

## The Science of Religious Beliefs

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## Abstract

Why have humans, throughout history and across cultures, shown a strong tendency to believe in the existence of superhuman intentional agents and attached this belief to notions of morality, misfortune, and the creation of the world? The answer emerging from the cognitive science of religion appears to be that explicit beliefs are informed and constrained by the natural and cross-culturally recurrent operation of implicit cognitive systems. Successful god concepts resonate with the expectations of these implicit systems but also have attention-demanding and inferentially-rich properties that allow their integration into various areas of human concern. Theological concepts may deviate from these natural cognitive moorings but require special cultural scaffolding, such as Whitehouse's two Modes of Religiosity, to do so and constitute additions to, rather than replacements of, the religious beliefs supported by implicit cognitive systems.



## The Science of Religious Beliefs

Over the past two decades, new insights from the cognitive science of religion have played a part in reviving interest in naturalistic attempts to explain the prevalence and recurrent forms of religious ideas and activities (e.g., Atran 2002, Boyer 2001, McCauley and Lawson, 2002, Pyysiäinen, 2004, Tremblin, 2005). A general theme emerging from these cognitive and evolutionary studies is the *Naturalness of Religion Thesis*: Religious thought and action are common across human history and cultures because of their relationship with particular naturally-occurring human cognitive systems. Religion springs naturally from the way ordinary human cognitive systems interact with ordinary human social and natural environments.

Though cognitive scientists of religion have had much to say about how natural cognitive systems inform and constrain the spread of religious *ideas* and *actions*, far less has been said about how a cognitive approach helps us understand religious *beliefs* or commitments.<sup>1</sup> People do not just talk about superhuman beings, they *believe* in their existence. People do not merely perform rituals, they also *believe* that the ritual should be performed for certain reasons and that it will have certain effects.

Here we summarize cognitive science of religion as the Naturalness of Religion Thesis bears on religious beliefs, what might be called the *Naturalness of Religious Beliefs Thesis*. Religious beliefs arise (at least in part) because they are natural outputs of human cognitive systems solving ordinary problems. We develop this Thesis by reviewing cognitive science of religion generally, but also by considering Robert McCauley's theoretical work concerning different types of 'naturalness' in cognitive systems, and by discussing recent research concerning the distinction between expert and common religious beliefs. Throughout our treatment, we take *belief* to mean *the state of a cognitive system holding information (not*

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<sup>1</sup> Notable exceptions are Boyer, 2001, Chapter 9, and Barrett, 2004, especially Chapters 1 and 2.



*necessarily in propositional or explicit form) as true in the generation of further thought and behavior.*<sup>2</sup>

Adopting a deflationary definition of beliefs as information that motivates actions (including speech acts) allows us to recognize that these sorts of beliefs underlie every religious action (including ritual, prayer, meditation, etc.) as well as the construction and proclamation of every religious doctrine. From this perspective, why people hold these sorts of religious beliefs (beliefs that motivate religious action), and why religious beliefs tend to take the forms that they do across time and place are central questions to the study of religion. But can *beliefs* on such a pedestrian level be scientifically studied? Our answer is yes.

Advances in the cognitive sciences over the past thirty years have provided new tools for explaining why some kinds of beliefs are more recurrent than others and why people are more receptive to some beliefs over others. Scholars working in the cognitive science of religion have begun sketching a scientifically informed account of religious beliefs. Below we summarize current scholarship from this area in support of the Naturalness of Religious Beliefs Thesis. We will outline the nature of maturationally natural cognitive systems and how those systems make certain types of religious beliefs (such as beliefs in supernatural agents and those agents' connections with morality, misfortune, and the creation of the natural world) so prevalent in human populations. We will also describe how societies can exploit certain features of human memory through ritual and instruction to pull beliefs away from the anchors provided by maturationally natural cognitive systems.

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<sup>2</sup> 'Belief' can be a problematic word for scholars of religion, as the ability of the term to designate a pan-human mental state has been questioned by such scholars as Evans-Pritchard (1956) and Rodney Needham (1973). They argue that the term 'belief' has built up numerous connotations during its history, such as conviction and devotion, and that numerous societies, such as the Nuer and the Penan, have no corresponding term or concept. Though 'belief' with all of its Western connotations might not be a useful construct for the study of religion, we argue that the notion of 'beliefs,' as used in the cognitive sciences, certainly is. Decades of work in the cognitive sciences, as well as the philosophy of mind, have led to the minimal definition of belief we employ here, which does not possess the connotations that many scholars reject but does manage to designate a universal functional mental state.



## Two Kinds of Belief

In discussing why it is that people have a tendency to believe in gods, we find it helpful (following Sperber, 1997) to distinguish between two types of beliefs: *reflective* and *non-reflective* or intuitive beliefs.

### Non-reflective

What we call ‘non-reflective’ beliefs maps closely onto what might be called ‘tacit knowledge.’ These non-reflective beliefs are the cognitive representations that we have whether or not we know we have them. They are non-reflective in that they do not require conscious, deliberate, reflective resources to form them. We may not be aware of our non-reflective beliefs even though they guide our information processing, speech, and other actions. Though unlikely to be represented as propositions, for the sake of clarity we will present examples as propositions.

Non-reflective beliefs include such ideas as ‘people have minds,’ ‘a definite article does not precede a proper name,’ ‘unsupported objects fall,’ ‘the sun moves relative to the earth,’ ‘frustrated desires produce negative emotions,’ and ‘raccoons are more biologically similar to opossums than to cows.’ Note that whether a belief is true or false is orthogonal to whether it is reflective or non-reflective.

### Reflective

In contrast, *reflective* beliefs are those beliefs we consciously hold; truths we explicitly endorse. These reflective beliefs more closely map on to common, casual uses of the term *belief* and typically are represented as propositions. The following are examples of reflective beliefs: ‘Dogs are better pets than cats.’ ‘The chair is brown.’ ‘Michael Johnson holds the world record in the 200 meter dash.’ ‘Bob is angry at Harvey because Luther told Tom about Bob’s secret.’ ‘Ilkka is seven feet tall.’

One’s reflective beliefs seem so idiosyncratic and dependent upon personal history, experiences, and cultural context, that they appear to defy any attempt at general explanation.



In the case of a given individual's reflective beliefs, this resistance to explanation may be true. Nevertheless, when considering why it is that people *generally tend* to hold the sorts of reflective beliefs that they do, including religious beliefs, the cognitive sciences provide us with some explanatory traction.

#### Reflective beliefs use non-reflective beliefs as defaults

Non-reflective beliefs anchor or constrain the range of likely reflective beliefs. The first way in which this constraint operates is by non-reflective beliefs serving as defaults for reflective beliefs. For instance, when confronted with a question such as, 'Do you believe raccoons are biologically more similar to cows or to opossums?' a person may have no explicit, reflective belief one way or the other, but must come to a decision. Unless relevant information from previous education in zoology and taxonomy comes to mind, the most likely reflective belief will be that consistent with relevant non-reflective beliefs. In this case, research demonstrates that people across cultures tend to non-reflectively use predictable heuristics for determining biological similarity in animals including general morphology and niche of the animals. In the absence of special, salient memory for zoological teaching on the matter, adults will generally say that the raccoon is more similar to the opossum. They form this (false) reflective belief because the relevant non-reflective belief is that raccoons are more similar to opossums. In the absence of salient, relevant, consciously accessible reasons not to do so, reflective beliefs simply read-off of non-reflective beliefs (Barrett, 2004, Chapter 1; Boyer, 2001, Chapter 9; Sperber, 1997).

#### Reflective beliefs gain plausibility through continuity with non-reflective beliefs

A second principal way in which non-reflective beliefs inform and constrain reflective beliefs is by lending credibility to reflective propositions. Contemporary research on beliefs and decision-making in various domains often points to the role of intuition or emotions (Chaiken and Trope, 1999; Gilovich, Griffin, and Kahneman, 2002; Wilson, 2002). Often, it seems when presented with a choice or decision, we have a gut-reaction that makes the decision and then we explicitly, reflectively generate reasons consonant with that gut-reaction. We report our reasons as why we believe what we do, but the intuitions or emotional reaction might actually prove more reliable predictors. Think of these intuitions or gut-feelings as products of



our non-reflective belief systems. Explicit propositions will be more likely to ‘feel right’ when they converge with implicitly held non-reflective beliefs. In fact, we would expect that the more different non-reflective belief systems that provide outputs consistent with a proposition, the more likely it is for that proposition to become a reflective belief.

Given that non-reflective beliefs anchor reflective beliefs in at least these two ways (serving as default assumptions and contributing to credibility of propositions), we now turn to the origins of these non-reflective beliefs. If non-reflective belief, in part, cause reflective beliefs, what causes non-reflective beliefs?

Where do non-reflective beliefs come from? Two paths

Non-reflective beliefs possess a certain fluency and automaticity that might be called cognitive naturalness. In a colloquial sense even, such beliefs feel very natural to us. Unlike forming and using such cumbersome and complex reflective beliefs such as string theory or the doctrine of the Trinity, non-reflective beliefs are easily and reflexively used. The cognitive naturalness of non-reflective beliefs can arise through two, non-exclusive, causal pathways. Here we adopt philosopher Robert McCauley’s distinction between practiced naturalness and maturational naturalness in cognitive systems and their outputs (McCauley, forthcoming).

Practiced naturalness captures the idea of acquiring mastery of certain concepts or skills through intensive training and practice. A chess master may acquire practiced naturalness regarding chess strategy and play. Given enough practice, automaticity and fluency results, so that knowledge of how various pieces move can become non-reflective beliefs. Similarly, an expert in Shakespearean literature might develop such well-rehearsed representations of various characters in Shakespeare’s plays that their motives, desires, and idiosyncrasies become non-reflective beliefs. More mundanely, growing up in a particular cultural setting can endow us with non-reflective beliefs about the proper way to order food at a restaurant, how to purchase food at a grocery store, how to drive a car, or how to behave during a worship service (e.g., when to stand, kneel, sit, etc.). These non-reflective beliefs become non-reflective through practiced naturalness.

This first causal route for the formation of non-reflective beliefs, then, includes what is generally meant by ‘enculturation.’ By virtue of repetitive exposure to certain ideas and practices, we internalize them to the point that they seem perfectly natural and we need no



longer consciously deliberate about them. Practiced naturalness, however, not only relies upon rehearsal, but also upon particular cultural scaffolding in the form of explicit instruction or special artefacts and spaces. To become a chess master, one needs to be taught the rules of chess and to have access to a chessboard and pieces. To gain practiced naturalness of reading music notation, one has to have access to sheet music and receive instruction about how to read it. This reliance on cultural scaffolding means that practiced naturalness, and the non-reflective beliefs associated with it, will be variable within and between cultural groups.

In contrast, *maturational naturalness* arises through the ordinary functioning of human biological endowment in ordinary human environments. Learning to speak your native language—and the non-reflective beliefs about that language—is maturationally natural. Any normal human in an ordinary linguistic environment will produce language fluency. No explicit instruction, artefacts, or culturally distinctive practices are required. Similarly, evidence exists that basic numeric skills (e.g.,  $1+1 = 2$ ,  $7 > 2$ ) arise through maturational naturalness. Again, no explicit instruction or other cultural scaffolding is needed to acquire the non-reflective beliefs undergirding basic numeracy.

As demonstrated most dramatically by developmental psychologists, humans do not come into the world with minds equally receptive to any and all ideas. Rather than minds as blank slates, minds have considerable bias built in either largely because of biological endowment, or as a predictable combination of biological endowment and typical exposure to the sort of world humans live in. This combination of factors produces *maturationally natural* cognitive systems.

Maturationally natural cognitive systems and the non-reflective beliefs they produce serve to inform and constrain the formation of practiced natural non-reflective beliefs. This informing/constraining function operates in two ways. First, maturationally natural systems limit what is easy to learn and achieve mastery of. For instance, our maturationally natural cognitive system for reasoning about physical objects and mechanical causation appears to be in place in the first half-year after birth. This system produces non-reflective belief such as ‘a physical object must contact another object in order to move it.’ Learning about mechanical systems (such as quantum mechanics) that ignore or violate a maturationally natural non-reflective belief will mean that such learning will require more rehearsal in order to reach naturalness and to produce non-reflective beliefs. To take an example closer to religious



studies, our maturationally natural cognitive systems presume that all beings exist in the same temporal system. Hence, the idea that God exists outside of time would not easily become a non-reflective belief with any degree of practiced naturalness. Reasoning about God's (non-)temporality will always be difficult because it violates deeply entrenched maturationally natural non-reflective beliefs.

A second way in which maturationally natural non-reflective beliefs inform and constrain the formation of practiced natural non-reflective beliefs is more indirect. Practiced naturalness typically requires explicit instruction or other cultural scaffolding. This explicit instruction, however, is less likely to be effectively developed for ideas that too greatly violate maturationally natural non-reflective beliefs. Returning to the example of God's non-temporality, the difficulty in clearly and consistently reasoning about God as a non-temporal being (that is, its relative cognitive unnaturalness) also means that explicitly communicating to another about God's non-temporality is difficult. But without this explicit instruction, others are less likely to gain practiced naturalness with regard to reasoning about God's non-temporality.

In two ways, then, maturationally natural non-reflective beliefs constrain the formation of practiced natural non-reflective beliefs. Additionally, non-reflective beliefs (of both the maturationally natural and practiced natural varieties) influence the range of reflective beliefs people are likely to hold. The relationship here is fairly straightforward. When forming a reflective belief, our default position is to simply 'read-off' our reflective beliefs from any relevant non-reflective beliefs. For instance, you may have never considered whether a raccoon is biologically more similar to an opossum than a cow. But if I ask you to create a reflective belief in this regard by saying, 'Do you think a raccoon is more biologically similar to an opossum or a cow?' you can still form a reflective belief. Unless you have salient reason to do otherwise, that reflective belief will be derived from your non-reflective beliefs regarding what features count toward biological similarity. Cross-cultural research has shown that these factors that we non-reflectively believe to be most important include general physical morphology, size, and environmental niche (Atran, 1990, 1995). We do not have to be taught these factors explicitly. They are maturationally natural non-reflective beliefs. Given the comparisons with the raccoon, our non-reflective beliefs tell us that a raccoon is more similar to an opossum. Unless we have salient reason to think otherwise, our reflective



belief just copies this non-reflective belief. You probably find yourself inclined to think that a raccoon is more biologically similar to an opossum than a cow. It takes specialized biological knowledge regarding the relative importance of reproductive organs that would lead one to reject the non-reflective belief and reflectively believe that a raccoon is more similar to a cow (because opossums are marsupials).

As applied to religious beliefs, if our non-reflective beliefs—particularly those that arise largely because of maturationally natural cognitive systems—encourage belief in superhuman agents or that a ritual should be performed in this way and not that way, then these are likely to become reflective beliefs as well. If maturationally natural cognitive systems bias humans to believe in gods, to believe that gods have beliefs and desires that direct their action, to believe gods' actions relate to human moral concerns, to believe that human identities are more than material bodies and may continue after death; then people generally would be biased to likewise reflectively believe such things. Below we review scholarship that suggests just these sorts of maturationally natural biases and others related to religious beliefs.

Which maturationally natural non-reflective beliefs inform and constrain religious beliefs? One way in which maturationally natural cognitive systems support certain types of religious concepts and beliefs is by making some concepts more memorable than others. Numerous religious concepts violate a small number of the expectations, inferences, and beliefs generated by maturationally natural cognitive systems (such as those dealing with physical objects, artifacts, living kinds, and persons) (Sperber, Premack, and Premack, 1995). The concept of a tree that has beliefs and desires, for instance, involves the transfer of an intuitive inference from one ontological domain (intuitive psychology) to another domain (living kinds) with which it is not normally associated. A stone statue that weeps tears of blood likewise involves the transfer of an inference pertaining to biological systems and applies it to an artifact. While violating too many maturationally natural expectations can make a concept extremely difficult to remember or process, violating a small number of such inferences and expectations has been shown to make concepts more memorable, as Pascal Boyer and Charles Ramble have documented that such 'minimally counterintuitive ideas' are more memorable for individuals in France, Gabon, and Nepal (2001).



The increased memorability of minimally counterintuitive ideas alone, however, cannot account for the widespread presence of religious concepts and beliefs, as numerous minimally counterintuitive ideas exist without becoming objects of belief or cultural elaboration. More factors are clearly involved. One such factor is the inferential potential of the concept (Boyer, 2001). An invisible tree and a person who has no beliefs or desires are minimally counterintuitive in relation to our maturationally natural cognitive systems. Yet, these concepts are not likely to become enduring ones in human minds or cultural traditions because few interesting or potentially relevant inferences can be generated from them. A tree that hears the thoughts of human beings, by contrast, is both a minimally counterintuitive and also an inferentially rich concept; upon learning of such a tree, one wonders what the tree knows about one's own thoughts and what the consequences of such knowledge might be. Such a concept invites individual and collective elaboration on the possible consequences of the existence of such a tree.

One of the most inferentially rich concepts for the human mind is the concept of an intentional agent, as the dispositions, intentional states, and capabilities of intentional agents are all immediately relevant for human concerns. Two related maturationally natural systems give rise to this inferential richness, the (Hyperactive) Agency Detection Device (HADD) and Theory of Mind (ToM).

Human beings, like most other animal species, are equipped with an agency detection device because other organisms are vital to our survival and reproduction. Both evolutionary logic and experimental evidence point to the device as being hypersensitive; that is, it routinely detects agency given thin or ambiguous evidence (Guthrie, 1993; Rochat, Morgan and Carpenter, 1997). In human beings, the range of stimuli which activate the HADD includes not only moving objects and sounds, but also events with no clear physical cause that seem goal-directed (such as a book falling from a shelf just after one dismisses the idea that the library is haunted) as well as physical traces of agency (such as writing, tracks, or crop circles).

After the HADD delivers the inference that an agent is or was present, human minds (and most likely only human minds) produce a wealth of inferences about the intentional states of the supposed agent through the maturationally natural cognitive system that most psychologists now call Theory of Mind (ToM) (Baron-Cohen, 1995). The supposed agent's



beliefs, desires, and intentions are all immediately relevant matters about which ToM produces inferences, as the intentional states of others have significant implications for human survival and reproduction.

Agent concepts, then, are particularly compelling and inferentially rich, as our HADD routinely produces intuitive beliefs in agency and our ToM produces numerous inferences about the intentional states of the supposed agent, making concepts of minimally counterintuitive (MCI) agents with an interest in human behavior very likely to be remembered and thought about by human beings. A concept of a minimally counterintuitive agent who has no interest in human behavior, who has no desires or intentions towards human beings, however, would not have the same inferential potential and relevance as one that does, making it less likely to become an enduring concept.

Obviously, being remembered and thought about make an idea more likely to be reflectively believed than those that are not remembered and thought about. However, being remembered and thought about do not *necessarily* result in an idea being reflectively believed. An additional relevant feature of many minimally counterintuitive agent concepts that does make them more likely to be believed is that they cannot be easily disconfirmed as explanations for events. Human beings have numerous ‘HADD experiences’—experiences of quickly detecting agency in the environment when additional evidence might lead one to conclude that no agency was actually present. In many cases, a non-agentive explanation for the movement, sound, trace, or event is discovered shortly afterwards and the agentive explanation is disregarded. But in the numerous cases where no such obvious alternative explanation is discovered, the agentive explanation produced by our HADD is still compelling. Intuitively believing in the presence of an unidentified agent produces a large amount of quick reasoning, as possible candidates for the agent and their various intentional states are immediately reviewed. While we can quickly rule out most candidate agents because of obvious circumstances, such as not being able to see them, many minimally counterintuitive agents, because of their various counterintuitive properties, cannot be disconfirmed as explanations, thereby protecting their plausibility.

We are not arguing that HADD experiences are directly responsible for belief in supernatural agents. We are arguing that HADD experiences, belief in minimally counterintuitive agents and discourse about such agents, are mutually reinforcing. HADD



experiences can help encourage, reinforce, and spread belief in minimally counterintuitive agents. For example, having a HADD experience with no obvious natural explanation in a location that one has just been told is the site of frequent divine appearances will make belief in those appearances more plausible. Similarly, exposure to discourse about minimally counterintuitive agents or having a reflective belief in them can increase HADD experiences, as hearing about such ghosts or gods increases the HADD's vigilance.

Once a human mind is exposed to concepts of minimally counterintuitive agents, those concepts are likely to be remembered and thought about and also likely to both encourage and explain HADD experiences. This memorability, inferential potential, and use in explanations of events all result from the properties of our maturationally natural cognitive systems.

People do not just believe in the existence of MCI-agents but also commonly believe that these agents are actively involved with both moral concerns and with fortunate and unfortunate events. These involvements are also supported by maturationally natural cognitive systems including intuitive morality, various social cognitive mechanisms, and HADD.

A body of evidence has accumulated over the past few decades indicating that human beings possess a maturationally natural morality. That is, evidence supports both the claim that a significant portion of human morality is a matter of nonreflective intuition rather than reflective moral reasoning (Haidt, 2001) and the claim that such intuitions reveal themselves on a predictable developmental schedule. The latter is most famously demonstrated through children's intuitive differentiation between moral rules and mere social conventions across cultures (Turiel, 1998). While the exact catalogue of immoral actions is still a matter of investigation and debate, intragroup murder, adultery, theft, deception and cowardice are strong candidates, as people tend to view rules involving such actions as immutable, even for those in power (Katz, 2000).

Intuitive morality is relevant to the connection between MCI agent concepts and misfortune through the operations of a variety of maturationally natural social cognitive mechanisms. ToM, as mentioned above, is but one among many social cognitive mechanisms that evolutionary psychologists and biologists attribute to human beings. Many of these mechanisms bear directly on moral concerns, as they involve an evaluation and judgment of the actions of others as well as a desire for and expectation of actions resulting in proper rewards and punishments. Leda Cosmides and John Tooby (1992, 2005), for instance, have



proposed and defended the existence of a universal cheater-detection device,<sup>3</sup> while Daniel Fessler and Kevin Haley (2003) have examined many universal emotions such as gratitude and anger as evolved cognitive mechanisms designed for the purposes of encouraging fitness-enhancing responses to various situations in the processes of social exchange. Gratitude is triggered by receiving a benefit from another, thereby encouraging reciprocity; and anger is triggered by actual or potential exploitation or harm, thereby encouraging retribution and punishment.

The interaction between intuitive morality and intuitive social cognition produces intuitions about justice, rewards, and punishments, as breaches of intuitive morality constitute cheating (attempting to both act selfishly as well as maintain the benefits of group membership) and therefore trigger an intuitive sense of injustice, anger, and the desire for and expectation of retribution. We expect, then, for kindness to be repaid with kindness and treachery to conjure punishment when peers interact and can easily and intuitively understand the actions of others as being motivated by the desire to reward or punish.

In many situations, however, there is no obvious observer of acts of kindness or treachery. MCI-agents become potentially relevant in such situations because their counterintuitive properties (such as invisibility and/or the ability to know human thoughts) allow them to witness such kindness or treachery and their numerous intuitive properties (such as being an agent with humanlike social dispositions) encourage them to desire the proper rewarding or punishing of the actor.

Because of this connection between MCI-agents and morality, beliefs about MCI-agents causing fortune and misfortune become intuitively plausible. While human beings may not have a general urge to explain everything in the world around them, they do seek explanations for events with significant consequences for their own survival and fitness. Having an explanation of misfortunes such as catastrophic illnesses, famines, and accidents would allow for the averting of such events in the future. Yet, the complexity of the world is, in many

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<sup>3</sup> While the existence of an evolved cheater-detection module is disputed (Sperber, Cara, and Girotto, 1995), it remains the case that human beings, as a result of our maturationally natural cognitive mechanisms, are much more skilled at cheater detection than many other types of detection.



cases, more than our intellects can handle. Given the bias toward agentive explanations of events provided by HADD and the abilities of MCI agents to both know about and punish misdeeds, those MCI-agents become compelling candidates as the initiators of misfortune, especially if such a misdeed is suspected. For example, Evans-Pritchard has reported that amongst the Azande, known foremost for their attributing misfortune to witchcraft rather than moral misdeeds, witchcraft is only embraced as an explanation of misfortune after it has been established that no moral rule has been violated (Evans-Pritchard, 1937, p. 64).

Explaining misfortune as the actions of MCI agents, a process supported by maturationally natural cognitive systems, also serves as an additional reinforcement of belief in such MCI agents. Each time we accept an explanation of misfortune as punishment by an MCI agent, we create a memory affirming the existence of this MCI agent and such memories become a part of our nonreflective cognitive resources such that, when reflectively considering whether or not we believe in the existence of MCI agents, we are more likely to have a reflective belief in their existence.

Note that our argument does not require all MCI agents to have a direct explicit connection with morality; that is, examples of MCI agents that are explicitly seen as non-moral (such as the Greek gods or Japanese kami) do not constitute disconfirming examples. Our argument is not that our maturationally natural cognitive systems force us to create and believe in concepts with certain properties but that they make certain types of concepts more memorable, compelling, and therefore widespread. We would predict, then, that given our maturationally natural cognitive systems, supernatural agents will commonly be regarded as involved with moral concerns and misfortune.

In addition to supporting beliefs in the existence of MCI agents and their connections to morality and misfortune, our maturationally natural cognitive systems also support beliefs in the divine design and creation of the natural world. While psychologist Jean Piaget argued that children under seven years of age believe the natural world to be the creation of human beings (Piaget, 1929), a body of more recent evidence suggests that they tend to favor the idea of divine creation. British psychologist Olivera Petrovich, for example, has presented evidence that children as young as four years of age differentiate artificial and natural objects and prefer the explanation that God, rather than human beings, created those natural objects (Petrovich, 1997, 1999). Whether Petrovich's results are the product of intuitive cognitive mechanisms or



explicit instruction in creationist discourse is a matter of debate, yet the available evidence points to the former, as E. Margaret Evans has documented that even children explicitly taught evolutionary explanations by parents and teachers still favor creationist explanations when accounting for species (Evans, 2001).

Similarly, Deborah Kelemen has found that children understand both living and non-living things as purposeful in the sense that they possess features designed to help themselves or others in some purpose (Kelemen, 1999a, 1999b, 1999c). Pointy rocks, for instance, are not thought to be pointy because natural processes happened to make them pointy, but because this keeps them from being sat upon (Kelemen, 1999d). The large number of studies suggesting that young children possess a bias to view the natural world as the creation of some superhuman agent has even made Kelemen and others view children as ‘intuitive theists’ for whom religious instruction merely confirms what they already believe (Kelemen, 2004).

The above lines of enquiry support the common contention by cognitive scientists of religion that ordinary, naturally-developing human cognitive systems anchor the range of possible religious belief and expression. Though specifying exactly which are the relevant anchors for religious beliefs is on-going, some scholars also seek to account for why the cognitive anchor-points are where they seem to be, particularly by appealing to the deliverances of evolutionary psychology (e.g., Atran, 2002, Bering, 2006, Boyer, 2001). Another concern in the cognitive science of religion focuses on the factors that help religious thought and action deviate from these anchor-points. Belief systems do develop that feature concepts that stretch natural cognition—precisely the point of McCauley’s observation that some ways of thinking and acting can acquire practiced naturalness given sufficient cultural scaffolding.

### Cultural Scaffolding, Popular Religion, and Theological Incorrectness

Harvey Whitehouse’s *Modes of Religiosity* theory is the most developed account of factors that stretch the tethers of cultural expression away from their maturationally-natural cognitive anchors (Whitehouse, 1995, 2000, 2004). Whitehouse tries to capture how cognitive dynamics in different types of collective religious events prompt the clustering into two distinct Modes



of Religiosity of a number of social and political features, and in turn, how particular social and political arrangements can scaffold beliefs that deviate from maturationally-natural anchors.

In the *Imagistic Mode*, the transmission of central theological insights is through rarely-performed but highly emotional events such as brutal initiation rites or rites of terror (Whitehouse, 1996). These events spawn emotion-laden episodic memories of events and co-participants, generate individual exegetical rumination, and to spur feelings of relational connectedness with co-participants. Because of these psychological dynamics, religious systems in this mode will tend to have relatively local, egalitarian political structures, be light on orthodoxy controls, and slow at expanding membership. Whitehouse argues that such high-arousal events also motivate analogical thinking, which encourage the discovery of and belief in connections between ideas and images—sometimes non-intuitive ones—that otherwise might not be readily transmitted.

In contrast, the *Doctrinal Mode* revolves around frequently performed, relatively low-arousal theological transmission events (e.g., modern Protestant Christianity). Such events are cognitively suitable for transmission of complex theological ideas that markedly deviate from maturationally-natural anchors, without establishing any particular emotional connection with co-participants, through their engagement of semantic memory. Religions of the Doctrinal Mode tend to involve relatively hierarchical political structures for enforcing doctrinal orthodoxy, and have the potential for large imagined communities of fellow participants and for rapid expansion. Whitehouse argues that doctrinal traditions successfully spread maturationally *unnatural* ideas because of their high levels of repetition and their hierarchical structures for policing orthodoxy.

The modes of religiosity Whitehouse describes help account for the fact that numerous religious traditions around the world have as part of their conceptual repertoires representations that diverge from those supported by our maturationally natural cognitive systems. Through many of the processes of the doctrinal mode, for instance, Christian theologians can sustain explicit beliefs such as Paul Tillich's notion that God is the 'ground of all being' rather than an anthropomorphic being.

Yet, the success of the doctrinal mode is only partial, as though it is the case that maturationally unnatural beliefs can be sustained and spread through repetition of rituals and



teachings, innumerable members of these traditions will not, for whatever reasons, participate in an adequate amount of training for these ideas to take hold. In addition, the maturationally unnatural beliefs may come to exist alongside of, rather than replace, maturationally natural beliefs, meaning that even for individuals with training in a religious tradition maturationally natural beliefs may still guide their reasoning and behavior (Barrett, 1999; Slone, 2004).

We argue, then, that the power of maturationally-natural biases is responsible for a significant amount of the variance in religious beliefs described in the literature on ‘popular religion.’ Previous attempts to isolate and explain key features of this variance, such as poverty and oppression (Levine, 1986), transformative vs. thaumaturgical goals (Sharot, 2001), transcendental vs. pragmatic complexes (Mandelbaum, 1966), and official vs. folk religious ideas (Yoder, 1974) all result in problematic counter-examples (Berlinerblau, 2001; Primiano, 1995). One important cause of this variance is the match between religious beliefs and our maturationally-natural biases. Many religious leaders and traditions have developed bodies of valued but cognitively costly teachings. For those numerous individuals who, for whatever social, economic, or cultural reason, do not receive sufficient training in such teachings, their religious beliefs will tend to conform more closely to the parameters of maturationally-natural cognition.<sup>4</sup>

For example, Emma Cohen (2007) has documented in her ethnographic study of Afro-Brazilian religionists a difference between the accounts of spirit possession offered by the group’s leader and the laity. Cohen observes that the leader of the spirit possession cult-house exclusively endorses a ‘fusion’ model of spirit possession, which holds that spirit possession involves the fusion of an occupying spirit with the host’s spirit to form a new individual.

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<sup>4</sup> Boyer (2001) has labeled this type of resistance to instruction the ‘tragedy of the theologian,’ but the resistance extends well beyond religious representations, as maturationally natural cognitive mechanisms deliver intuitions about the nature and behavior of physical objects that are quite different from the teachings of contemporary physicists. A large part of the difficulty of learning and believing the theories of contemporary physics is that they contradict our basic intuitions about the physical universe. Similarly, a large part of the difficulty in learning and believing Paul Tillich’s concept of God as the ‘ground of being’ is that it contradicts basic intuitions about agents and space-time.



While all initiated members are familiar with this account, they are not formally trained in this concept and its implications. As a result, cult house members fall back on maturationally natural cognition to guide their reasoning on what happens during spirit possession, consistently endorsing a ‘displacement’ model, which holds that spirit possession consists in the displacement of the conscious will and agency of the host with the occupying spirit. Cohen argues that maturationally natural cognitive mechanisms such as Theory of Mind lead to the intuitive belief that only one mind can control a body at any given moment and that the gravitation toward the displacement model even in the face of contrary teachings is due to the displacement model’s better fit with this maturationally-natural belief (Cohen, 2007; Cohen and Barrett, in press a, b).

Besides helping account for the variance in the explicit beliefs between religious elites and laity, maturationally natural cognitive mechanisms can also help account for the discrepancies between individuals’ explicit religious beliefs and the implicit religious beliefs those same individuals use to reason in everyday contexts. Such discrepancies have been documented in both the field and the lab and reinforce the need for the distinction between reflective and non-reflective beliefs.

For instance, Jason Slone (2004) describes several historical and contemporary cases of discrepancies between theological orthodoxy, allegedly affirmed by community members, and the more maturationally natural non-reflective beliefs that guide day-to-day behavior. He provides evidence that while many Theravada Buddhists explicitly insist that the Buddha was only a man, they act and reason as if the Buddha is a god. Construing the Buddha as divine receives maturationally natural support because of its great inferential potential. Slone also describes how early Puritan Calvinists explicitly denied human free will concerning matters of salvation but acted and reasoned informally as if people could freely choose to accept or reject the Christian faith. A denial of human free will in the case of decisions to accept or reject Christ is wholly counterintuitive, as our maturationally natural cognitive systems concerning intentional agents (such as ToM) naturally presume that agents’ actions are determined by their own internal mental states such as beliefs and desires. To suggest that in some matters of belief these mental states have no causal efficacy is incomprehensible to this system. These cases highlight the anchoring effect of maturationally natural cognitive systems and how they can produce a gulf between individuals’ reflective beliefs and the non-reflective beliefs that



they still employ in reasoning in everyday contexts. Slone refers to this gulf as ‘theological incorrectness’.

In addition, Barrett and colleagues (Barrett, 1998, 1999; Barrett and Keil, 1996; Barrett and VanOrman, 1996) have experimentally demonstrated that stated beliefs about God’s attributes in reflective contexts do not always match implicit beliefs in on-line tasks such as comprehending a narrative. In these studies conducted with Hindus in India and adult Jewish, Christian, and non-believers in the United States, experimenters asked participants to *use* their concept of God (or Shiva, Vishnu, or Krishna) while listening to and answering questions about several stories constructed for the study that included God. Even though control conditions demonstrated that readers did not have to understand God’s activity anthropomorphically in the stories (Barrett and Keil, 1996, Study 2), participants generally did use an anthropomorphic concept of God—even when it contradicted their own stated theological beliefs in a questionnaire task. For example, when explicitly stating that God could attend to many different things at the same time, they understood a story as saying that God attended to one prayer and *then* another prayer even though the text entailed no such sequential ordering. Participants who claimed God can hear everything at one time nevertheless remembered a story as saying that God was unable to hear a bird singing over the sound of jet engines. The story, in fact, said no such thing. (For instance, in a control study in which a space alien with the ability to hear everything at once was substituted for God in the story, readers did not make this mistake.)

Maturationally natural cognitive mechanisms are, thus, constantly at work in religious beliefs. Intuitive ontologies, HADD, and ToM provide anchors for religious beliefs by making minimally counter-intuitive agents more likely to thrive in human populations. And while the social and cognitive dynamics of the imagistic and doctrinal modes of religiosity allow religions to stretch the tethers away from these anchors, the stretching only goes so far. The explicit beliefs these dynamics engender never completely replace the maturationally natural ones, either in whole populations or even within an individual person, as many individuals will not be sufficiently trained in these more cognitively costly beliefs and even those individuals that are will continue to utilize more maturationally natural beliefs in much of their quick, intuitive reasoning.



### Conclusion: Cognitive Science and Religious Belief

To summarize the analysis above, permit us to sketch an answer to Barrett's (2004) titular question, 'Why would anyone believe in God?' (or more precisely, why have humans, throughout history and across cultures, shown a strong tendency to believe in the existence of superhuman intentional agents and attached this belief to notions of morality, misfortune, and the creation of the world)?<sup>5</sup> The answer emerging from the cognitive science of religion appears to be that beliefs generally form through the operation of implicit, maturationally-natural cognitive systems feeding their outputs to reflective cognitive systems. Propositions consonant with the output of maturationally-natural cognitive systems tend to seem plausible on a reflective level and become believed. By virtue of being only minimally or modestly counterintuitive, god concepts are easily remembered and transmitted and retain general plausibility. Additionally, their special properties make them striking, attention-demanding, and easily integrated into the reasoning of other cognitive systems. By virtue of being agents, gods have tremendous inferential potential. They may be used to explain many phenomena. This ability for gods to non-reflectively make sense of events in the world encourages belief in them. By virtue of being agents with special knowledge and power, gods may be used to reason about great fortune and misfortune, and be connected with human moral failings or triumphs as causes of otherwise inexplicable fortune or misfortune. Consequently, gods

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<sup>5</sup> Perhaps worth noting, because of the attention these findings have been receiving in controversial trade books and in the popular media (e.g., Bloom, 2005; Dawkins, 2006; Dennett, 2006), is how the scientific explanation of religious belief bears upon the justification of such beliefs. No scientific enterprise, including the cognitive science of religion, can show that no supernatural agents exist and therefore that beliefs in their existence are false. The aim of the cognitive science of religious belief is more modest in its scope than trying to scientifically weigh in on metaphysical commitments. The cognitive science of religious belief simply tries to account for how naturally-occurring features of human mind-brains interact with features of human environments to make it probable that people come to believe in gods.



become connected with yet more cognitive systems that may produce god-consistent non-reflective beliefs. The notion that the natural world exhibits intentional design and purpose appears to be an early-developing natural propensity in human minds. Hence, concepts of creator gods or gods that direct the natural world may appear particularly intuitively plausible. Taken as a whole, the way our minds work in historically prevalent natural and social environments encourage us to believe in gods generally.

In addition to providing a compelling answer to the question of why human beings across time and space believe in the existence of MCI-agents and routinely connect these agents to morality, misfortune, and creation, the cognitive science of religion also offers insights into the causal mechanisms behind one important dimension of the diversity in religious beliefs. Explicit beliefs diverging from maturational cognition can be sustained through the social and cognitive dynamics of the imagistic and doctrinal modes of religiosity. The imagistic mode utilizes infrequent, high-arousal rituals to engage episodic memory and encourage personal rumination on religious symbols and imagery. The doctrinal mode utilizes frequent, low-arousal rituals and instruction to engage semantic memory and encourage the retention of doctrine. If individuals do not participate in the dynamics of either mode of religiosity to a sufficient extent, for whatever reason, their explicit religious beliefs are much more likely to adhere more closely to the anchors of maturationally natural cognition. Individuals who do participate in the dynamics of a mode of religiosity to the extent that they explicitly believe in more cognitively costly, maturationally unnatural religious concepts will in many cases still employ maturationally natural versions of those concepts in everyday contexts and in quick, intuitive reasoning.

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