent structures in the world (realists) and those that view (scientific) explanations as entirely contingent on communicative processes, with only an arbitrary relation to a language-independent world (constructionists). -In light of our definitions of explanation above, realists are after ontic explanations, while constructionists typically insist that epistemic explanations are all we've got and "the best we can do is contribute intelligently to the conversations of our time" (von Stuckrad 2010: 158). While we acknowledge the importance and value of constructionist explanations, we agree with theorists like Engler (2004) and Hjelm (2014), who emphasize that constructionism does *not* preclude realism or entail radical relativism. Thus we prefer to locate constructionist approaches within a critical naturalistic (and hence realist) framework (see Asprem 2014: 80-86), premised on the view that humans evolved. We, thus, presuppose that scientific theories of religion offer causal explanations of human behaviors that are ultimately grounded in an evolutionary (rather than transcendental) framework.

To specify what that means more carefully, we need to clarify our approach to two other widely discussed problems in the study of religion: what is meant by religion and what is meant by reduction and reductionism.

1.2 Defining Religion: In the discussion so far, we have proceeded as if we could shift the ontological ground of "religion" from the transcendental to the social-cultural realm without incurring any difficulties. In fact, this is not the case. Those who ground religion in ontological reality are able to offer *essentialist* definitions of religion based on their understanding of the sacred, transcendent, or supernatural, which they typically derive from tradition or revelation. Scholars who want to treat religion as a socio-cultural phenomenon without grounding it ontologically typically *stipulate* a definition of religion that then constitutes the phenomenon they seek to describe and/or explain (Platvoet 1999, Arnal 2000), which then imposes a scholarly definition on the range of religion-related terms mobilized by different groups on the ground.

As Stausberg (2010, 3-6) points out, theories that take religion as their object of study of necessity make implicit or explicit claims regarding the specificity of religion(s). "Only if religion can be said to have or to be identified with any specific *properties,* to possess its own *regularities,* or to be communicated as a specific *code,* can one be sure to recognize religion in observation, unless one makes it a point to analyze only instances of religion identified by social actors as 'religion' (3)." As researchers, we are interested in the latter and so choose to analyze the use of religion-related terms by social actors. We view "religion" and related terms (e.g., spirituality, magic, superstition, the esoteric, and the occult) as complex cultural concepts (CCCs), that is, as abstract nouns with unstable, overlapping meanings that vary within and across social formations.[1] Here, in other words, we are in agreement with constructionist approaches to "religion": *as a CCC*, "it" does not exist apart from human communicative actions, and being "identified by social actors as 'religion'". Given this, we, like Beckford (2003) in sociology and Bloch (2010) in anthropology, question whether it is possible to construct a theory of religion per se.

"Religion" is, of course, not unusual in this regard. Indeed, we think that human experience is typically expressed in terms of complex cultural concepts and embedded in social formations. Because CCCs are embedded in social formations that determine their meaning, we do not think it is possible to explain CCCs (as such) in scientific terms. The emergence of meanings and uses of these concepts is the subject matter of discursive, constructionist approaches. However, studying CCCs is not the only thing we can do. The building block approach (BBA) is premised on the idea that we can explain *human experience*, by first redescribing phenomena of interest in behavioral terms, and then decomposing them into components (or building blocks) in order to reconstruct how the phenomena emerged and identify mechanisms that interact to produce them. Now we are no longer studying the CCCs (e.g. "religion", "magic", "prayer"), but clusters of observable *human behaviors* that serve as raw materials for the meaning-making processes that result in, and sustain, CCCs.

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[1] See Asprem, Egil, and Ann Taves. 2016. "Complex Cultural Concepts." Building Blocks of Human Experience Website. < http://bbhe.ucsb.edu/ccc-simple/> (5 December 2016). As we go on to explain: "Due to their instability and variable use, the building block approach does not operationalize CCCs or seek to explain them as such. Rather, it seeks to explain the behaviors to which they refer in the context of specific social formations. So, for example, if we take 'magic' as our point of departure, we must specify the *formation* in which we are studying 'it', redescribe 'it' in behavioral terms, and pose our research questions in *basic concepts* (e.g., what actions are performed? How are they performed?). The outcome of such a study cannot be a theory or an explanation of 'magic' in general, but of a specific patterned practice, which a given formation may characterize as 'magic,' but which other formations may characterize differently" (Ibid < http://bbhe.ucsb.edu/ccc-simple/ccc-elaborate/>)

In so far as the phenomena of interest to us involve knowledge and practices, we share the explanatory agenda that Roy Ellen (2010, 393-94) views as central to anthropology, broadly conceived, as concerning:

> the mechanisms by which knowledge and practices acquired in previous life-cycles are learned, re-learned, negotiated, re-negotiated, modified, and reinterpreted to allow individuals to function socially and ecologically in shifting contexts and successive generations. Our major concern as anthropologists is to explain how objects, practices, ideas, patterns of interaction, and relationships continue to be transmitted sufficiently accurately to allow for the reproductive continuity, not of each unit of 'culture' or 'society', but of each locally or virtually delineated population. The question is ultimately a Darwinian one, but it requires different kinds of intermediate-level theorizing to answer it.

Methodologically, however, we presuppose that any explanation must be based on a careful descriptive analysis of the phenomena of interest to us as researchers in the terms used by those we are studying. This brings us to the issue of reduction and reductionism.

1.3 Reduction and Reductionism: In religious studies, the term "reductionist" has often been used as an epithet to disparage a theory without careful consideration of what is meant by the term (Idinopulos and Yonan eds. 1993). As technical terms, as opposed to epithets, both reductionism and reduction can be used in various ways that need to be specified in any serious discussion (see Brigand and Love 2015). Here we will use **reduction** to refer to placing the phenomenon we seek to explain (the explanandum) "in a new context, whether that be one of covering laws and initial conditions, narrative structure, or some other explanatory model" (Proudfoot 1985, 197).

As Proudfoot states, reduction in the context of *describing* a subject's point of view is highly problematic. He distinguishes between descriptive and explanatory reduction as follows:

> *Descriptive reduction* is the failure to identify an emotion, practice, or experience under the description by which the subject identifies it. This is indeed unacceptable. [If a person says they had a "vision in which the Virgin Mary appeared to them" and we redescribe the phenomenon of interest as a "delusion with religious content", we are guilty of a descriptive reduction.] … *Explanatory reduction* consists in offering an explanation of an experience, [including why they interpreted it the way they did,] in terms that are not those of the subject and that might not meet with [their] approval. This is perfectly justifiable and is, in fact, normal procedure. (196-97, see also Blum in prep [NAASR 2015])

The first step, thus, is always to analyze these human efforts to make sense of situations in their own -- oftentimes competing and contested – terms and thus, where possible, to reconstruct the process through which meanings emerged and were stabilized in systems of knowledge and social practice. As a second step, we can seek to explain these processes in scientific terms.

As already indicated, we will argue that the best way to produce reductive explanatory theories of various behaviors subjects deem religious is by identifying the various components (entities and activities) that interact to produce the behaviors. This is what the new mechanists mean by

a mechanism. As we will see in part 3, there is broad agreement in both the biological and social scientific literatures that the identification of mechanisms must begin with a detailed description of the phenomenon or phenomena to be explained before attempting to identify parts. Before turning to the new mechanism, however, we need to have a closer look at how mechanistic approaches – old and new – are situated within philosophical accounts of scientific explanation more generally.

Part 2: Explanation in the Philosophy of Science

In Part II, we highlight the following difficulties with traditional scientific approaches to explanation:

1) Aristotle's four *aitia,* which could be translated either as causes or explanations, generated confusion regarding the relationship between causation and explanation. His conception of final cause, grounded in teleological explanations of biological traits and human-made artifacts, led to confusion surrounding the relationship between functions and causes.
2) The extension of the (old) mechanistic theory of causation, which worked well in astronomy and physics, to the biological, psychological, and social sciences, where it failed to address the complexities of living organisms, much less humans.
3) The retreat from all metaphysical claims, causality included, such that scientific explanation was reduced theoretically to deductive-nomological laws, which bore little relation to the way that scientific research was actually being conducted.
4) The embrace of statistical explanations, which are expressed as probabilities based on correlations, but do not identify causal mechanisms.

The philosophy of science has produced a number of different views on what explanation is. Central to these debates is the issue of causation – what counts as a "cause", and what role do causes play in explanations? Here we shall discuss four influential approaches to the question of causes and explanation, each of which had limitations that the new mechanism attempts to overcome:

1. Functional-teleological accounts
2. Causal-Mechanistic accounts
3. Law-based accounts
4. Statistical/probabilistic accounts

2.1 Functional-Teleological Accounts: These accounts typically are derived from **Aristotle's Four Causes/Explanations.** Although Aristotle's philosophy was premised on a now outmoded cosmology, he did much of his thinking about explanation/causation in relation to living things. This gives his approach both major weakness and surprising contemporary strengths, which we will discuss below. Relative to causation, the main thing to note is that, in contrast to some later approaches, Aristotle did not make a sharp distinction between causation and explanation. He was concerned to argue, notably in *Physics* (II.3) and *Metaphysics* (V.2), that there are four different ways to explain "why" something exists. These are typically rendered as his "four causes": the material, efficient, formal, and final cause. However, the word Aristotle used in

Greek, *aitia*, is perhaps better translated as "explanation" (see Broadie 2015), since the "four causes" are, in fact, answers to four different explanatory questions. As Broadie explains, to ask about a phenomenon's material causes is to ask what it is composed of (the statue is made from granite). To ask about its formal causes is to ask about its shape and structure (the statue is in the likeness of a man). To ask about its efficient cause is to ask how it was produced (the artisan worked the granite to produce the statue). To ask about its final causes is to relate the phenomenon to the goal that set the production in motion (the king had the artisan make the statue in order to honor the gods). On this view, a complete explanation of a phenomenon thus requires information about how a phenomenon is composed of certain kinds of matter (its material cause) arranged in accordance with a particular structure (its formal cause) by an agent (its effective cause) for the sake of realizing a certain goal or end (its final cause). It is the final causes, meaning the *goals* and *intentions* that underlie some (effective) course of action, that have explanatory priority in Aristotle's scheme (Falcon 2015). In other words, Aristotelian explanations are essentially teleological or functional *in relation to goal directed action*. In contrast, later theories of explanation tend to distinguish clearly between teleology and causation, and to view functions as part of a causal explanation only in a very limited sense.

2.2 Causation and Early Modern Mechanical Philosophy

The basic Aristotelian epistemology laid the natural-philosophical foundations for the many scientific advances of the late-Hellenistic and Islamic cultures of the Mediterranean basin, and contributed greatly to the so-called "renaissance of the 12th century" in the Latin high Middle Ages (Grant 1996). However, two major disruptions in the view of explanation took place during the early modern period. The first disruption was associated with the development of classical mechanics in physics, and the subsequent expansion of the "mechanical philosophy" to areas such as biology (e.g., Descartes) and politics/society (e.g., Hobbes). Nowadays associated with "the scientific revolution" almost to the point of identity, the mechanical natural philosophy explicitly severed ties with Aristotelian physics in favor of a simpler view of explanation that focused solely on the interaction of empirically observable and quantifiable properties of matter (see e.g. Clatterbough 2015 for an overview).

Much of the motivation for this shift came from the obvious empirical failures of the Aristotelian program to provide accurate prediction of basic phenomena such as motion. The emerging mechanistic research programs thus combined a focus on observation and experimentation with a use of mathematical measurements and formalizations. The mechanistic view held that there is no need to invoke intentions, goals, or reasons in accounting for physical systems; all phenomena can be explained in terms of quantifiable properties related to inert matter in motion. In contemporary philosophy of science, this view of causality is generally known as *conserved quantity accounts* (Salmon 1971): a causal mechanism is characterized by "the conservation of inertial motion through contact action" (Descartes, paraphrased in Craver and Tabery 2015: 5). Gone are Aristotle's final causes – exchanged instead for chains of causal interactions whereby pieces of inert matter transfer observable physical qualities to one another.

The successes of the mechanistic program in astronomy, physics, and eventually also in

chemistry, inspired natural philosophers to attempt to apply this model of explanation to other fields of inquiry, including biology and moral philosophy (the founding discipline of the social and psychological sciences). In these fields, it generated much controversy that has retroactively shaped the reputation of the mechanistic program. From Descartes' view of animals as mindless automata to Hobbes' bleak view of human society and La Mettrie's robotic humans, the attempt to subsume all of nature to a mechanistic explanatory scheme in which mechanisms are understood as closed interactions of conserved quantities continues to provoke a strong negative reaction (Asprem 2014: 50-67). It is our impression that much of the present-day opposition against bringing scientific methods to bear on humanistic phenomena tacitly views contemporary science through this anachronistic lens.

2.3 Empiricism and the Decline of Causation

A second disruption in theories of explanation is associated with the rise of empiricism, and especially with the work of David Hume. While philosophers today differ on how to interpret Hume's accounts of causation in the *Treatise of Human Nature* and *Enquiry Concerning Human Understanding* (see e.g. Garrett 2015), one particularly influential interpretation sees Hume as a skeptic about the very concept of causality. On this view, the empiricist philosopher does not see any evidence of causality *as such* – all he has access to is regularities of experience. Thus, while a mechanist might say that billiard ball *A* striking billiard ball *B causes* ball *B* to move and *A* to stop, the Humean skeptic would counter that all we see is a *tendency* of *A*-*B* collision and *B*-acceleration to follow each other in a certain temporal sequence. We do not see the "cause" – only a correlation of two behaviors. To the extent that the Humean variety can be called a theory of causation, it is what philosophers of science today call a "regularity theory". All things considered, when we say that A is a cause of B, we mean that there is a statistical relationship between their occurrences.

While much of the rapidly advancing science of the nineteenth century followed closely on the mechanistic philosophy, the empiricist skepticism toward causation made a remarkable comeback in the twentieth. Coupled with the increasing mathematical sophistication of the mechanistic theories and the rise of statistical analysis, Humean-style empiricism led to the decline of the concept of causation in modern philosophy of science – a decline from which causation is only now starting to recover.

2.4 Logical Positivism, Covering Laws, and the Decline of Causation

Despite the popular view that "modern science", and physics in particular, is all about discovering causes and effects, both philosophically minded physicists and philosophers of science of the past century tended to view the concept of causation with much suspicion (for an early example, see Russell 1912). In the first half of the twentieth century, the influential logical empiricist (or logical positivist) school, formed primarily in the Vienna circle, followed Hume in questioning all metaphysical claims, causality included. According to them, a scientific theory must only contain statements that refer directly to specific sense data (the empirical or positivist part), and a formalized system of logical and mathematical relationships that connect such observational statements (the logical part) and allows for the derivation of *new* observational sentences (hypotheses) that can be tested against experience. Coinciding – and

partially interacting with – the rise of logical positivism, an ambitious generation of young physicists working to define the new quantum mechanics occasionally emphasized the uselessness of the old mechanistic view for their discipline: Werner Heisenberg even went so far as to state that the new physics "establishes the final failure of causality" (Heisenberg 1927: 83; cf. Asprem 2014: 114-119). The view of causality under attack here is, of course, the classically mechanistic one of continuous contact-mediated transfer of quantities.

The dominant approach to scientific theorization that emerged from these developments was the so-called *deductive-nomological* (DN), or "covering law" theory of explanation, associated above all with Carl Hempel (1965). According to Hempel, to *explain* an event is to invoke a law that *describes* and *predicts* that event given certain starting conditions. In other words, it must be possible to *derive* the sentence that described the behavior to be explained (the *explanandum*) from some broader covering law (the *explanans*). Explanation is a logical relationship between sentences, where one set of sentences is theoretical (laws), and the other is descriptive (describing the behavior to be explained) (see Woodward 2014). Much like Hume, then, deductive-nomological explanation has no place for causality, only for laws that describe regularities in nature.

The deductive-nomological account of explanation is unabashedly tailored to physics. In the sciences, however, one size does not fit all. The DN theory is not very good at accounting for explanations in the so-called special sciences, such as biology, psychology, or neuroscience, where "general laws" are typically not very helpful. It also has problems with the so-called *historical* sciences – including cosmology, geology, and evolutionary biology, as well as paleontology, archaeology, and history – that seek to explain how *particular* chains of natural events have unfolded to produce the forms and features of the world. In these disciplines, which cover the vast majority of the sciences (and the humanities), explanation is typically *not* about formulating laws as much as finding the relevant, co-dependent factors that help us explain or predict some (typical) course of events. Covering laws theories were still popular when C.P. Snow wrote his influential "Two Cultures" essay in 1959 and during the "positivism dispute" (*Positivismusstreit*) of the 1960s. Because these texts are still influential, the view that "modern science" is all about finding generalizable laws has proved remarkably resilient. Philosophers of science, however, have largely abandoned this view for statistical explanations and accounts that pay closer attention to how scientists in various disciplines *actually do* when they explain phenomena.

2.5 Statistical Explanations

In addition to the fact that the covering law account of explanation makes for a bad fit with actual explanatory behavior among scientists, its indifference to causes means that it fails to sift out relevant from irrelevant information. It is easy to construct general covering laws that logically "explain" some outcome, but which, upon closer inspection, appear rather doubtful. Here is an example invented by Wesley Salmon (1971: 34):

> *Covering Law: All males who take birth control pills regularly fail to get pregnant.*
> *Initial Condition: John Jones is a male who has been taking birth control pills regularly.*

Outcome: John Jones fails to get pregnant.

While the outcome can be derived from the general law and the prevailing condition, they can hardly be said to *explain* the outcome. Any explanation worthy of the name needs to specify the relevant properties that make a difference to the outcome. One way of doing this is to look for *statistical dependencies* between individual factors. Salmon (1971) formalized this approach to explanation as the "statistical relevance" (SR) model of explanation (see also discussion in Woodward 2014). In this approach, valid explanations are premised on the *homogenous partition* of the data – a concept that is roughly analogous with what experimentalists call a control group. For example, if we want to find out whether some attribute *X* is relevant to another attribute *Y* within some population or class *A*, we need to partition the class *A* into subclasses with and without attributes *X* and *Y*, and run statistical analyses to figure out whether members of A are more likely to have *Y* if they *also* have *X*. If such a statistical relationship can be found, we would say that X *explains* Y.

The statistical relevance model of explanation overcomes the problem that covering law explanations have with determining relevance, and it also has the advantage of tallying with the way that scientists in many fields – not least in the biomedical sciences – produce explanations in practice. It does however leave some issues when it comes to the question of causation. The explanations provided by the statistical relevance approach are expressed as *probabilities*, and the explaining factors or attributes are linked by *correlations*. Robust correlations do help us predict phenomena and can even provide clues for effective interventions (such as when taking a particular drug correlates with overcoming a particular disease), but they do not really provide answers to *why* and *how* such correlations occur. As Federica Russo and Jon Williamson (2007) have argued, good explanations in the biomedical sciences *combine* a probabilistic strategy of statistical correlation with a search for specific causal mechanisms that account for the dependencies. It appears that statistical relevance explanations, too, only get at one part of what explanations ought to do.

After a century's eclipse, it has become clear to many philosophers of science studying sciences other than physics that a robust account of explanation that is in touch with how the explanatory project of scientific disciplines really does proceed cannot do without some notion of causality. This realization is a starting point for the new mechanism. As we shall see – and somewhat paradoxically considered the connotations of the old mechanical philosophy – this recent movement has allowed for a broadening of the notion of causation even to the extent of reconsidering aspects of the Aristotelian view.

Part 3. The New Mechanical Philosophy

In Part III, we discuss the following contrasting features of the new mechanism:

1) It is based on the way that research is actually being done in the so-called "special sciences" (biology, neuroscience, and psychology) where the focus is on the discovery of [causal] mechanisms that describe how particular phenomena work.

2) Mechanisms are defined not in terms of universal and fundamental causes, but in terms of local interactions between entities (or components) specific to the phenomenon in question.
3) In this view, mechanisms can be conceived vertically as nested levels of mechanisms and horizontally in terms of causal chains distributed along spatiotemporal lines.
4) Because it is grounded in evolutionary biology, the new mechanism includes the goal directed actions of animals and the mental abilities required to produce them as potential causal factors.
5) The phenomena to be explained can be specified at any scale and the nature of the constitutive components will differ depending on the scale of analysis. Social scientists are actively engaged in extending mechanistic explanations to the scales at work in human socio-cultural phenomena.

The new mechanism is squarely grounded in the biological sciences and evolutionary theory. This has enabled it to restore Aristotle's focus on goal-directed action as a central feature in the evolutionary development of animal minds, without postulating teleological causes. As Barrett (2015) argues, it is because animals (unlike plants) *move* that they evolved the abilities associated with minds. The new mechanism presupposes and thus creates a framework within which to model the interaction of these two distinctive features of animals – goal directed action and mental abilities (however rudimentary) – at increasing levels of complexity from the single celled organism to complex human societies. Given the space constraints here, we will defer discussion of the issues involved in extending the new mechanism to the social sciences for a later publication.[2] Here we will focus on the core features of the new mechanism that provide a basis for its extension to the humanistic social sciences.

3.1 The Emergence of the New Mechanism

Philosophers of science have shown an increased interest in mechanisms and causality since the turn of the twenty-first century (see e.g. Craver and Tabery 2015). Where the covering law theory of explanation was based on ideal cases from the most theoretical branches of physics, and the statistical relevance theory proved successful for dealing with aspects of the biomedical sciences, a newer group of philosophers, who sometimes refer to themselves as "the new mechanists" (e.g. Bechtel and Richardson 1993/2010; Glennan 1996, 1997; Machamer, Darden, and Craver 2000; Craver 2007; Craver and Tabery 2015), are developing an approach to explanation based on how research is done in the so-called "special sciences," such as biology and neuroscience. These are sciences in which a large part of the scientific activity and progress over the past half century has focused precisely on uncovering mechanistic interactions within biological organisms. Typical examples include the mechanism of protein biosynthesis in cells, and the mechanism of the action potential of neurons.

In the words of two of its proponents, "the new mechanical philosophy is less a systematic and coherent set of doctrines than it is an orientation to the subject matter of the philosophy of science" (Craver and Tabery 2015: 3). As such, it has been prompted by the observation that,

[2] Taves & Asprem, in preparation.

contrary to the logical empiricists' emphasis on logical formalism and theories of justification, scientists have generally been oriented toward the discovery of [causal] mechanisms that describe how particular phenomena work. The new mechanists place this process of discovery at the center of their understanding of scientific activity, and explore what mechanistic explanations consist of, how and why they work, and what metaphysical implications follow.

While the new mechanists borrow the term "mechanism" from early-modern predecessors such as Descartes, Hobbes, or Newton, the way that they understand the term is markedly different. Notably, the new mechanists do not mean to suggest that the phenomenon explained with reference to a mechanism is thereby "merely a machine"; nor do they embrace the metaphysical view of a deterministic "world machine" of the type famously imagined by Laplace (1820/1995: 2). Instead, the new mechanists are interested in how scientists explain some behavior with reference to the interactions of relevant entities and processes. Instead of aiming to reduce phenomena to universal and fundamental causes, such explanations are always local and specific to the phenomenon in question.

3.2. **What is a mechanism?**

A mechanism *explains* the behavior of a phenomenon in terms of the interaction of various components (entities and activities). According to one minimalistic consensus definition, a "mechanism for a phenomenon consists of entities and activities organized in such a way that they are responsible for the phenomenon" (Illari and Williamson 2012, 120). The term "responsible for" is carefully chosen, because the behavior can vary widely, from how a system changes into another, to how a system remains static or resistant to change. Moreover, the behavior of the system (the phenomenon of interest) can be specified at any scale, from micro to macro.

At this point we want to flag that the new mechanism's emphasis on identifying relevant *components* and their local interactions and organizations makes it congruent with what we call a building block approach to human experience (see bbhe.ucsb.edu). As we present the basic features of the new mechanism, readers should keep in mind that (1) we view the interacting components of mechanisms as analogous to what we call building blocks, (2) components will *themselves* usually be in need of further mechanistic explanation, and (3) the phenomena to be explained as well as the interacting components adduced to explain them can be any process or entity that admits a sufficiently precise description, from the behavior of a person, to a repeated group practice, to a neuromodulatory process, or a sensory phenomenon. Thus, while the new mechanists are mostly using the framework to identify mechanisms in biological and neuropsychological systems, as a general "orientation to the subject matter of the philosophy of science" it is applicable to a host of other domains as well, including the study of religion.

The following illustration shows how some phenomenon (system S engaging in behavior ψ) can be explained mechanistically with reference to how relevant components of the system (X_1, X_2, X_3, X_4, each engaging in their own behavior φ_1, φ_2, φ_3, φ_4) are interacting (arrows) to produce the behavior.

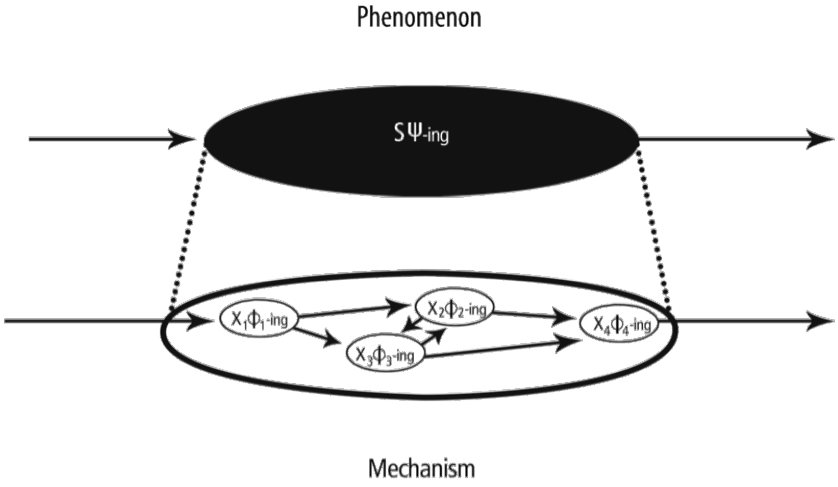

Fig. 1: A visual representation of a mechanism (Craver 2007).

Each of these interacting components engages in its own behaviors, as the illustration shows, and each behavior can itself be explained mechanistically. This is illustrated in Fig. 2 below. X_1 exerts *causal power* on X_2 and X_3, within the mechanism that explains S. To continue to break X_1 down into further components (P_1, P_2, … P_n and T_1, T_2, … T_n) is to *explain* changes in its causal capacity.

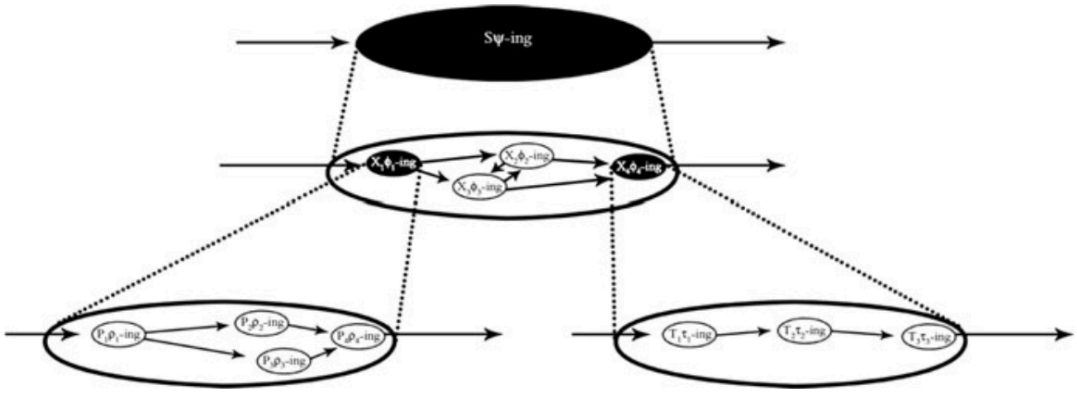

Fig. 2: A multi-level mechanism. (Craver 2007, xx)

This type of analysis is called *decompositional*. It is *synchronic* as opposed to *diachronic*, in the sense that it considers some phenomenon as a system (S), and analyzes it in terms of component parts that are all interacting synchronously. There are several important things to note here.

First, the cascade of explanations in Fig. 2 constitutes a "multilevel mechanism" (Craver and Tabery 2015: 20). "Levels of mechanisms" are *not* to be confused with levels of "nature" (ranked according to features such as size and complexity [e.g., atoms, molecules, cells, organs, and organisms]) or "disciplinary levels" (e.g., physics, chemistry, biology, psychology, the social sciences, and the humanities). In the context of a multilevel explanation, "level" simply means

that the mechanism (e.g., the interaction of P_1, P_2, … P_n in relation to X_1 or T_1, T_2, … T_n in relation to X_4) that explains any given X is nested within (i.e., a part of) the mechanism that explains the behavior of *S*. For example, if we make the collapse of WTC 1 on 9/11 as the behavior (S) that we seek to explain, will include the interaction between a building (X_1) and a plane (X_2). The building (X_1) as a whole is constructed of "parts" that in turn explain how the building responded to the impact of the plane. The behavior of the plane (X_2), which contained crew and passengers, some of whom hijacked the plane, can be broken down into interacting individuals with varying intentions and reasons motivating their behaviors (i.e., the interaction of R_1, R_2, … R_n).

Second, since mechanisms are nested within mechanisms, such that any particular mechanism is simultaneously both a phenomenon of interest (relative to the mechanism that produces it) and a mechanism (relative to phenomena that it produces), researchers must always specify a phenomenon of interest somewhere in the many levels of mechanisms. For example, a terrorism scholar may be less interested in the chemistry of jet propulsion and the physics of collapsing buildings, stipulating their phenomenon of interest instead as how groups and individuals can become motivated toward behaviors understood as "terrorism".[3]

Third, although there is no causal interaction between levels, there is interaction *at a level*, which takes place *over time,* which may alter the causal capacity of the system in question and, thus, its ability to effect change over time. A single mechanism, thus, links synchronic and diachronic processes.

This double nature means that a mechanism can be elaborated in either of two ways depending on what we want to explain, either synchronically, as we have just discussed, or diachronically. In contrast to the synchronic analysis, comprised of nested levels of mechanisms, we can view mechanisms diachronically as linked into causal chains distributed along spatiotemporal lines (Ylikoski 2013; see fig. 3). To have a comprehensive understanding of processes of change, stability, and variation, we need to invoke both these aspects of mechanistic explanation. The analysis of causal chains is necessary to establish which events are related (i.e. whether it is A or B or both that are causally relevant for bringing about C), while a synchronic analysis of nested levels of mechanisms is necessary to answer why, or in virtue of what, A or B has the capacity to act on C. Put differently, one method establishes *causal histories*, the other explains changes in the *causal capacity* of individual entities in those histories.

[3] For a recent example of an evolutionary and (in our sense) mechanistic approach to this very question, see Atran 2016.

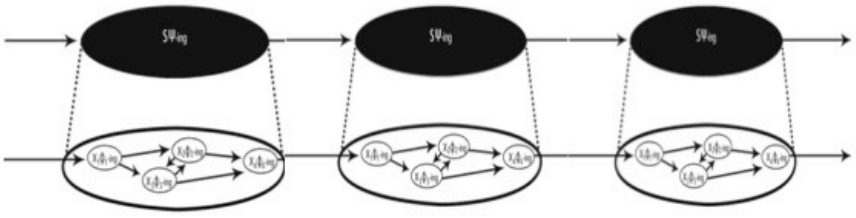

Fig. 3: A series of diachronic phenomena

Although references to "mechanisms" in the natural sciences are often references to constitutive mechanisms, this is an overly narrow view of mechanisms. Here, we are drawing on recent discussions (see Ylikoski 2013; Kaiser et al. 2014) to make a careful distinction between a mechanism viewed constitutively in terms of its component parts and diachronically in terms of causal chains (for further discussion, see Taves and Asprem, in preparation). We do so in order to include the diachronic explanations that are more prominent in fields such as cosmology, geology, archeology, evolutionary biology and psychology, and history in the book version.

3.3 Goal-directed Actions as Causal Powers: From biology to society and back again

Traditionally, humanists explain events by identifying human actors, attributing mental states, such as intentions and goals, and matching their behaviors with these states. Following the "antipositivist" wave at the beginning of last century, this perspective has also had a strong influence on the social sciences. Taking their cue from thinkers such as Droysen and Dilthey, many scholars assume that there is a fundamental divide between the "natural sciences" (*Naturwissenschaften*) and the "humanities" (*Geisteswissenschaften*) such that the sciences are about explanation (*erklären*) while the humanities seek to *interpret* (*verstehen*).

The split between interpretation and explanation has long since come under severe criticism, not least from theorists seeking to ground our understanding of human behavior in the psychological, cognitive, and biological sciences (for a few paradigmatic examples, see Lawson and McCauley 1990:12-31; Sperber 1996: 32-55; Slingerland 2008: 2-28). As discussed in part 1, we think that the split between interpretation and explanation is best resolved by recognizing Proudfoot's distinction between descriptive and explanatory reduction. We must "interpret" in the sense of uncovering and reconstructing, to the best of our ability, the meanings and points of views of our subjects, but after this, we must reduce in order to explain. This is standard procedure when it comes to identifying mechanisms. Thus, as Illari and Williamson (2012; see also Illari and Russo 2014, 122-124) indicate, there is broad agreement in both the biological and social scientific literatures that the identification of constitutive mechanisms proceeds in three steps:

1. Describe the phenomenon or phenomena;
2. Find the parts of the mechanism, and describe what the parts do;
3. Find out and describe the organization of parts by which they produce, in the sense of bring about, the phenomenon.

We can use these steps to clarify the two ways we can approach the subjective meaning, intention, or beliefs that subjects ascribe to their actions, depending on whether we treat the subjective meaning as the phenomenon of interest (step 1) or as a potential part of a mechanism for a phenomenon (step 2). If we want to study folk explanations as such, they are the phenomenon of interest that we would seek to explain in terms of mechanisms, both causal (diachronic) and constituent (synchronic). We can also consider subjective meaning as a potential component that might interact with other entities or processes to produce a phenomenon. This returns us to a question that the new mechanists are debating, i.e., whether "content-bearing mental states" (i.e., specific beliefs as opposed to believing as a process) can be part of a mechanism (Illari and Williamson 2011, 831). Although the details are not resolved, the new mechanism clearly makes room for this possibility.

From an evolutionary perspective (Barrett 2015), we can understand minds and mental processes as evolving together with organisms' capacity to *move*. As Barrett (p. 18-26) indicates, the foundation of cognition was laid with the mutation that created the first light-sensitive cells: with basic discriminatory powers, such as distinguishing light from dark and hot from cold emerged the basic power to move toward and move away. This is the basis of intentionality. The rest is evolutionary history: With increasing complexity, new discriminatory capacities have been added and old ones overridden, in the constant selection of whatever trait is adaptive in a changing environment. Regardless of whether they are able to reflect on their goals, this means that the goal directed actions of organisms and the cognitive abilities required to produce them must be taken into account as *causal powers* within complex, multilevel mechanisms linked diachronically across evolutionary time.

Moreover, as soon as we ground our understanding of the natural world (and not just biology) in the principle of natural selection, we can reintroduce concepts such as functional design into the explanatory scheme without a return to Aristotelian teleology. This point can be extrapolated to apparently "non-mechanical" phenomena such as goal directed actions and the cognitive abilities that support them. The causal power of intentions, like that of other functional designs, must be approached *diachronically* as well as *synchronically*, and related to *distal* as well as *proximate causes*. [4] In other words: While the traditional, methodological individualist view would be content with relating an action to the intentions of an actor or group of actors, we would proceed to 1) explain those intentions themselves in terms of the interacting constituent parts of the actor or group that produced them (e.g., unconscious mental processing, biologically based drives, psychological biases and heuristics), and 2) explain the general capacity for intentionality – and for pursuing particular kinds of goals – with reference to natural selection as a distal cause.

3.4 A Case Study: We can conclude with an example that demonstrates how this approach to explanation allows us to explain religious claims differently. Joseph Smith's claim to have

[4] This discussion is implicitly based on our reading of Tibergen's (1963) "four questions", which will be unpacked in the book version (Taves and Asprem, in preparation).

recovered and translated ancient golden plates buried in a hill in upstate New York provides an apt example. Smith's followers then and today typically explain his actions in supernatural terms, attributing the burial of the plates to an ancient inhabitant of the Americas and the content of the plates to his forbearers who recorded historical events including an actual visit of Christ to his people. Smith's critics then and today view his claims as false and typically explain his actions in terms of deception or fraud. Scholars are generally divided as well. Some (generally Latter-Day Saints [LDS] scholars) take Smith's claims at face value, thus opting for a supernatural explanation, while others (generally non-LDS) believe there were no ancient golden plates and conclude from this that Smith was either deceptive or deluded. Both are making claims about his intentions. The former, presupposing the supernatural, claims that his intention was simply to do what an angel of the Lord commanded. The latter claims that he either consciously intended to deceive others or unconsciously deluded himself. Phenomenologically oriented and methodologically agnostic scholars bracket this contentious issue and limit themselves to analyzing what arose as a result of Smith's claims.

Deliberately focusing on a particular aspect of the problem, how might an evolutionary framework allow us to do better job of understanding intentionality? Most crucially, it would require us to remind ourselves that intentionality is a product of evolution. This might lead us to wonder if the competing explanations of Smith's intentions as either real-supernatural or fake-deceptive-deluded might not be a bit too simplistic. An evolutionary perspective on intentionality would situate it in the context of goal directed action, which would remind us that intentions do not have to be conscious in order to result in actions. Many different action oriented systems compete for primacy below the threshold of consciousness (Huang and Bargh 2014). If we also bear in mind that humans have evolved as *social* animals whose mental processes depend heavily on interactions with others, we might wonder if a focus on Smith's intentions alone is sufficient to explain the belief in the existence of ancient golden plates or if group processes might play a significant role.

While scholars have disagreed over whether ancient Nephites or Joseph Smith was the efficient cause of the golden plates (and others have simply opted out of explaining), a mechanistic explanation would seek to explain the behavior (believing in the existence of ancient golden plates) in terms of entities and activities that were responsible for producing it, grounded in an explanation of the evolved capacities that allowed believers to do so. To arrive at a mechanistic explanation, we would have to begin with a careful reconstruction of the phenomenon of interest (the belief) as it developed over time in that particular social historical context, based on the most reliable historical sources. The reconstruction would reveal not only a constellation of relevant beliefs within Smith's family and in his local environment, but also several key points in a historical process of belief formation, which we can think of as a series of diachronic events (as depicted in Fig. 3; for more detail see Taves 2016).

1) 1823 - A dream-vision in which an angel appeared and told Smith that ancient plates were buried in a nearby hillside.
2) 1827 - The recovery of plates

3) 1827-1828 - Smith and his immediate followers interact with an object that is always covered or hidden in a box per the Lord's instructions to Smith. Witnesses see the ancient plates in vision when delivered/revealed by an angel.

If we focus just on the first event – the 1823 dream-vision – we find that Smith did not attempt to recover the plates until the angel returned, instructed him to tell his father, and he and his family confirmed the reality of the vision. Confirming the reality of the vision confirmed the reality of the angel as an intentional agent and plates as a material object. This crucial initial event can be explained mechanistically as an interaction between an individual (Smith), who had an unusual dream-vision, and others close to him, who believed that contents of the dream-vision were real and not just imaginary. Smith and his family members were the interacting parts that produced the phenomenon of interest (a shared reality in which an external intentional agent [an angel of the Lord] appeared and reported the location of an actual ancient material object).

We can further analyze (decompose) each individual (or component) in this initial 1823 dream-vision event to investigate what they contributed to the interaction in terms of abilities, beliefs, and motivations. It is at this level of mechanism that the family decided whether the reported angel's intention [to get Smith to find and recover the plates] was a product of Smith's imagination or of an independent agent. While the various labels applied to the postulated agent – angel or disembodied spirit, delusional belief, or fictional character – offer explanations, they do not provide mechanisms that explain how the Smith family came to believe an agent was present. An evolutionary perspective on intentionality radically upends our everyday sense of ourselves as unified "selves" and offers an alternative framework in which humans and other animals are understood as comprised of multiple, mostly unconscious impulses directed to different ends that compete for attention and normally gain primacy in serial fashion (Huang and Bargh 2014; McCubbins and Turner 2012, 393–94). From an evolutionary vantage point, we can more easily understand how impulses that surface to consciousness – in dreams or otherwise – may seem self-alien and as a result might easily be construed as belonging to someone else (Wegner 2002, 221-270, Taves and Asprem 2016).

In cases, such as this, where available beliefs about angels lead close associates to conclude that an independent agent has manifested its presence to or through an individual, they may create a shared reality in which this new agent can continue to intervene. The emergence of this shared reality (event #1) enabled Smith and his family to come up with reasons why he was unable to recover the plates when he went to the site, and, in the wake of another appearance of the angel, enabled Smith to come up with a plan for co-creating the plates with the Lord and, thus, to recover them (event #2). The outcome of event #1 thus serves as input into event #2, which in turn serves as input into event #3.

3.5 CONCLUSION

As we hope to have shown, the question of explanation in the study of religion is much more complex and wide-ranging than common dichotomies between explanation and interpretation, or description and reduction tend to convey. This problem already begins in deciding the

explanandum: are we studying "religion" in the abstract, or are we studying the people who engage in practices that get deemed "religious"? We have defended a naturalistic approach grounded in the new mechanism and evolutionary theory that takes human behaviors – both individual and group behaviors – as its object of study, and seeks explanations that are grounded in evolved capacities that bring together the nexus of bodies, minds, and groups. While this approach may at first sight seem alien to some of our humanities colleagues, we hope to have shown that in *principle* this approach can do justice to a whole swath of cultural, psychological, material, and social elements. To seek an explanation of a phenomenon is, simply, to search for mechanisms that connect individual parts in some causally connected whole, and to embed these mechanisms in causal chains connected over longer time scales. This urges us to expand our explanatory scope in two dimensions: diachronically, we must connect the historical time scales studied by historians to an evolutionary time scale studied by biologists; synchronically, we must deepen our analysis of behavior from the level of conscious intentions, reasons, and goals, to the sub-personal level of evolved drives and tendencies that compete for the control of the body below the threshold of consciousness. Taking this approach may have unsettling consequences for the illusion that an irreducible, "rational" self is in control of the human body, and certainly for the notion that "cultures" and "religions" somehow possess their own inherent teleologies that unfold through history. It does, however, help us pinpoint why and how and to what degree the human capacity of creating niche environments and abstract cultural systems have a real effect in the world.

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