Religious Cognition

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In the early years of the 20th century, William James delivered the lectures that would turn into his classic *The Varieties of Religious Experience: A Study in Human Nature*. Within, James argued that the sciences had largely overlooked religion as a topic of legitimate study, despite that fact that religion has played a major role in many, if not most, human lives throughout history. Throughout the remainder of the century, interest in the psychological factors that contribute to peoples' religious beliefs waxed and waned. However, the past decade or so has brought consistently renewed interest in questions related to the *cognitive* factors that enable and constrain religious beliefs, as well as the ways that peoples' religious beliefs in turn affect cognitive processes.

This chapter's central argument is that religious cognition does not represent a "special" category of cognition, though it may represent a specific configuration of (common) cognitions and beliefs . Instead, religious cognitions emerge largely through the workings of cognitive mechanisms devoted to other specific purposes. And specifically, many different aspects of religious cognition can be productively viewed and studied from within a conceptual framework highlighting the interaction between the social cognitive mechanisms that enable humans to perceive, represent, and reason about minds in the world and the potentially related social cognitive mechanisms that enable cultural learning. The interplay between social cognitive mechanisms for mind perception and cultural learning offers insights into diverse domains of religious cognition, including belief in supernatural agents, mind-body dualism, afterlife beliefs, and beliefs about the origins of species. In addition, an integrative perspective incorporating both cognition and culture can help explain large-scale patterns in the epidemiology and ontogenesis of *both* religious belief and religious disbelief.

Is Religious Cognition Special?

Humans possess a variety of different cognitive mechanisms devoted to performing a variety of specific tasks (e.g., Wellman & Gelman, 1992). Is religious cognition itself a core cognitive domain in which children reliably develop similar intuitive expectations across cultural contexts, or is religious cognition instead a product of the workings of other cognitive capacities?

Most of the people who have ever lived—including most of the people alive today—have adopted various religious beliefs, and in many ways these beliefs appear to be constrained in specific ways. While the recurrence of similar themes—such as more-or-less anthropomorphic supernatural agents—across different religions might indicate the workings of specific mechanisms devoted to religious cognition, there is an emerging consensus that, rather than being its own core domain, religious cognition instead emerges as a byproduct of the workings of other cognitive faculties (e.g., Atran & Norenzayan, 2004; Barrett, 2000; Boyer, 2003).

We do not have cognitive mechanisms *for* religious cognition, but rather religious cognition tends to be a good fit for the types of minds that humans have. Successful religious beliefs and practices are able to mesh well with humans' existing cognitive architecture, even though this cognitive architecture is not specifically devoted to religious cognition. In this view, a central goal in studying religious cognition is exploring which specific cognitive faculties are especially likely to enable and interact with religious concepts. This perspective helps researchers to draw upon existing cognitive literatures in order to "carve nature at the joints," and form productive hypotheses about the phenomena they study.

What Needs Explaining?

Religious cognition includes a rather disparate group of separate types of beliefs that people hold about the world. This section highlights some questions that a comprehensive model

of religious cognition should consider, and subsequent sections will evaluate the explanatory power a mind perception framework offers for conceptually uniting these seemingly disparate phenomena. Of central importance to most (arguably *all*) religions, supernatural agent beliefs are an ideal point in which to begin exploring religious cognitions. Throughout history, most people have believed in the existence of at least one supernatural agent. To a researcher from another planet, this might provoke some genuinely puzzling inquiries. Why have the vast majority of people who have ever lived endorsed the existence of empirically unverifiable supernatural agents? Why do the endorsed supernatural agents of disparate peoples tend to be fairly similar in some ways, and incredibly different in others? What cognitive processes enable and constrain beliefs about supernatural agents?

Of course, not all religious concepts center on beliefs about gods. Many religions also include beliefs about the origins of the world and its inhabitants, or about purpose and apparent order in the world, or about mysterious existential quandaries such as what happens when people die. Do these types of religious concepts depend on the same types of cognitive processes as do supernatural agent beliefs?

Finally, although most of earth's human inhabitants have adopted religious beliefs of one sort or another, there are currently more than half of a billion people who do not adopt belief in gods (e.g., Zuckerman, 2007). What brings most people to belief, but a sizeable minority to disbelief?

On the surface, these appear to be a diverse set of questions about relatively unrelated phenomena. However, at their core, most of these questions are social in nature, focusing in some way on peoples' supposed interactions with other intentional social agents, be they human or supernatural. In addition, questions about apparent purpose and design in nature again center

on the theme of intentionality. Finally, I will argue that much of the answer to why some people are not believers again comes down to social cognitive factors influencing either people's abilities to mentally represent intentional supernatural agents, or to the end result of the workings of social cognitive processes devoted to cultural learning.

Religious Cognitions as Inherently Social Phenomena

To illustrate how various forms of religious cognition are inherently social in nature, consider three distinct types of cognitions: afterlife beliefs, beliefs about the origins and apparent functions of living things, and supernatural agent beliefs. Of course, these three types of cognitions are not exclusively religious. For example, people may believe in a variety of supernatural agents not explicitly endorsed by their culture's dominant religion (e.g., ghosts or garden fairies). Nevertheless, all three of these types of beliefs are central to religions around the world. And all three fundamentally depend on social cognitive processes.

Many (if not most religions) include various afterlife beliefs (e.g., Bering, 2006). Not all faiths include afterlives in which people are allocated to either a good place or a bad place in reward (or punishment) for deeds committed while alive. But most faiths do include notions of what lies beyond the present life. But why should afterlife beliefs be viewed as social phenomena? Ultimately, belief in an afterlife depends upon a form of mind-body dualism. People tend to view themselves as composed of two distinct, yet interacting, elements: a physical body, and a more ethereal mind or self (e.g., Boyer, 2001; Bloom, 2004). A body is what we are made of, but a mind is who we *are*. Bloom (2004) has argued that this type of folk dualism results from the distinct ways in which our minds perceive the world. According to this argument, we have distinct cognitive mechanisms for representing physical stuff in the world and for representing the social world, and the minds on which social interactions depend. Because

separate cognitive mechanisms track physical objects and perceive the contents of other minds, it is easy to represent the two as fundamentally distinct elements of people. People are innate folk dualists because we use different cognitive mechanisms to track physical and social relations. And, although we might be able to see a body and represent that part of a person as dead, it may be harder to represent the (easily dissociable) mental aspects of a person as entirely absent from the world (e.g., Bering, 2006). So, without cognitive mechanisms that enable us to easily track the social world around us, dualism might not be intuitively compelling. And without dualism, afterlife beliefs make little sense. As with supernatural agent beliefs, afterlife beliefs depend directly on social cognition.

Many religions also deal with questions of teleology. Is there an underlying purpose or design to the world? Where did efficiently operating, apparently well-designed things like plants and animals come from? Even as children, people make teleological judgments about the natural world: clouds don't merely emit rain...clouds *are for* raining (e.g., Kelemen, 2004). Teleological thinking—ascribing functionality and purpose to the world—appears to be an intuitive default stance. For example, teleological thinking increases among people whose executive functions are disrupted, either by experimental manipulations (Kelemen & Rosset, 2009) or by Alzheimer's disease (Lambrozo, Kelemen, & Zaitchik, 2007). If people intuitive find it plausible to view the world as having purpose and function, it is a small step to believing in an intentional basis to this purpose and function. Indeed, there is evidence that children quite readily ascribe intentional causes (e.g., supernatural creators) as the ultimate origins of animal species (Evans, 2000; 2001). As with afterlife beliefs, social cognitive processes appear to be the bedrock upon which (oftentimes) religious cognitions regarding teleology and the origins of species lie.

Across religions, supernatural agents play a prominent role. The supernatural agents in which people believe vary greatly across contexts, from the ancestor spirits common among many small-scale societies to the powerful morally-concerned gods of most world religions. Yet despite these differences, the gods of most religions tend to be described and represented as intentional social agents with whom believers can interact. Indeed, a central point of many religions is that people can interact with their gods in order to assuage existential anxieties (e.g., Atran & Norenzayan, 2004). As intentional agents, the gods of most religions tend to be described in social, mentalistic terms. God can experience *anger* when his dictates are not adhered to. The Norse trickster god Loki *schemes* to interrupt the *goals* and *wishes* of Odin. Zeus becomes *upset* when his wife Hera *intends* to act in opposition to his *plans*. Some gods might be explicitly described as an abstract force, but implicitly, people tend to represent their gods as anthropomorphic social agents (e.g., Barrett & Keil, 1996). As I will argue in more detail in subsequent sections, the common anthropomorphic social aspects of supernatural agent beliefs around the globe may result from these beliefs emerging as byproducts of humans' basically similar social cognitive mechanisms that evolved for dealing with other human social agents.

In sum, many types of cognitions fundamental to religions—including afterlife beliefs, beliefs about function and purpose in the world, and supernatural agent beliefs—variously depend on basic social cognitive processes. In the next section, I will explore supernatural agent beliefs in more detail, to highlight how certain religious cognitions can be viewed as extensions of everyday social cognition.

Mind Perception, God Perception

Supernatural agent beliefs are not exclusive to religions, but they are endemic to them. Believers typically describe (Guthrie, 1993) or implicitly represent (Barrett & Keil, 1996) their

gods as anthropomorphic intentional agents with whom humans can meaningfully interact. Given that peoples' gods are seen as social agents, it is perhaps unsurprising that there are certain commonalities between ordinary social cognition and supernatural agent beliefs. However, a much stronger claim may also be made: that supernatural agent beliefs actually are directly derived byproducts from ordinary social cognition. Specifically, the cognitive capacity to represent and reason about other (human) minds in the world—variously termed mentalizing, mind perception, or theory of mind—is the specific cognitive faculty that both enables and constrains supernatural agent beliefs. This view makes a number of specific claims about supernatural agent beliefs that can be evaluated against currently available evidence. If supernatural agent beliefs are byproducts of everyday social cognitive processes in general, and mind perception abilities in particular, then it follows that:

I. Neurologically, the same brain regions known to underpin mind perception and social cognition should also be recruited when people are thinking about supernatural agents.

II. Developmentally, children's abilities to reason about supernatural agents should closely track developmental changes in children's mind perception abilities.

III. The same cognitive biases known to constrain mind perception in adults should constrain supernatural agent beliefs.

IV. The same social contexts that lead people to seek out social connection with other minds should also lead people to seek out gods.

V. The same types of responses triggered when people perceive other minds should also be triggered when people are thinking about supernatural agents.

What is Mind Perception?

Before exploring in detail the connections between mind perception and peoples' representations of supernatural agents, it is worth briefly discussing and defining mind perception. Just as people need to be able to form spatial representations of objects in order to navigate the physical landscape, individuals must be able to form representations of other people's minds in order to navigate the social landscape. The ability to perceive other minds allows people to gauge the intentions of others (e.g., "Is this big fellow smiling because he is about to hug me, or smiling because he is about to rob me?"), the knowledge-states of others (e.g., "Is she a good source of information about where I should go to eat tonight?"), and to ease communication in ambiguous circumstances (e.g., "Was that a joke, or a serious business proposal?"). This is a challenging endeavor, of course, because people cannot directly witness the contents of others' minds, but must instead infer their contents based on indirect cues. Oftentimes, these inferences must be made with partial and inconsistent information. Nevertheless, most of us are able to easily survive the pitfalls of social life (well, most of the time, we do well enough).

Without providing a comprehensive summary of mind perception (which can be obtained instead in Epley & Waytz, 2010), there are several relevant and basic features. First, although there is vigorous debate about the exact timing of various developmental milestones, children's abilities to mentally represent other minds and their contents—termed theory of mind (Premack & Woodruff, 1978) or mentalizing (Frith & Frith, 2003)—follows a regular developmental trajectory during the first several years of most children's lives. By about the end of the second year of life, children are able to explain the behavior of others in mentalistic terms and know that people get upset when their desires are thwarted (e.g., Bartsch & Wellman, 1995). While this type of reasoning demonstrates holding a representation of another person's mental

states (e.g., "I *know* what Mina *wants*"), a more complicated feat involves mentally representing cases in which another's mental states differ from one's own (e.g., Dennett, 1978; Flavell, 1986; Wimmer & Perner, 1983).

While the exact timing of developmental milestones is hotly debated, by mid-childhood most people can reason well about the beliefs of others, even when those beliefs differ from their own. However, even as adults, there are stable individual differences in advanced mind perception abilities. Most notably is the case of the autism spectrum, which is associated with deficits in advanced mentalizing abilities (e.g., Baron-Cohen, 1997; Frith, 2001). In addition, there is a reliable gender difference such that women tend to be better than men at advanced mentalizing tasks (e.g., Baron-Cohen, Joliffe, Mortimore, & Robertson, 1997; Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001; Stiller & Dunbar, 2007). So, although most adults have little trouble perceiving other minds (though see Birch & Bloom, 2007 for cases where even adults fail false belief tasks), not all adults seem to be quite as adept in this regard.

Finally, there are a suite of social cognitive consequences triggered when people feel that they are targets of another mind's attention. Indeed, a classic study commonly cited as the first social psychological investigation (Triplett, 1898) studied what is essentially a question about mind perception: how does performance vary with the presence of an attentive audience? Perceived social surveillance (i.e., feeling that other minds are attending to oneself) typically leads people to worry about their appearances. That is, when people feel watched, they tend to experience a state of public self-awareness (e.g., Duval & Wicklund, 1972) that often interferes with performance on various tasks (e.g., Beilock & Carr, 2005; Savitsky & Gilovich, 2003). However, only agents perceived as mindful produce this effect (Allen, Blascovich, Tomaka, & Kelsey, 1991). And as people worry about how they appear to others, they may take steps to

ensure that they look better. This leads both to increased socially desirable responding (Sproull,

Subramani, Kiesler, Walker, & Waters, 1996) and increased prosocial behavior (Bateson, Nettle,

& Roberts, 2006; Haley & Fessler, 2005) when people feel that they are being watched.

This brief discussion of mind perception sets the stage for a critical evaluation of the

connections between mind perception and supernatural agent beliefs. If god perception

"piggybacks" on social cognitive mechanisms primarily devoted to mind perception, then there

should be intimate commonalities between the two at the levels of neurology, development, bias

and constraint, context-dependent effects, and consequences. The following sections treat each of

these cases individually, testing them against extant evidence from respective literatures.

<div align="center">**Empirically Evaluating the 5 Predictions**</div>

I. Neural Bases of Mind Perception and God Perception

In recent years, a number of researchers have used neuroimaging techniques in an

attempt to elucidate which brain regions underlie religious cognition. If, as outlined in the

present chapter, thinking about supernatural agents depends on cognitive machinery primarily

devoted to ordinary, everyday mind perception, then one would predict substantial overlap in

activation when participants are either thinking about God or performing more basic social

cognition tasks. At least two research teams have independently found suggestive evidence that

this is the case. Schjoedt and colleagues (2009) explored patterns of neural activation in strongly

religious Danish Christians as they either prayed to God (a supernatural agent these participants

believe to be real) or made a wish to Santa Claus (a supernatural agent that no participants

believed to be real). Relative to wishing to Santa, praying to God produced increased activation

in the temporo-parietal junction, the temporopolar region, the anterior medial prefrontal cortex,

and the precuneus, all regions classically identified with mind perception (see, e.g., Castelli,

Happe, Frith, & Frith, 2000). These authors pithily summarized the implications of these findings (p. 205), that for believers "praying to God is an intersubjective experience comparable to 'normal' interpersonal interaction." Corroborating these findings, Kapogiannis and colleagues (2009) investigated the brain regions activated when participants were asked to think about God's mental states. Unsurprisingly (in the context of the present conceptual framework), the authors found heightened activity in the same brain regions known to underpin social cognition and mind perception. Combined, these studies demonstrate that thinking about gods and thinking about social interactions with other humans are entirely comparable activities, at a neurological level.

II. Developmental Trajectories of Mind Perception and God Perception

Children display developmental regularities in their understanding of other minds. Typically, this regularity is seen as a series of developmental milestones in which children are able to overcome a given error in their thinking about other minds (e.g., not being able to recognize that other minds can hold different knowledge than their own). If mind perception abilities underpin mental representation of supernatural agents, then the errors children make when thinking about other people's minds should also influence children's descriptions of God's mental capabilities. This is a particularly interesting prediction because many gods, the Judeo-Christian deity being a prime example, are described as omniscient—without mental limitations. Yet if children describe God in terms that reflect their own waxing understanding of other human minds, rather than in the explicitly omniscient terms that reflect what they most likely have heard about God, this would represent strong evidence that children's conceptions of supernatural agents are driven more by their own core social cognitive capabilities than by explicit religious indoctrination.

To investigate this question, Lane, Wellman, and Evans (2010) took advantage of a well-known limitation in children's developing mind perception abilities. Young children typically demonstrate a *reality bias*; that is, they assume that other people's minds have accurate knowledge about the world. As they get older, children come to appreciate that other minds can have false beliefs—they can be mistaken about the true state of the world. A classic test of this developmental step is the use of a task whereby children see a container that appears to contain one type of object (e.g., a Crayola crayon box usually holds crayons). Next, children are shown that the box in fact contains a different type of object (e.g., marbles). When asked what a naïve agent would predict as the contents of the box, young children report that the naïve agent would think that the container contains what it actually contains (marbles), while older children understand that the naïve agent would be fooled by the appearance of the container and therefore guess based on the apparent (rather than actual) contents (e.g., crayons). Lane and colleagues performed these sorts of tasks, only they asked children what God would think is in the box, and found an intriguing developmental trend. The youngest children reported that God would know the true contents of the box, consistent with either reality bias or an accurate representation of God's omniscience. During the age range in which children first begin to attribute false beliefs to others, they also attributed false beliefs to God! Only the oldest children were able to override this intuitive response and give a theologically correct description of an omniscient God. The most parsimonious interpretation of these findings is that children's representations of God's mental abilities closely mirror their representations of other human minds, with expectations of divine omniscience only explicitly coming online later, likely through enculturation rather than development. At the same time, this explicitly elaborated representation of an omniscient God is not without its flaws, as even adults will implicitly describe God as having anthropomorphic

mental constraints, such as needing to have perceptual access to events to know that they are occurring (Barrett & Keil, 1996). Let us turn now to other ways that adults' intuitive representations of God diverge from explicitly espoused theological representations.

III. Adult Biases in Mind Perception and God Perception

As children develop, they become ever more adept at inferring and reasoning about the contents of other minds. However, this developmental trajectory does not arrive at an end point of perfectly accurate mind perception, and adults exhibit a number of biases in the ways that they reason about other minds. If mind perception abilities underpin mental representation of supernatural agents, then systematic biases in adult mind perception should also be reflected in adults' representations of God.

Among other biases, adults tend to assume that others hold similar beliefs as themselves, and only adjust this initial *egocentric bias* with additional processing (e.g., Krueger & Clement, 1994). To the extent that this mind perception bias also influences religious cognition, people should tend to have an egocentric bias when thinking about God's beliefs. Across an elegant series of studies, Epley and colleagues (2009) found converging evidence to support this hypothesis. On a variety of issues (e.g., abortion), people tend to report that God holds opinions similar to their own. Additionally, experimental manipulations of people's beliefs on various issues also caused them to change how they viewed God's beliefs. Strikingly, Epley and colleagues (2009) also compared brain activation while participants were thinking about their own beliefs and while participants were thinking about God's beliefs…and found no differences. Combined this studies do not merely indicate that people hold egocentric representations of God's mind (just as they hold egocentric representations of other human minds). Instead, Epley and colleagues found that representations of God's mind were even more

egocentrically biased than were representations of the minds of other humans. This startling

finding may be driven by the fact that people can adjust their initial egocentric representations of

others' beliefs as they learn more about each other, yet people do not seem to frequently receive

behavioral confirmation or disconfirmation of where God stands on things. Thus basic mind

perception processes—along with their inherent biases—are all people have to go on.

IV. Social Contexts Triggering Mind Perception and God Perception

Social cognition and mind perception processes are not always activated. Rather, they

tend to be elicited in certain situations. If mind perception abilities underpin mental

representation of supernatural agents, the same social contexts that lead people to seek out other

minds in the world should also lead people to seek out affiliation with supernatural agents. What

situations lead people to seek out other minds, however?

As inherently social creatures, humans have a need to belong (Baumeister & Leary,

1995), and people experience a variety of negative consequences when this need is thwarted,

either through ostracism or loneliness (e.g., Williams, 2007). However, when people's need to

belong is thwarted, they can seek out contact with other human minds through either seeking

new friendships (Maner, DeWall, Baumeister, & Schaller, 2007) or in imagining new social

contacts (Twenge, Catanese, & Baumeister, 2003). Epley, Akalis, Waytz, and Cacioppo (2008)

investigated whether loneliness might lead people to increased belief in various supernatural

agents. In one study, they had participants complete a questionnaire that purportedly predicted

future life outcomes, but in reality was an experimental manipulation designed to make some

participants feel lonely. After completing the questionnaire, participants received fake feedback

that either made them feel okay about their future life prospects (e.g., "You're the type who has

rewarding relationships throughout life") or made them feel as if they would live lonely lives

(e.g., "You're the type who will end up alone later in life"). After receiving the good or bad news, participants—in an ostensibly separate task—filled out demographic questionnaires, including one that measured belief in supernatural agents, including God, angels, ghosts, and the Devil. Participants who were made to feel lonely via the fake feedback given after the initial questionnaire reported greater belief in supernatural agents than did participants who were not made to feel lonely. This result was not merely the result of the manipulation making participants feel negative affect, as a subsequent study compared two experimental conditions that made feel participants feel negatively, albeit in different ways. There was a similar increase in belief in supernatural agents among participants who were made to feel lonely by watching a clip of Tom Hanks in *Cast Away*, relative to participants who were made to feel afraid by watching a clip from *Silence of the Lambs*.

Furthermore, there is evidence that thinking about supernatural agents can, in fact, buffer people against the ill effects of ostracism. After an experimental manipulation that made participants feel ostracized, participants who received a subtle religious prime were less susceptible to negative consequences then were participants who received no such prime (Aydin, Fischer, & Frey, 2010). Loneliness and ostracism leads people to seek out other minds in the world, however this basic affiliative motive to seek out other minds can lead either to people seeking new friendships, or to people seeking God. Both strategies help ease the sting of social pain.

V. Social Cognitive Consequences Triggered by Mind Perception and by God Perception

People are quite sensitive to the presence of other minds. However, other minds are not merely passive pieces of furniture in the social landscape. The minds of others can direct their attention on our own minds. Knowledge (or supposition) that we are targets of other minds'

attention is known to trigger a host of social cognitive consequences. As already discussed, perceived social surveillance (i.e., feeling watched) leads to increased public self awareness (e.g., Duval & Wicklund, 1972), socially desirable responding (Sproull, et al., 1996), and prosocial behavior (e.g., Bateson, et al., 2006; Haley & Fessler, 2005). If mind perception abilities underpin mental representation of supernatural agents, then thinking about gods should trigger these same consequences for believers. Indeed, thinking about a watchful, morally concerned god might be a particularly potent cue to trigger feelings of being watched, and thus a potent trigger for public self-awareness, socially desirable responding, or prosocial behavior.

The present conceptual framework provokes two interrelated questions. First, does thinking of God causes increased public self-awareness among believers? Second, is this effect is comparable the effect of feeling watched and judged by one's human peers? Some of my own work (Gervais & Norenzayan, 2012) yields suggestive supporting evidence for both possibilities. In one study, we had participants rate a series of adjectives (e.g, loving, distant) based on different criteria. In a control condition, participants rated how common each adjective is in everyday speech. In a second condition aimed at eliciting public self-awareness through making participants think of human social surveillance, participants rated each adjective according to how much each participant felt that the word might be used by peers to describe the participant. In a final condition aimed at triggering thoughts of God, participants rated the degree to which they felt each adjective described God. After completing the adjective rating task, participants completed a brief measure of state public self-awareness (sample item: "Right now I am self-conscious about the way I look." Govern & Marsch, 2002). Among those participants who were high in belief in God, thinking about other peoples' judgments increased public self-awareness, as expected. More interestingly, however, thinking about God produced a comparable effect. For

strong believers, thinking about judgment by one's peers and thinking about God appear to have

psychologically similar results. For participants low in belief in God, the story was different, as

thinking about judgment by one's peers elicited significantly more public self-awareness than did

thinking about God (which, incidentally, produced the lowest public self-awareness of the three

conditions).

Similar results emerge when looking at socially desirable responding. In terms of stable,

trait-level associations, Trimble (1997) found a reliable positive association between religious

beliefs and socially desirable responding in a meta-analysis of the correlates of religiosity.

Though suggestive, this evidence cannot answer questions of causation. As with public self-

awareness, there is experimental evidence linking thoughts of God to socially desirable

responding. Gervais and Norenzayan (2012) performed an experiment in which participants were

given an opportunity to engage in socially desirable responding after receiving either a subtle

prime to think about God or a control prime. Those participants primed to think about God were

significantly more likely to agree with socially desirable (though likely untrue) statements such

as "No matter who I'm talking to, I'm always a good listener." This effect was entirely driven by

strong religious believers in this study, although it should be noted that the effects of priming

religious concepts among nonbelievers are inconsistent across the literature.

Finally, just as people engage in more prosocial behavior when they feel watched, they

are also more likely to engage in prosocial behavior when they are primed with religious and

God concepts. Specifically, subtly priming thoughts of God and religion leads to increased

honesty (Randolph-Seng & Nielsen, 2007), willingness to volunteer (Pichon, Boccato, &

Saroglou, 2007), and anonymous generosity and fairness (Shariff & Norenzayan, 2007).

Although there are possible alternative and complementary explanations for these effects, all are

broadly consistent with the possibility that thinking of God leads to prosocial behavior in part by reminding people of a morally concerned, mindful agent who is monitoring their behavior. Future research should more directly address the potential mechanisms underlying the religion-prosociality link. However, given that God primes trigger a number of other social cognitive consequences associated with perceived social surveillance, mind perception does provide one framework within which such future research may prove fruitful.

Summary

A conceptual framework that views mind perception as a key cognitive foundation of religious belief leads to a number of empirically testable hypotheses. Although research on the foundations of religious cognition is still developing, current evidence largely converges to support hypotheses drawn from this perspective. Mind perception and god perception share substantial overlaps in neural activation, child development, and adult biases. Further, the same social contexts that prod people to seek out other minds in the world also promote belief in supernatural agents. Finally, thinking about other minds monitoring us triggers many of the same social cognitive consequences as does thinking about God, at least for believers. Thus far, most of this chapter's discussion has focused on ways that mind perception processes affect individual religious representations and concepts. The remainder of the chapter turns to instead view social cognition and religious cognition in the larger context of human interactions.

Religious Cognition in a Cultural Context

The preceding sections largely discussed the ways that social cognitive mechanisms devoted to mind perception also underpin the mental representation of supernatural agents. However, it is a far step from being able to mentally represent a given supernatural agent and coming to believe that that agent actually exists. This is empirically and theoretically

problematic, because even children are able to reliably distinguish between agents that actually

exist and fictional agents, while being able to easily mentally represent both (e.g., Sharon &

Wolley, 2004). Furthermore, children are can also reliably tell the difference between what

actually exists and what only exists in pretence (e.g., DiLalla & Watson, 1988; Golomb &

Galasso, 1995; Harris, Brown, Marriot, Whittal, & Harmer, 1991; Morison & Gardner, 1978;

Samuels & Taylor, 1994). This should come as little surprise to any parent, who will no doubt notice

his or her children readily engaging in pretend play, without confusing the pretence for reality. Indeed,

many children mentally represent and "interact with" imaginary friends—often described as supernatural

agents—while entirely understanding that the imaginary friends are not, in fact, real (Taylor, 1999).

Given that it is easy for people to represent a wide variety of agents—supernatural and natural—without

coming to believe that they are real, what mechanisms enable people to selectively come to believe in

some agents, but not others?

One straightforward potential answer to this question is that people might find many

supernatural agent concepts interesting or memorable, but they only come to believe in those supernatural

agents who tend to be supported by a given cultural context (e.g., Gervais & Henrich, 2010; Gervais,

Willard, Norenzayan, & Henrich, 2011). Cultural learning, rather than anything special about the

cognitive content of a given supernatural agent, may explain the patterns of belief in given supernatural

agents, as well as other facets of religious cognition. On one level, this claim seems obvious, almost to the

point of tautology. Why else would children growing up in a primarily Christian region probably grow up

to be Christians (or, perhaps, atheists who only produce arguments against a Christian God), rather than

worshippers of Zeus and the ancient Greek pantheon (see Gervais & Henrich, 2010 for more discussion

on this dilemma)?

Despite the *prima facie* plausibility of cultural learning as a belief mechanism in religious

cognition, the issue is actually somewhat contentious within the literature. After all, following the logic of

religion as a cognitive byproduct, might not cultural learning perhaps be unnecessary to produce belief in

supernatural agents? In this view, belief is a default stance, and culture may operate only to produce

disbelief (e.g., Bering, 2010). For example, Barrett (2010, p. 171) claims "little cultural scaffolding is

necessary" to produce belief in supernatural agents. While there is much to recommend a perspective

viewing much about religious cognition as a cognitive byproduct (indeed, as much of this chapter

indicates, it is a perspective recommended by this author), it is insufficient to explain patterns of belief in

supernatural agents. Furthermore, it fails to recognize a rich literature that has emerged in the past couple

of decades recognizing culture as a potent force driving human cognition, cooperation, and evolution

(e.g., Chudek & Henrich, 2011; Boyd, Richerson, & Henrich, 2011).

Cultural Learning and Religious Cognition

Humans inhabit a cultural niche, relying on information from conspecifics to an *unprecedented*

degree in order to survive (Boyd, et al., 2011). However, humans are not simple culture sponges who

passively soak up information from their surrounding contexts. Rather, people possess a variety of

specific social cognitive adaptations that allow them to pursue different specific cultural learning

strategies (see Rendell, et al., 2011 for a review). For example, a naïve cultural learner in a new

environment may try to haphazardly learn vital skills through trial-and-error learning. Alternatively (and

likely with more success), he or she could attempt to learn from other individuals in the area. For

example, a learner could observe other people in the area and try to imitate what most other people are

doing by adopting a *conformist learning* strategy (e.g., Boyd & Richerson, 1985; Henrich & Boyd, 1998).

Rather than indiscriminately copying the majority of people, our cultural learner could instead selectively

target and emulate cultural models who appear to be more successful or prestigious (e.g., Gil-White &

Henrich, 2001). In order to figure out who is successful, our cultural learner could even simply see which

other individuals seem to have a larger number of people imitating them—the imitation of others, after

all, might be a good cue to who is worth imitating (e.g., Chudek, Heller, Birch, & Henrich, 2012; Gil-

White & Henrich, 2001).

Naïve cultural learners cannot simply attend to information likely to have an immediate survival

payoff. After all, a naïve learner, by definition, does not know which information is likely to be

important. As a result, learners may generally use these learning strategies to adopt entire repertoires of behaviors, beliefs, norms, dress codes, food preferences, and so on from their surrounding cultural contexts. However, learners are likely to adopt beliefs that are backed up by actions. After all, talk is cheap, and learners can be more confident that a cultural model actually holds a belief if he or she is willing engage in actions likely to be costly if the model did not actually hold the given belief (e.g., Henrich, 2009). For example, if a model informs a learner that bright red mushrooms are delicious and nutritious, the learner would likely be more persuaded if the model actually was willing to eat said mushrooms. That is, learners should pay keen attention to beliefs that are backed up by *credibility enhancing displays* diagnostic of underlying belief (Henrich, 2009).

How might cultural learning strategies influence religious cognitions? Although this question has received more detailed treatment elsewhere (e.g., Gervais, et al., 2011; Harris & Koenig, 2006), one general answer is possible. Imagine that our fictitious cultural learner is not trying to learn how to survive, but rather learning what to believe about the world. If savvy, the learner will use a variety of cultural learning strategies to assess the beliefs of others, including assessments of what most people (conformist transmission) or successful people (prestige-biased transmission) believe. In addition, the learner should pay special attention to beliefs backed up by actions (credibility enhancing displays). In this latter case, religions around the world often include a variety of costly and painful rites that allow people to prove their faith—rites including ritual scarification, male and female genital mutilation, self-flagellation, dress codes, dietary restrictions, and even martyrdom). These costly credibility enhancing displays likely help to ratchet up belief in and commitment to the tenets of a given religion (e.g., Atran & Henrich, 2010; Henrich, 2009). As an end result, our naïve cultural learner would most likely come to believe in the religion common to their own particular cultural milieu. By recognizing the specific cultural learning mechanisms underlying the formation of beliefs, researchers are able to more clearly specify the conditions under which individuals will come to believe in—rather than merely mentally represent—a given religious tenet.

Little about human nature makes sense without culture, and there is little reason—empirical or theoretical—to expect that something as fundamentally culturally-bound as religious belief would be an exception. Indeed, there is evidence indicating that cultural learning strategies influence a wide array of religious cognitions, including afterlife beliefs, beliefs about the origins of species, and belief in supernatural agents (see, e.g., Gervais, et al., 2011 for a more extended discussion of these topics.). The study of religious cognition may benefit greatly by more fully incorporating rigorous models of cultural learning strategies—and the social cognitive mechanisms that facilitate them—into the cognitive study of religion.

<center>**Nonreligious Cognition**</center>

It may seem odd to close a chapter on religious cognitions with a discussion nonreligious cognition. However, the rich theoretical landscape of religious cognition must also accommodate the cognitions of religious nonbelievers. After all, there are currently more than half of a billion nonbelievers in the world, making them the fourth largest "religious" group in the world (Zuckerman, 2007). The bulk of this chapter has focused on the ways that social cognitive mechanisms—mind perception and cultural learning in particular—enable religious cognition to flourish. If these social cognitive mechanisms are largely universal to humans, and are also fundamental to religious cognition, then why are there so many nonbelievers (or any at all)? Or, to frame the question differently, if religious cognition is built on universal social cognitive foundations, then what are potential sources of individual differences in belief? The two main foci of this section present two candidate explanations for variability in religious cognition: individual differences in mind perception and differences in cultural learning inputs. I will now discuss relevant evidence pertaining to these two possibilities, with a specific focus on belief in God.

Individual Differences in Mind Perception and Belief in God

Most mentalizing tasks are designed to gauge whether or not children of various ages have passed various developmental milestones, and the measurement of advanced adult mentalizing is still a contentious issue. Nonetheless, as already discussed, available measures indicate that there are stable and appreciable differences in adults' advanced mind perception abilities. If mind perception abilities underpin mental representation of supernatural agents, then individual differences in advanced mentalizing abilities should predict variation in belief in God.

As previously noted, autism is associated with, among other things, deficits in mentalizing abilities. This raises the possibility that people with autism spectrum disorders might lack intuitive support for belief in God and, therefore, exhibit reduced belief. Indeed, one study (Norenzayan, Gervais, & Trzesniewski, 2012, Study 1)) found that adolescents diagnosed with autism are only 11% as likely as neurotypical control participants to report strong belief in God. Subsequent tests examined whether the autism spectrum—the suite of traits that underlie autism, yet also vary considerably in nonclinical samples—was negatively correlated with belief in God. Across three studies drawing large samples in Canada and the United States (Norenzayan, et al., 2012, Studies 2-4), the autism spectrum was, indeed, negatively associated with religious belief. This relationship was fully and significantly mediated by various measures of mentalizing, and held up controlling for a whole slew of other factors that covary with the autism spectrum, religious belief, or both (e.g., eduation, income, interest in science, systemizing, personality). In sum, the mentalizing deficits associated with the autism spectrum also constrain the degree to which people belief in God.

In addition, there are reliable gender differences in advanced mentalizing abilities, as previously discussed. Interestingly, there are also reliable gender differences in belief in God: women tend to be more religious than men (e.g., Argyle & Beit-Hallahmi, 1975; Lenski, 1953;

Miller & Hoffman, 1995; see also Chapter 14 in this volume). It is possible that gender

differences in advanced mentalizing abilities explain the gender gap in belief in God. Indeed,

across three studies (Norenzayan, et al., 2012, Studies 2-4), mentalizing fully and significantly

mediated gender differences in belief in God.

These findings—that advanced mentalizing abilities constrain belief in God—suggest a

few avenues for future research. First, although autism is associated with mentalizing deficits,

Crespi and Badcock (2008) argue that autism and schizophrenia can be seen as two endpoints on

a spectrum, with hyperactive mind perception on the schizophrenic end. It is therefore possible

that schizophrenic individuals might exhibit hyperreligiosity. Although there is no firm scientific

consensus regarding relationships between schizophrenia and religiosity, and there is both active

research and debate, there is at least some evidence (albeit somewhat tangential) that is

consistent with a link between schizophrenia and religiosity: schizophrenic patients do tend to

report higher belief in supernatural agents than do patients with anxiety disorders or depression

(Kroll & Sheehan, 1989), and religious ideation is most common among those experiencing

many other severe symptoms of schizophrenia (Siddle, Haddock, Tarrier, & Farragher, 2003).

Second, the ablilty to mentalize is partially heritable (Hughes & Cutting, 1999), and the

relationship between mentalizing and belief in God may help explain why religiosity is partially

heritable (Bouchard, McGue, Lykken, & Tellegen, 1999).

Cultural Learning and Belief in God

Most people are able to easily mentally represent a while host of supernatural agents,

but they tend to only believe in some. I have argued that specific cultural learning strategies—

including conformist learning, prestige-biased learning, and credibility enhancing displays—lead

people to selectively believe in some gods but not others. For example, somebody growing up in

a cultural context in which cultural inputs support belief in Zeus is likely to believe in Zeus, rather than in Papa Gede, Vishnu, or Yahweh. And the converse is true for individuals growing up in cultural contexts supporting Papa Gede, Vishnu, or Yahweh, respectively. However, there are hundreds of millions of people on earth who do not endorse any of these gods, or any others for that matter. How might cultural learning explain these people?

Simply, if cultural input supporting a given god is necessary to instill belief in that god, then disbelief in all gods might simply result from contexts in which individuals do not receive clear cues to believe in any specific gods. Indeed, this appears to be the case for many, if not most, current inhabitants of Scandinavian countries like Sweden and Denmark (Zuckerman, 2008). More detailed investigation lends further support.

In perhaps the most comprehensive test of the role cultural learning plays in supernatural agent beliefs, Lanman (2012) conducted widespread research to tease apart different potential sources of religious disbelief, particularly focusing on the role of credibility enhancing displays. He queried believers and nonbelievers alike on the number of credibility enhancing displays of their parents' religious faith they witnessed while growing up. While growing up, current believers witnessed almost twice as many credibility enhancing displays of faith in supernatural agents than did nonbelievers. What is particularly striking, however, is that this staggering difference even holds up only when looking at participants whose parents espoused belief in God or gods. Far from belief in God or gods being a cognitive default that requires little cultural scaffolding, even children of religious believers who do not act upon their faith are likely to grow up to be nonbelievers! Given these striking results, future research examining the contribution of other specific cultural learning to religious beliefs would be welcome.

Mentalizing deficits and cultural learning might be two distinct pathways to atheism, but they are not the only such pathways, and there are likely many distinct origins of religious disbelief (e.g., Norenzayan & Gervais, in press). Two likely pathways stem from existential security and cognitive style. First, religion tends to flourish in areas where everyday life is difficult and unpredictable (e.g., Norris & Inglehart, 2004). In the lab, presenting people with a variety of existential threats (loss of control, awareness of death, etc.) bolsters religious faith (e.g., Kay, Gaucher, McGregor, & Nash, 2010; Norenzayan & Hansen, 2006). Conversely, under conditions of existential security, or conditions in which the government provides stability, religious zeal fades (e.g., Kay, Shepherd, Blatz, Chua, & Galinsky, 2010; Norris & Inglehart, 2004) as witnessed in, for example, modern Scandinavia (e.g., Zuckerman, 2008). Second, people possess both intuitive and analytic systems for processing information, and religion looks to rest upon largely intuitive foundations. As a result, increased reliance on analytic thinking predicts lower levels of religious and paranormal belief (Gervais & Norenzayan, 2012; Pennycook, Cheyne, Seli, Koehler, & Fugelsang, 2012; Shenhav, Rand, & Greene, 2012), and experimental manipulations that trigger analytic thinking also reduce religious belief (Gervais & Norenzayan, 2012, Shenhav, et al., 2012).

Summary

The present conceptual framework identifies two potential sources of variability in religious cognition. Individual differences in mind perception abilities may be one source of variable religious belief. To the extent that the mental representation of gods requires adept abilities to represent and reason about the minds of others, then people's advanced mentalizing abilities may place a constraint on degrees of religious belief. Of course, most religious nonbelievers worldwide likely have intact mentalizing abilities, suggesting that other factors

likely have major influences on religious belief and disbelief. Cultural learning appears to be one such factor, as credibility enhancing displays greatly contribute to the development of belief in God or gods. However, research on both of these areas is still in its infancy, and much more empirical work is needed. In addition, it is likely that there are many more sources of variability in religious cognition than the two outlined here, and hopefully the coming years will bring further research into this gap in the literature.

Conclusions

The scientific study of religion has flourished in recent years. As this volume illustrates, social and personality psychology have been at the vanguard of a recent resurgence of empirically-based approaches for understanding religion. This movement has in part been successful because it has been able to importat successful research programs and theoretical frameworks from social and personality psychology. By drawing upon existing literatures, researchers interested in understanding religion can pick from well-understood methodological tools and increasingly well-articulated models of human cognition.

The present chapter highlights mind perception as one cognitive foundation of religion. By viewing religions as inherently social phenomena that recruit and depend on the same cognitive mechanisms that govern everyday social interactions, a number of predictions come into sharp focus. Mind perception and religious cognition 1) depend on the same neural substrates, 2) track the same developmental patterns, 3) are influenced by the same sorts of biases, 4) are triggered by the same situations, and 5) trigger the same types of cognitive and behavioural responses. In addition, cultural learning—which ultimately depends on mind perception—appears to be intimately intertwined with religious belief and disbelief. Mind

perception and cultural learning explain some, but not all, pathways that lead some folks towards religion and other folks away from religion.

Social cognition provides one productive lens through which to view religious cognitions in general—and representations of supernatural agent beliefs in particular—derive from ordinary social cognitive capacities for perceiving other minds in the world. These representations interact with still other social cognitive capacities devoted to cultural learning to help explain variation in religious cognition. Above all, however, the present chapter hopefully highlights how viewing religion in terms of more basic cognitive mechanisms may illuminate the rich tapestry of both religious and nonreligious cognition.

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