



# Religious thought and behavior

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While earlier approaches to religious thought and practice searched for ‘magic bullet’ approaches to explain religious thought and behavior, seeing it as an example of irrationality, illusion, integrative force, symbolism, or false explanations of origins, cognitive scientific approaches have suggested that we see it rather as an aggregate of the products of various cognitive mechanisms. Studies in the cognitive science of religion, informed by experimental work, have converged on a standard model of explaining religious thought and behavior by focussing on the role of minimally counter-intuitive concepts, agent and animacy detection, ritual representations, notions of contagion and contamination avoidance, theory of mind, coalitions, and moral intuitions. © 2012 John Wiley & Sons, Ltd.

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## INTRODUCTION

Whether they reside in Katmandu or Kalamazoo, people sometimes say some very puzzling things and at certain moments engage in some very odd behavior, especially when these statements and acts occur in religious contexts. For example, the Dorze of Ethiopia claim that leopards are Christian animals and observe the fasts of the Orthodox Church and, therefore, will not kill their goats on those feast days.<sup>1</sup> The Dorze have no qualms, however, about protecting their livestock from marauding leopards on those same days. What is interesting about this example is the idea that that predator is constrained by ritual observance but at the same time, the people are not willing to take the chance that such ritual observance can be completely trusted. Or take the example of a common practice among the Zulu of the Amazizi district in KwaZulu/Natal where it is obligatory for a young woman to wear the fat of a recently slaughtered cow as a shawl without tearing it in preparation for her wedding. If it is torn, this counts as a sign that she is not a virgin<sup>2</sup> (Figure 1). Or take the American creationist who believes that it is important to get a flu shot every year because he knows that the flu virus mutates but nevertheless claims that evolution ‘is just a theory’ and that the world and everything in it was created by God in short order, perhaps in as little as seven days or if, by chance, a day is perhaps metaphorical it can be reconceived as a thousand years.

Earlier discussions of these forms of thought and associated behaviors by philosophers, ethnographers, and psychologists have focussed on whether such statements and practices are instances of superstition or irrationality at worst or metaphor or symbolism at best.<sup>3</sup> A great deal of intellectual energy was expended in the first half of the twentieth century in trying to identify the ‘magic bullet’ that might account for the widespread nature of religious thought and its associated practices. Some social scientists, for example, argued that religious thought serves to provide the intellectual means to unify or integrate a cultural system<sup>4</sup> or they thought that religious thought serves as an organizing principle of power that justifies a special elite (Marx), or perhaps that religious thought is an early example of human attempts to explain origins later superseded by the emergence of scientific modes of thought (Tylor) or that given the centrality of relationships of power in social situations that religious thought reinforces and justifies male dominance. In each case, it was hoped that some key idea would bring everything into perspective. Despite such attempts, however, these approaches simply left too many features of religious thought and practice unexplained. Ultimately, they did not move us much closer to develop an explanatory understanding of these odd and even bizarre patterns of thought because they failed to identify the psychological mechanisms involved.

Even when attention was paid to psychological mechanisms, early psychological theorizing tended to either focus on the illusory nature of religious notions

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**FIGURE 1** | Zulu rite of virginity.

(Freud)<sup>5</sup> or sought out paradigmatic cases of religious experiences with the hope that they might provide clues about why religious ideas and practices arise with such regularity across cultures. William James,<sup>6</sup> for example, was particularly interested in the kinds of psychological processes that led to religious thought and underwrote religious practice. He regarded religious experience in general and mystical experience in particular as paradigmatic cases of religious thought. By focussing on religious experience, he and his followers tended to view such experiences as primarily affective and emotional and as at some distance from rational thought and even antithetical to it. However, a great deal of religious thought, when viewed in cross-cultural perspective, has little if anything to do with such special experiences, especially mystical ones. Generalizing from such special cases, for example, from altered states of consciousness, to the vast majority and statements and practices that arise in religious contexts, misses what is most interesting about them from a scientific point of view.

## LOOKING FOR PSYCHOLOGICAL MECHANISMS

In the past two decades, cognitive scientists have begun to realize that a magic bullet approach is

too simplistic and misses the possibility that many psychological mechanisms might be at play in the production of both the ideas that emerge in religious contexts and the many practices, particularly ritual activity, that frequently accompanies the emergence of such ideas. By focussing on the religious thought and practice as an example of complex systems of cognitive processing, cognitive scientists have sought to move the discussion forward from purely interpretive endeavors (religious thought is an example of a, b, or c) to a mature explanatory understanding by identifying and analyzing the cognitive processes that seem to lead to the types of statements and practices alluded to above. Cognitive scientists have developed hypotheses intended to answer questions such as why, if they are so strange, such ideas and practices are so easily transmitted within and between generations? Why is it that ideas and behaviors that have no obvious utility get transmitted, while Darwinian ideas have to battle to receive a hearing? What psychological mechanisms account for the generation of such ideas in the first place? What further theoretical and experimental work might lead to more satisfying results than those typically offered by an earlier generations of social and behavioral scientists as well as scholars in the humanities?

## SOME SURPRISES

Cognitive scientists and evolutionary psychologists have proffered some surprising answers. For example, they have begun to show by experimental means that certain aspects of religious thought when tied to processes such as animacy detection, agent detection, theory of mind, or threat detection is parasitic on such mechanisms. A specific process that has been suggested is that of the hyperactive agency detector now typically referred to as HADD. From an evolutionary point of view, any organism that is structured to identify agents in the environment has a selective advantage over organisms that do not because being able to distinguish between something that is simply moving under its own power and something that is moving toward you with the intention of possibly harming you would be of great value not only to a lively future but also to your reproductive capacities. Any such mechanism, of course, would be liable to produce false positives because it is better to be safe than sorry. This idea was first suggested by Robert McCauley and subsequently developed by a number of scientists in the cognitive science of religion.<sup>7</sup> Given the tendency toward producing false positives raises the possibility of detecting agents even when they are not there. So people not only see ghosts on dark nights in quiet

alleys but also see faces in the clouds.<sup>8</sup> To make sense of this ‘tweaking’ of our detection mechanisms, we need to focus on the differences between the intuitive and the reflective thoughts.

## INTUITIVE AND REFLECTIVE THOUGHT

Humans have a capacity for reflecting not only on the world but also on their reflections. They also have intuitions that simply seem to come with the territory. These intuitions have been called our naïve or folk systems of knowledge. Typically, our intuitions speak to our basic expectations of what the world is like. They are our early, quick, and dirty ‘theories’ of what is out there and not yet informed by science (see Ref 9 for a recent development of this idea). Our folk or naïve systems of knowledge (folk physics, folk biology, folk psychology) by and large serve us in good stead in our day-to-day traffic with the world. We do not try to walk through walls except when we are not paying attention, we expect our plants to grow if we water them, and we expect to get a tongue lashing if we see a deep frown on our friends face. We do not need scientific psychology to get on with it. We also know that our capacity for reflection, which often leads to highly abstract modes of thought, takes time to develop and very often requires institutional support. Its highest form is scientific theorizing, and when we need serious explanations of why we cannot walk through walls, why plants get diseases even when watered, and why frowns do not always signal what we expect them to, we grasp for scientific knowledge.<sup>10</sup> So given the role that our folk systems play in every day life, it is no accident that religious notions so easily get a ride because they are able to co-opt the mechanisms at work. As Boyer<sup>11</sup> has shown, when our minds engage in the process of representing a cue about an artificial object such as a statue, all we have to do is to transfer a property from the intentional domain to the domain of artifacts in order for the resulting notion to be interesting enough to attract our attention and transmit it to others, for example, a tree that talks. So given our folk intuitions, only minimal tweaking of these intuitions by violating some feature of a basic category or transferring a feature from one category to another will give us minimally counter-intuitive ideas that, because of their counter-intuitiveness, will provide interesting enough to go through to the next generation.

Even when our capacity for reflective thought achieves a highly developed state such as it does in mature sciences, it is available for co-option by

theologians and the institutions that support them. Some of the most abstract reasoning in Western literature can be found in theological texts, for example, the *Summa Theologica* of Thomas Aquinas or the *Institutes* of Calvin or more recently *The Systematic Theology* of Paul Tillich. Their very abstractness provides a lure to those gifted with solving intricate puzzles or those who like challenges that lead to discovering intricate relationships between terms.

Justin Barrett and Frank Keil<sup>12</sup> designed experiments to tease out the difference between our folk systems of knowledge and our capacity for abstract thought. Subjects were first queried about their beliefs about God was like. It should come as no surprise that God was regarded as having the standard properties commonly attributed to him in various religious traditions, such as, omniscience, omnipotence, atemporal, and so on. Subjects were clear that the doctrines about God’s nature were fundamental. Nevertheless, when subjects were presented with stories about God’s actions in the world, they reported His actions in anthropomorphic terms rather in the doctrinal terms they had insisted on. God, for example, did one thing after another rather than simultaneously. Of particular interest was the subjects systematic misremembering of events in the direction of folk systems of knowledge.

Pyysiainen, in his new book *Supernatural Agents: Why we believe in Souls, Gods and Buddhas*,<sup>13</sup> also affirms the usefulness of the distinction between the intuitive and the reflective thoughts but focuses on the folk psychology and, in particular on theory of mind, and argues that theology, a clear example of abstract thought, emerges out of our folk knowledge. He thinks that beliefs about superhuman agents are natural emerging, as they do, out of our intuitions especially those about other minds.

When all is said and done, of course, finding the reference for these tweaked intuitions and the elaborate development of them in theological exercises is deeply problematic and requires an explanation. From a utilitarian point of view, such religious intuitions with their counter-intuitive features present a puzzle and raise the problem of how such ideas are transmitted in the first place.<sup>14</sup> We shall focus next, therefore, on cultural transmission.

## TRANSMISSION

Not all ideas that are entertained are transmitted. We do have passing thoughts that are not expressed and are quickly forgotten. We also, however, have ideas that we take very seriously but no one else does and they quickly die their own little deaths.

Some ideas, however, do manage to attract our attention. A significant amount of experimental work has shown that even very young children in experimental situations pay attention to phenomena that go against their expectations. We only have to slightly alter a few of the properties of a stimulus for it to command our attention. To call attention to a tree in our pathway while we walk is noticed momentarily until we have passed it, but calling attention to a tree that is reputed not only to understand what we say in a special language but also to be capable of making some change in our health certainly attracts our attention. So, for example, ritual practitioners among the Yoruba of Nigeria speak to a tree in a special language because of its putative healing properties.<sup>15</sup> Interestingly, this tree (*Rauwolfia Vomitoria*) does possess a bark, which has various medicinal properties. Reserpine, an alkaloid, is derived from its bark and has been used for high blood pressure. It is also used for various other illnesses including acting as a tranquilizer for the mentally ill.

One of the marks of religious notions is that they consist of features that both violate some of our expectations of concepts such as 'person', 'living thing', or 'artificial object' and confirm others.<sup>16,17</sup> It seems that ideas that violate some aspect of a concept such as 'person', for example, stand a greater chance of being remembered and, therefore, transmitted within and between generations.<sup>18</sup> When highly emotional states become associated with such ideas, they have an even greater chance of successful transmission. 'The cognitive alarm hypothesis suggests that high emotion tends to both marshal and to focus cognitive resources on its apparent causes, which, if vindicated by subsequent developments, marks the events as especially memorable' (Ref 18, p. 113) Harvey Whitehouse, a cognitive anthropologist who has done field work in Papua New Guinea, sees memorability as playing a fundamental role in explaining the emergence and persistence of religious thought. Because he is interested in how religions change, he has pursued studies that focus on the role that memory plays in the transmission of religious concepts and the behavior they inform and the cognitive processes by which such concepts are encoded. His theory provides one account of cultural transmission by suggesting that frequency is a significant variable in explaining why certain kinds of religious concepts are remembered and transmitted.<sup>19</sup> The more frequently a religious ritual is performed, the more its memorability is enhanced. But the less frequently a religious ritual is performed, the more it requires the inclusion of emotional factors if its transmission likelihood is to be enhanced. He gives many accounts of how rituals that generate emotional states

induced by food and sleep deprivation, punishment, and so on serve to ensure the transmission of religious concepts to future generations.

## THE EMERGENCE OF A STANDARD MODEL: TOWARD A COGNITIVE SCIENCE OF RELIGION

Given the work on religious thought and practice by cognitive scientists in the past two decades, Pascal Boyer<sup>11,20</sup> has argued that it is now possible to speak of a standard model of religious thought and behavior in cognitive science and evolutionary psychology. Such work even has a label and is known as the *cognitive science of religion*.<sup>21</sup> This subdiscipline in cognitive science has been driven by the work of Lawson and McCauley<sup>14</sup> who provided the first systematic treatise in the cognitive science of religion, Pascal Boyer,<sup>11,22</sup> Barrett,<sup>12,23</sup> Pyysiainen,<sup>24,25</sup> Eilam et al.,<sup>26</sup> Slone,<sup>27</sup> Atran,<sup>28</sup> McCauley and Lawson,<sup>18</sup> and Tremlin.<sup>29</sup> There is general agreement among these scholars about the essential features of the model, which are as follows:

1. Minimally counter-intuitive concepts play a fundamental role in religious thought and inform religious ritual practice. Such concepts are informed by the properties of general notions such as 'person', 'living thing', and 'man-made object'. These tweaked concepts capture our attention because they both go against some standard property of the concept in question, while at the same time, they also reinforce other features of the same concept. For example, the notion of a ghost or spirit, which has wide cross-cultural spread, both violates our expectation of the physical features of personhood (spirits can move through solid objects) and confirms other features, such as the capacity to communicate with people under some conditions.<sup>11,12</sup> Minimally counter-intuitive notions riding on the back of folk ontologies are found in many different cultures and are diagnostic of religious concepts. In fact, it is their attention-grabbing property that partially accounts for their memorability.<sup>16,17</sup>
2. Some minimally counter-intuitive concepts are specifically associated with intentional agents.<sup>14</sup> Such agents are regarded as having some special, non-ordinary qualities (e.g., they may be ubiquitous, know your thoughts, and have special powers). In fact, such properties make them appear to be superhuman agents.<sup>14</sup> Gods,

spirits, angels, demons, ancestors, and ghosts populate the world of superhuman agents. From a psychological point of view, such concepts are simply minor variations on standard theory of mind.<sup>12</sup> Such variations might emerge from theory of mind but their significance is profound in their effect on human behavior.

3. Ethnographic studies over the past century have demonstrated how widespread ritual activity is. While the world is full of rituals, some rituals are specifically tied to assumptions about superhuman agents. So while a man may wash his face in the same way every morning, in a religious situation, washing ones face may have a clear association with an agent with special qualities who requires one to wash ones face not only every morning but most do so three times and then sing a song. Failure to do so opens the door to danger. It is not surprising there that rituals associated with superhuman agents will be regarded as particularly compelling. What is of particular scientific interest is that where in a ritual superhuman agents are represented enables us to make a number of predictions about whether such rituals are one off or repeatable, whether they are central or peripheral in the ritual system, whether they permit the substitution of instruments, and so on.<sup>14,18,30,31</sup>
4. Mary Douglas<sup>32</sup> alerted us to the importance of notions such as purity and impurity, cleanliness, and pollution. Notions such as purity and pollution are widespread in religions across cultures and through time. From the point of view of the cognitive science of religion, such religious notions are by-products of deep-seated intuitions about contagion and contamination that seem to be triggered in interesting ways and unexpected ways, for example, refusal to drink from a glass into which someone has spit even if the glass has been thoroughly washed. Rozin and his colleagues<sup>22,33</sup> think that such behavior is derived from, and relevant to, contagion and contamination-avoidance patterns of behavior that have an evolutionary explanation. While much of the earlier psychological studies attempted to account for religious thought and behavior in terms of the psychology of fear, recent work in the cognitive science of religion focuses on notions in precautionary psychology that focus on potential rather than imminent or manifest danger. The point being investigated by evolutionary psychologists is whether precautionary behavior provides a selective advantage.
5. What is interesting is that at the cultural level of analysis, we find that the thematic content of many religious rituals focuses on the avoidance of possible threats by performing stylized, patterned behavior. In fact, much recent work on obsessive-compulsive disorder (OCD) has begun to pay attention on the relationship between religious ritual behavior and pathological behavior from a non-Freudian perspective.<sup>34,35</sup>
5. Predation, assault, and the risk of death are with us no matter what period we live in, whether we reside in Paleolithic caves or float in the narrow corridors of the space station. Threats to well-being have fed and supported the development of notions such as souls as spirits because while biological death is easily understood even by young children, psychological death is a much more difficult concept to assimilate.<sup>36</sup> The decay of a dead body is easy enough to observe. Just think of the road kill on public highways that young children frequently observe. So young and old alike know that bodies are subject to death and decay. What is cross-culturally widespread is a set of notions expressed in many different ways that persons are more than bodies. Bloom<sup>37</sup> argues that we have a deep tendency to be Cartesian dualists. Because of this tendency, humans tend to wonder about what happens to this 'more' when the body dies. Much new experimental work is teasing out the underlying cognitive processes that lead to such intuitions. Scholars of comparative religion have amassed copious information about the widespread nature of afterlife beliefs. And the study of the mechanisms that are involved in the development of afterlife beliefs is now underway.
6. Being initiated into a group by means of a set of ritual practices provides important information about social status, commitment, and proper affiliation. Such products of ritual participation provide signals or marks that show ones membership in an in-group and identify outsiders.<sup>18</sup> Not only do such marks signal identity but they also serve to encourage those who are still outside to become affiliated and join the coalition. Marks that identify membership can be anything from wearing special clothes, to going naked, to shaving ones head, to exhibiting special scars, to being proud possessors of unique jewelry, and to being dressed identically. Symbols such as these serve to advertize our shared commitment to costly activities. We show that we are willing to pay the price for the benefits provided.<sup>28</sup>

7 All human beings have moral intuitions about what is fair and what is not, what is right and what is not, what is good and what is not, and what is responsible behavior and what is not. Obviously, in different cultural contexts, the contents of such notions differ to some extent. Religious notions easily co-opt these notions of the fair, the right, and the good, and when associated with the notions of superhuman agents, they acquire a particular force because if it is good to do something, it is even better to do if the gods know that you are doing it. And if it is wrong to do something, if some counter-intuitive agent might be watching you then you had better not do it. Boyer<sup>22</sup> argues, therefore, that religious morality is parasitic on evolved intuitions that are there, religion or not. The ready availability of counter-intuitive agents with special qualities is typically construed as interested parties in decision making. If I am already tuned to wondering about what I ought to do in a particular case, and if I believe that my actions are observable by an interested superhuman agent, then the decision that I make will be affected by that belief.

## CONCLUSION

The cognitive science of religion is clearly a progressive rather than a degenerative research program as an increasing number of scientists develop what is obviously an inferentially rich project. Scientists from ethology, neurobiology, evolutionary biology, cross-cultural psychiatry, cognitive, social and evolutionary psychology, and evolutionary anthropology have joined philosophers of science in multidisciplinary research programs that explore issues relevant to our understanding of religious thought and behavior. A crucial, if recent, movement emphasizes identifying the evolutionarily bequeathed cognitive mechanisms (in very fundamental domains) that underlie religious behaviors, rather than focusing on 'religion' per se, as viable research objects.<sup>22,38-41</sup> For example, a group of researchers have recognized the relevance of studies in threat detection,

risk assessment, and precautionary psychology for identifying mechanisms that play a role in ritualization, an area with clear links to everyday and pathological behaviors as well as cultural/religious rituals.<sup>34,35,42-50</sup> Researchers have also begun targeting the roles of specific neuropeptides and the specific contexts complicit in regulating trust and cooperation tendencies.<sup>51,52</sup> In addition, the coalitional behaviors of individuals in groups has recently been investigated by ethologists who have focused on behaviorally identifiable hierarchies that often dictate how coalitional behaviors manifest (particularly within religious communities).<sup>53</sup> This has been done via studies on humans and other animal species, the latter often providing animal models that can be extrapolated onto human behaviors.<sup>26,54,55</sup> Each of these examples illustrates the renewed focus on providing explanations from a cognitive science perspective, particularly by introducing innovative but historically viable methods into the general study of religious thought and behavior.

Perhaps of even greater significance is the increasing attention being paid to cross-cultural studies that includes data collection generated by experimental studies in diverse populations. While the forefront of scientific progress has been centered in the United States and other Western countries, there is evidence of a new recognition of resources and expertise in important crucibles of varying human behaviors and genetic pools.<sup>56</sup> These include sub-Saharan Africa, Eastern Europe, the Levant, North African, and Southeast Asia as well as the traditional research populations of the United States and Western Europe. The cooperation between scholars in these areas and the sharing of resources and natural human laboratories has the potential to provide crucial insight into the important quest to account for both variations and similarities between populations in terms of the role of neurocognitive systems and their actual environmental domains.

The future of the cognitive approaches to theorizing about religious thought and behavior is in the integration of evidence gathered in multiple cultures and populations and by scholars in heretofore seemingly disparate disciplines.

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