

# Go Tell It on the Mountain: How the Cognitive Science of Religion Accounts for the Transmission of Religious Belief

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## Abstract

The transmission of religious belief systems is hypothesized to result from certain innate cognitive faculties with which all humans are endowed. Research from the cognitive science of religion suggests that we have faculties that are highly sensitive to detecting agency in environmental stimuli and are more likely to remember those agents when they violate expectations that are otherwise consistent with the ontological categories to which they belong. These so-called minimally counterintuitive agents are more easily remembered than intuitive agents. Frequently, explanatory power and morally strategic information are often attributed to these counterintuitive agents, qualifying them as “gods,” around which belief systems are formed and transmitted. These belief systems are maintained through the practice of formal rituals, some of which are emotionally evocative while others are more routine.

**KEYWORDS:** cognitive science of religion, hypersensitive agency detection device, minimally counterintuitive agents, ontological categories, gods

The purpose of this paper is to review research from the cognitive science of religion that suggests reasons for the successful transmission and maintenance of religious belief systems. Such reasons involve universal human cognitive faculties that are capable of accepting the plausibility of certain supernatural beliefs, transmitting these beliefs to others, and maintaining these beliefs through repetition and ritualization. Religious belief systems may be broadly characterized by the presence of the sacred (Pals, 2006), particularly in reference to the existence of the supernatural. Scholars of religion tend toward either a broader or narrower definition of religion. In the narrower sense, religion may have a sense of the sacred without the presence of supernatural beings, as with some forms of Buddhism, who do not believe in God, but who do have “a sense of the sacred” (Pals, 2006, p. 13).

In the broader sense, religion involves both a sense of the sacred and a belief in supernatural beings. This is exemplified by the Old Testament account of Moses’ encounter with God in the Burning Bush. As Moses turns aside to see the bush on fire but not consumed, God tells Moses “Do not come near; take your sandals off your feet, for the place on which you are

standing is holy ground.’ And he said, ‘I am the God of your father, the God of Abraham, the God of Isaac, and the God of Jacob.’ And Moses hid his face, for he was afraid to look at God” (Exodus 3:5-6). This event illustrates the presence of both the sacred and the supernatural. It illustrates what Rudolf Otto describes in *The Idea of the Holy* (1958) as an encounter with the *numinous*, the “Wholly Other,” that inspires awe and a sense of being overpowered with the Other’s majesty.

The account of Moses and the Burning Bush in Exodus 3 provides an excellent basis for describing those elements in human cognition that contribute to the transmission and maintenance of religious belief. In Exodus 3, Moses notices that the bush is burning but was not consumed. Verse three reads, ‘And Moses said, “I will turn aside to see this great sight, why the bush is not burned.”’ What about the Burning Bush was attention-getting? Why would Moses “turn aside to see this great sight”?

Moses’ amazement involves two key concepts in the cognitive science of religion: the hypersensitive agency detection device (HADD) and the perception of minimally counterintuitive agents (Barrett, 2004). The HADD is an innate adaptive cognitive faculty that alerts humans to the possible presence of living others that appear to possess agency. When humans encounter ambiguous cues in their environment, it is safer to assume that such cues results from intentional agents. Pascal Boyer offers this explanation of how Barrett’s HADD leads us to find agents in ambiguous stimuli:

Our evolutionary heritage is that of organisms that must deal with both predators and prey, in either situation, it is far more advantageous to overdetect agency than to underdetect it. The expense of false positives (seeing agents where there are none) is minimal, if we can abandon these misguided intuitions quickly. In contrast, the cost of not detecting agents when they are actually around (either predator or prey) could be very high (Boyer, 2001, p. 145)

When Moses first encountered the Burning Bush, it is reasonable to assume his natural cognitive faculty of agency detection activated in order to discern whether this counterintuitive event warranted action.

Such an explanation should not be construed as an attempt to explain away Moses’ encounter. Instead, it may be viewed as the Lord working through the natural cognitive faculties given to all humans as part of their creational endowment. If Moses was not intuitively endowed with such meaning-making faculties, the Burning Bush may not have been of sufficient interest to capture his attention.

The Burning Bush in the Exodus account provides an excellent illustration of a minimally counterintuitive agent. A bush is a member of an ontological category that includes biological entities without self-propulsion. Such entities follow a typical course of growth and development,

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produce like species, are subject to destruction or death, etc. Moreover, entities in this ontological category subsume the characteristics of spatial and physical entities, characteristics of which include occupation of a single location in space and time, visibility, tangibility, solidity, and cohesion (Barrett, 2011). Ontological categories form intuitively as we encounter phenomena in our environment. Research in developmental psychology suggests that children develop expectations for these ontological categories at an early age. Most of what we perceive in our environment consists of what categorizing external stimuli into categories and interacting accordingly. The perception of a tree whose leaves and branches are waving vigorously in the wind doesn't activate the fight-flight response while a snarling, barking dog does. The former doesn't excite the fight-flight response because we know that the tree will not charge, while there is every possibility the snarling dog may. Such intuitive expectations allow us to predict and control our environment to maximize our survival.

Things in our environment become counterintuitive when they violate what is intuitively expected by its membership in an ontological category, or if the expectations are transferred from one ontological category to another (Barrett, 2011). A person who walks through walls is a breach of what we expect based on our intuitive understanding of physics, while a mountain that is alive transfers essence from the biological domain to the physical domain (McCauley, 2011). The Burning Bush violates the expectations of the ontological category of biological entities by failing to be consumed by fire. As such, the Burning Bush is minimally counterintuitive. By violating expectations the agent commands attention from the observer (Barrett, 2004). Once Moses' attention identifies the Burning Bush as minimally counterintuitive, it further violates its ontological category by speaking, the voice telling Moses "Do not come near; take your sandals off your feet, for the place on which you are standing is holy ground." Of course, the voice is identified in Exodus 3 as God, so what initially appeared inexplicable becomes explained by God Himself. Nonetheless, Moses' initial attention was directed not to an ordinary bush nor a burning bush that was being consumed, but a burning bush that was not consumed – "a great sight."

The term "minimally" is an important qualifier for counterintuitive concepts. Experimental evidence suggests that MCIs are more readily remembered than intuitive concepts (e.g., trees don't attack) and excessively counterintuitive concepts (e.g., trees that run, vanish, and sprout chipmunks instead of leaves). In fact, although excessively counterintuitive agents may attract more attention, it is more difficult to remember. Boyer and Ramble (2001, cited in McCauley, 2011) conducted an experiment where participants were asked to imagine a situation where a unfamiliar location contained unusual items that were either normal, minimally counterintuitive, or more counterintuitive. Results indicated "that across cultures participants remembered the minimally counterintuitive items significantly better than they remembered the others" (McCauley, 2011, p. 167). In a similar study cited by McCauley (2011), Barrett and Nyhof (2001) found that minimally counterintuitive concepts were more easily remembered than normal concepts both in the short-term and after three months. Similarly, they found that minimally

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counterintuitive concepts were more easily remembered than exotic concepts that did not violate ontological expectations, like leaves the size of tables. Moreover, they also found “that participants tended to transform the exotic items that they did remember into ones that were minimally counterintuitive” (McCauley, 2011, p. 168).

The research by Barrett and Nyhof (2001) provides support for Boyer’s theory that “counterintuitive concepts have transmission advantages that account for the commonness and ease of communicating many non-natural cultural concepts” (p. 91). Since counterintuitive concepts appear to be more easily transmitted than intuitive concepts, this helps to explain why such concepts are so prevalent across cultures and so readily spread” (Barrett & Nyhof, 2001, p. 91).

It is possible that minimally counterintuitive agents may violate ontological expectancies but not encourage cultural transmission. As Barrett (2004) explains, “imagine you heard about a rock that vanished every time someone looked at it. Though such a thing would be an MCI ... the vanishing rock would not likely become part of any religious system” (p. 25) because “the vanishing rock cannot begin to support inferences regarding morality in social interactions, why trouble befalls some people, how the rains come, why the crops succeed or fail, or what happens to the dead” (p. 28). Such an MCI lacks “what Pascal Boyer has called inferential potential, the ability to generate a broad range of ideas, inferences, explanations, and predictions about issues that matter to people” (Barrett, 2011, p. 106). Boyer (2001) demonstrates the importance of inference in the transmission of MCIs involving metamorphoses. First, metamorphoses are partial, not complete. In *The Voyage of the Dawn Treader* by C. S. Lewis, the character Eustace becomes a dragon, but not fully a dragon. He maintains his human identity, demonstrates helpfulness, and exhibits a desire to become human again. Had he been turned into a flying lizard who was fully lizard and not at all human, the story of Eustace would have ended. Eustace’s partial metamorphosis allowed C. S. Lewis to allegorize conversion by having the lion Aslan (the allegorical Jesus) remove Eustace’s dragon skin to reveal a (converted) human Eustace underneath. Boyer also notes that the ontological categories are closely connected. Changing from human to dragon maintains greater inferential potential than changing from a human to a rock. The ontological categories would be too far apart for successful inferential potential. “These two features – metamorphoses are not complete, and they often occur between close categories- are connected. They both preserve a source of inferences” (Boyer, 2001, p. 68).

To summarize so far, innate cognitive faculties for detecting agency and remembering events and agents that are minimally counterintuitive *and* have robust inferential potential promote the cultural transmission of religious ideas (Barrett, 2004). This explanation, easily applies to the heroic figures of folklore and myth. However, it stops short of providing a critical aspect of religious belief, namely the involvement of moral judgment. Boyer (2001) asserts that moral intuition is an innate cognitive faculty required for social interaction. Nonetheless, such moral intuition doesn’t become cloaked in religious absolutes to repress dissent. Barrett (2004) notes,

Contrary to what many believe, religions do not invent morality wholesale and insert gods as the final arbiters over right wrong. Rather, people the world over seem to have massively overlapping senses of what constitutes moral behavior. This regularity across cultures casts doubt on the alleged arbitrariness or relativity of morality (p. 47).

Minimally counterintuitive agents imbued with the ability to make moral judgments are rightly considered gods in a religious belief system, where “gods” are defined as “any minimally counterintuitive agents believed in by a community of people for which there are observable behavioral consequences of the belief” (Barrett, 2004, p. 126). The basis of such judgment is what Boyer (2001) calls *strategic information*, which is full access to all relevant knowledge about an event requiring moral judgment and corresponding action. Because gods have full access to all strategic information required to render judgment, such judgments are considered just punishment for wrongs done. There is no more salient example of such reasoning than in the Old Testament book of Job. Unimaginable calamity befalls Job. His three friends come to “comfort” him by striving to convince him that some moral lapse explains Job’s calamity, despite his vigorous protestations of righteousness. Eliphaz, one of his three counselors, begins with a gentle rebuke (Job 4-5) but resorts to hysterical accusations that Job deprived people of food, water, and clothing (Job 22), this being the only reasonable explanation for such severe judgment. Of course, only the reader is privy to the true explanation for Job’s trial (Job 1-2), which is not related to any immorality on Job’s part. Barrett’s explanation for why Job’s counselors might resort to such thinking involves cognitive faculties that look for causes of surprising misfortune and explain such misfortune based on the arbitration of a supernatural agent knowing about evil done and executing judgment on the basis of that knowledge (2004).

Boyer offers two important clarifications on the role of gods and moral arbitration. “First, our moral intuitions suggest to use, from the youngest age, that behaviors are right or wrong by themselves, not depending on who considers them, or from what point of view” (2001, p. 189). Hamlin, Wynn, and Bloom (2007) conducted several empirical studies that appear to support Boyer’s assertion of intuitive morality in preverbal infants. Hamlin, et al, (2007) showed both 6-month and 10-month old infants several scenarios involving interactions between simple geometric figures. During the first trial, the figures represented a climber, a helper, and a hinderer, all of which had eyes to resemble sentient beings. The climber attempted to ascend an inclined plane. After two unsuccessful attempts, the helper assisted the climber to successfully reach the summit, after which the climber jiggled to represent happiness. Alternatively, after the climber’s unsuccessful attempts to reach the summit, the hinderer pushed the climber down, causing the climber to tumble down to the bottom of the plane. These scenarios were repeated in alternate order with all participating infants. The infants were then asked to select a toy from among the geometric figures. Overwhelmingly, both the 6-month and 10-month olds selected the helper over the hinderer. The second trial involved removing the eyes from the climber and

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keeping it stationary, making it a simple ball. The helper and hinderer from the first trial then either moved the ball up the incline or down the incline respectively. The infants were again asked to select a toy from among the geometric figures. There was no significant difference in object choice in both groups. Hamlin, et al, (2007) reasoned that this ruled out perceptual preferences as an explanation for infants' preferences in the first trial since only non-significant differences were found in the second trial; had infants preferred the helper for perceptual reasons, the helper would have been the overwhelming choice in the second trial. During the third trial, the climber was given back its eyes, and the helper and hinderer were each paired with a neutral figure who neither helped nor hindered the climber, but simply traced the same path the climber followed. When asked to select preferred figures, both groups of infants significantly preferred the helper to the neutral figure, and significantly preferred the neutral figure to the hinderer. In summary, "infants were both drawn towards helpers and independently inclined to avoid hinderers, revealing both positive and negative evaluations" (Hamlin, Wynn, & Bloom, 2007, p. 558).

Boyer's second clarification involving gods is that "gods and spirits and ancestors are generally considered *interested parties* in moral choices and moral judgments, rather than providers of codes and rules" (2001, p. 189). As interested parties with strategic information about right and wrong and full access to the thoughts and behaviors of human beings, gods, ancestors and spirits have moral opinions about human thoughts and behaviors, which humans experience as intuitions. As Barrett noted earlier, these intuitions are widespread across time and cultures, suggesting them to be an innate part of human cognitive faculties. For Boyer (2001), moral intuition is an embedded part of the evolutionary process that enables humans to live successfully in community. Unable to access this aspect of our evolutionary development, humans attribute morality to supernatural agents as a means of explaining their existence.

Regardless of whether moral intuition is merely an adaptive function of evolution or the reflection of a real and transcendent lawgiver, gods with strategic information about morality "makes accounts of them even more likely to be remembered, pondered, and communicated to others" (Barrett, 2004, p. 49). Barrett offers three reasons why this might be the case. First, gods have the potential to be either powerful allies or enemies. Second, "superknowing gods demand more attention than some other counterintuitive beings ... because of their status" (Barrett, 2004, p. 50). Third, as referenced previously, gods are arbiters of moral behavior, punishing the evil-doers, rewarding the exceptionally good, and arbitrating among contestants in issues of morality. Such socially salient characteristics are more likely to be transmitted widely and integrally among the community of believers.

Religious beliefs are maintained through communal ritual behaviors and observances. Two areas of research explore rituals in the transmission and maintenance of religious belief: ritual form theory (Lawson and McCauley, 1990, cited in Barrett, 2011), and modes of religiosity (Whitehouse, 2004). Religious rituals may be understood as an observable action with an agent and a religious object that "changes the state of affairs by appeal to the power of god, who is

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usually represented in the ritual structure by a proxy such as a priest or sacred object" (Barrett, 2011, p. 205). According to ritual form theory, rituals take three forms: rituals involving special agents who act as channels through whom gods act, as with priests performing baptism; special instrument rituals, where instruments are the means by which gods act, such as the bread and wine in Christian communion, and special patient rituals, where either gods or their representatives are being acted upon, as when food or drink are left for the ancestral dead. McCauley and Lawson (2002) also differentiate between "one-off" rituals, which occur rarely and are accompanied by great sensory pageantry, and repeated rituals, which are performed frequently enough to become habitual and often become "the exercise of of a well-rehearsed skill like any other, such as riding a bicycle, using a telephone, typing on a keyboard, or reading a book" (McCauley, 2011, p. 201). These latter rituals correspond with special instrument or special patient rituals, while one-off rituals are typically special agent rituals. Special agent rituals are typically accompanied by stimuli that are designed to be cognitively and emotionally arousing, seizing participants' attention, increasing their sense of direct participation, and enhances retention in memory (McCauley, 2011).

Whitehouse (2004) identifies two modes of religiosity involving both memory and ritual: the doctrinal mode, and the imagistic mode. The doctrinal mode relies on ritual action that is "highly routinized, facilitating the storage of elaborate and conceptually complex religious teachings in semantic memory but also activating implicit memory in the performance of most ritual procedures" (Whitehouse, 2004, pp. 65-66). The stimulation of semantic memory to recall religious teaching also requires the presence of religious leaders who can repeat and elaborate on complex doctrines. Moreover, religious leaders must conform to some agreed upon orthodoxy that is reflected in both their teaching and in the rituals performed, such as the repeating of the Lord's Prayer or the Apostle's Creed. The need for orthodoxy also encourages the development of a center of authority and a professional guild, like imams, priests, or rabbis. This, in turn, facilitates the spread of the religion. Repeated rituals become relegated to implicit, or procedural memory, where the performance of such rituals may be done without reflection on their meaning. As such, they tend to reinforce religious knowledge stored in semantic memory.

The imagistic mode of religiosity (Whitehouse, 2004) contrasts with the doctrinal mode. Because they involve extremes in ritual practice, like violent initiation rites or ecstatic states of consciousness, Imagistic religious experiences are performed infrequently but are high in emotional arousal, intense enough to be encoded as "flashbulb memories." Because of their rarity and intensity, these experiences are subject to idiosyncratic interpretation, inhibiting the development of a common verbal narrative that can be easily transmitted, overseen by religious leaders, or superintended for orthodoxy. Also because of their rarity and intensity and despite the ability to agree on a uniform explanatory narrative, the intense experience builds strong group cohesion that necessarily excludes those who have not participated in the experience.

The theoretical and empirical research cited herein attempts to demonstrate a link between innate cognitive faculties that are highly sensitive to agency in the environment, particularly when such agency is perceived to violate one or more of the expectations associated with that agent's ontological category, and the belief in and transmission of knowledge about gods. These minimally counterintuitive agents are often assumed to possess strategic information both about what is moral and who is moral, and are equipped to act accordingly. Such information is readily remembered and transmitted to others, forming a community of like-minded believers. Religious rituals maintain a connection with gods through special agent rituals or reinforce knowledge about gods through special instrument and special patient rituals. Of the two modes of religiosity, the doctrinal mode is most likely to experience successful dispersion because of its semantic nature, uniformity of doctrine, and centrality of religious leadership.

To conclude, Barrett offers two cautionary notes to those who may be tempted to see this cognitive processes as evidence that religious belief is a vestigial cognitive artifact. First, Barrett notes, "just because our mind is naturally oriented to see the divine in some situations does not mean that a god is not really acting" (2011, p. 118). Moreover, Barrett asserts that,

A scientific explanation of how human cognitive systems form beliefs in gods only 'explains away' gods if you already believe they don't exist. For believers, such explanations just specify the means by which actual gods are perceived and understood (or misunderstood) (Barrett, 2011, p. 150).

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