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Chapter 8

Is There Such a Thing as a Christian Child? Evidence of Religious Beliefs in Early Childhood

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Children are often assumed to lack religion either because they have limited cognitive abilities to support mature religious thinking (Freud, 1913/1955; Goldman, 1964; Piaget, 1926/2007; Spilka, Hood, & Gorsuch, 1985), because they do not possess the requisite emotions or experiences (Johnson & Boyatzis, 2006), or because they lack the anxieties, needs, and interests that motivate religiosity (Uhlmann, Poehlman, & Bargh, 2008). We take issue with this entrenched notion, arguing instead that young children do indeed possess all of the necessary prerequisites for religiosity. However, the capacity for religion is not something that is "prepared" early on but rather is something that develops over the course of the first several years of life. In combination with biases that initially prepare young children for thinking about the natural world, recurrent experiences and inputs, constructivist tendencies, explanatory motivations, and other important components of typical development, children predictably begin to latch onto religious ideas by middle childhood. This is evidenced in their understandings of other minds, their biases to detect agency, their purpose-based explanations of origins, their dualistic notions of death, their acceptance of nonnatural causality, and their spiritual emotions and experiences. In sum, recent evidence collected by cognitive scientists of religion, anthropologists, psychologists, and others suggests that there is strong reason to think that young children can in fact be religious. There

is a sore need for more research on this topic, however, especially with a broader range of populations.

Richard Dawkins has said, "There is no such thing as a Christian child: only a child of Christian parents" (2006, p. 18). Setting aside its potentially inflammatory nature, this statement carries a weighty implication: children are not themselves religious. Many psychologists of religion have agreed with this idea (e.g., Allport, 1960; Paloutzian, 1996; Spilka, Hood, & Gorsuch, 1985; Starbuck, 1899/2010), and those who have not actively denied the existence of religion in childhood have tended to ignore the topic completely. The assumption that young children cannot be religious also exists in folk wisdom around the world. Many religions, such as Judaism and various sects of Christianity, wait until early adolescence to treat individuals as full members of their congregations. The Vezo of Madagascar do not involve children in rituals directed toward ancestors, as the adults assume that youngsters are not mentally sophisticated enough to understand religious matters (Astuti, in press).

Of course, the supposition that religion does not exist in childhood is predicated upon a very specific definition of religion. Specifically, to say "there is no such thing as a Christian child" does not mean that there are no children who attend Christian churches or participate in Christian rituals, as this is obviously a falsity. The degree of participatory engagement in a particular religious tradition is not the topic being addressed by Dawkins and others who deny religiosity to children, all of whom acknowledge that there is much more to religion than engaging in scripted actions with other members of a faith community. The question at stake is whether children who engage in religious practices are merely going through the motions in a state of disengaged passivity or oblivion. In other words, the crucial issue is the degree to which children can have religious *faith*.

Faith is derived from deeply personal religious beliefs and experiences. In stressing this as the present topic of interest, we depart from the sociological notion that collective social practices constitute the defining element of religion (e.g., Berger, 1967; Durkheim, 1912/1995; Geertz, 1973; Wilson, 1982). We argue that religious faith is not entirely a culturally learned phenomenon, passively internalized via enculturation and top-down, domain-general learning mechanisms. Nor is it something that children are pressured into or unwittingly latch onto due to the pervasive influence of memes, as Dawkins (2006) and Dennett (2006) would have it. Rather, religion primarily stems from within the person rather than from external, socially organized sources; it is fundamentally a component of individual human minds (Adams, Hyde, & Woolley, 2008; Barrett, 2004; Bering, 2005,

2011; Bloom, 2007; Boyer, 2001; Dawson, 1909/2009; Elkind, 1970; James, 1902/1982; Kelemen, 2004; Malinowski, 1957; Trotter, 1916/2005).

"Religion" is an elusive term that defies a single accepted definition, and we will only focus upon one of many possible operationalizations of religion in this chapter. Specifically, we will choose to define religion as consisting of beliefs, emotions, or experiences relating to supernatural entities (Tylor, 1871/1920). Therefore, "religiosity" will not be differentiated from "spirituality." Because researchers have tended to neglect emotional and experiential components of religion, especially during the period of early childhood, this chapter will be primarily centered on the topic of early religious belief. However, the noncognitive components of childhood religion will be touched upon at the conclusion.

Contrary to Dawkins, we argue that there *is* quite likely to be such a thing as a Christian child—or at least a religious child. We believe that evolved components of the human mind tend to lead people toward religiosity early in life. These biases are not themselves religious in nature and will not produce religious cognition in the absence of other psychological and environmental factors. However, they embody constraints such that children growing up in typical environments will have a strong tendency to develop along a trajectory in which they will be especially prone to acquire religious beliefs. The present chapter will primarily serve to elucidate the process by which religion is expected to develop in childhood. As the current state of knowledge is admittedly sparse and almost exclusively limited to Western monotheistic religious traditions, the chapter will also serve as an appeal for further research on this topic.

DEBUNKING THE "ANTHROPOMORPHISM THEORY"

The purported lack of religiosity in childhood is often attributed to insufficient cognitive abilities for supporting mature religious thinking. Pre-adolescent children have been said to possess an anthropomorphic, material understanding of God that precludes a more abstract concept of God's spiritual nature (for reviews, see Hyde, 1990; Nelsen, Potvin, & Shields, 1977). Psychoanalytic and attachment theorists have argued that this anthropomorphism stems from initially modeling God concepts upon ideas of one's parents (e.g., Bovet, 1928; Dickie, Eshleman, Merasco, & Shepard, 1997; Erikson, 1963; Freud, 1913/1955; Kirkpatrick, 2005). Piagetians have claimed that children's anthropomorphism of God stems from their underdeveloped cognitive abilities (e.g., Goldman, 1964). It is assumed that children are not equipped to deal with abstract concepts (like that of God) until they move from the concrete operational stage into

the formal operational stage, which occurs around the onset of adolescence. They are thus assumed to be fundamentally unable to think about agents as nonhuman, which also precludes other religious concepts—such as prayer, biblical understanding, and religious identity—from fully developing in childhood (Long, Elkind, & Spilka, 1967; Nye & Carlson, 1984; Piaget, 1926/2007; Spilka et al., 1985). Regardless of their fundamental differences in theoretical approach, Freudian and Piagetian supporters of the "anthropomorphism theory" share a basic assumption: namely, that children are doomed to base their religious concepts on their experience with the concrete world and will therefore not achieve an adult-like capacity for religious belief until they have reached maturity.

Although this anthropomorphism theory dominated the study of religion throughout the 20th century, disagreement with this theoretical stance has recently gained a prominent foothold. Some scholars (e.g., Barrett, 2001; Barrett & Richert, 2003) have lamented that much of the evidence for childhood anthropomorphism has come from biased methodologies, such as studies in which children were asked to draw pictures of God (e.g., Pitts, 1976). Additionally, the fact that children sometimes profess human-like concepts of God does not mean that they are cognitively doomed to do so (Barrett, 2001).

In fact, developmental psychologists have amassed positive evidence that young children and even babies can represent abstract, nonhuman agents. Many studies support the conclusion that various types of self-propelled beings are thought about differently than humans from a very early age. Even infants readily attribute agency to a wide range of entities, as evidenced by their attribution of goals to objects such as geometric shapes (Gergely, Nádasdy, Csibra, & Bíró, 1995), boxes (Luo, 2011), and featureless robots (Shimizu & Johnson, 2004). As soon as there is evidence that babies can attribute goals to humans, they are also able to attribute goals to a range of other objects, and therefore first-person experience or analogies between humans and these nonhuman entities are unlikely explanations of the promiscuity of agent attribution (Luo, 2011). Additional evidence also suggests that humans are not always used as a prototype category when reasoning about other kinds of agents. For example, children as young as three years of age use animal exemplars instead of humans as inductive bases from which to reason about novel biological properties (Herrmann, Waxman, & Medin, 2010). There is also good reason to think that children's concepts of the supernatural are not necessarily predicated upon a "human" concept, as the anthropomorphism theory asserts, but are rather built from a more general and abstract conception of intentional agency (Atran, 2002; Barrett, 2004; Kelemen, 2004; Rottman & Livingston, in press).

Experimental evidence has substantiated the claim that children's conceptions of God are not necessarily anthropomorphic at any age (Rottman & Livingston, in press; Tamminen, 1991), and they are possibly even *less* anthropomorphic than those found in adulthood (Jensen, 2009). This does not mean that God concepts will never resemble human concepts. Indeed, there is good evidence showing that children often think about God in human-like ways (e.g., Shtulman, 2008), just as is the case in adults (Barrett & Keil, 1996). However, the important point is that children are not constrained to be anthropomorphic (Barrett, 2001). As will be reviewed in more detail below, a series of studies have provided ample evidence that even five-year-old children possess concepts of God that are differentiated from their representations of humans in principled ways (Barrett, Richert, & Driesenga, 2001; Knight, Sousa, Barrett, & Atran, 2004; Lane, Wellman, & Evans, 2010). These findings can serve as an existence of proof against the Freudian and Piagetian notion that young children are not cognitively equipped to think about God as qualitatively different from humans. In consequence, recent developmental research has severely undermined the legitimacy of the anthropomorphism theory, opening the door to the possibility that children are able to reason about abstract religious ideas from an early age.

THE EARLY DEVELOPMENT OF RELIGION

Given that developmental research suggests that children can conceive of a variety of agents in nonanthropomorphic terms, it becomes plausible to investigate whether children do in fact entertain various religious thoughts. However, merely demonstrating that children have sufficient cognitive abilities to reason about abstract religious ideas is far from showing that they will be especially likely to adopt religious ways of thinking about the world. The ability for abstract thought is merely a necessary prerequisite. A much stronger claim: that children are actually predisposed to believe in religious entities and phenomena requires evidence about children's typical developmental progression and the innate architecture of the human mind.

Cognitive scientists of religion have recently argued that religion as a whole has arisen from a conglomeration of cognitive adaptations for dealing with the natural world (e.g., Atran, 2002; Atran & Norenzayan, 2004; Bloom, 2009; Boyer, 2001, 2003; Kelemen, 2004; Kirkpatrick, 2005; Pyysiäinen & Hauser, 2010; Thagard, 2005). That is, religious ideas are natural developments that predictably emerge in childhood as by-products of other features of the human mind. Even though religious beliefs are not

necessarily psychological adaptations themselves (but see Johnson & Bering, 2009, for an argument that they are), they still come about partially as a consequence of the biological endowment of *Homo sapiens.*

There are different flavors of the argument that religion is a product of human nature. The boldest of these claims, which we will call the "strong naturalness theory," asserts that religious concepts emerge automatically and endogenously, and that they are actually quite intuitive to young children (Barrett, 2004; Barrett & Richert, 2003; Bering, 2005, 2011; Bloom, 2007; Burdett & Barrett, 2010; Kelemen, 2004; Richert & Barrett, 2005). Although newborns are not necessarily claimed to possess full-blown religious predispositions, this theory does posit that humans are fully equipped with an early-developing array of latent cognitive biases that will deterministically produce religious beliefs with minimal environmental triggering. Children are expected to latch onto religious ideas without effort, and developmental changes are therefore relegated to playing a very minimal role in the emergence of religious belief. The strong naturalness theory has been characterized by some as embodying a nativist perspective (e.g., Bering, 2002). Others have refrained from making any claims about inateness, preferring instead to call the recurrent intuitiveness of religion "maturationally natural" (Barrett, 2008a; McCauley, in press), although a nonnativist account of how children are "cognitively equipped from early on" with quasi-religious "default assumptions" (Richert & Barrett, 2005, p. 284) seems difficult to discern without any other proposed mechanisms to account for this naturalness.

One variant of the strong naturalness theory is the "preparedness hypothesis" (Barrett & Richert, 2003), which flips the anthropomorphism theory on its head by asserting that intuitions about agent properties are actually more fit for reasoning about God than for thinking about humans! Specifically, the preparedness theory states that children spontaneously understand agents as being immortal, omniscient, and omnipotent (Barrett, 2004; Barrett & Richert, 2003). As children grow older, they come to adjust these initial ideas to more appropriately think about human capacities. However, their default assumptions are maintained and perpetuate accurate reasoning about God and other supernatural agents. The preparedness theory thus suggests that religious ideas are widespread because they are intuitive and easily formed by children, who are naturally endowed with a propensity toward theism.

An alternative to the strong naturalness theory—one that we argue for here—offers a more nuanced naturalness proposal, which we will call the *"developmental constraints theory."* This idea overlaps somewhat with the strong naturalness theory in that both of these positions maintain that

children have the capacity to reason about gods, spirits, and other religious entities in nonanthropomorphic ways from an early age. Additionally, both theories share the assumption that religion is heavily predicated upon natural tendencies and cannot be understood as resulting primarily from education or passive acquisition from parents or society. However, the developmental constraints theory breaks from the strong naturalness theory by arguing that development must be taken into account as a major explanatory factor. According to the theory being proposed here, religious thinking is not likely a foundational part of cognition, nor is it a natural *default for explaining events. Instead, children are proposed to construct* religious hypotheses largely in response to the limitations of other frameworks for interpreting and reasoning about the world. Rather than being over-attributed from the start, religious forms of thinking will never be an initial stance. Most importantly, children do not come into the world as "born believers," even in a weak sense of this term, but rather must develop some understanding of the natural world before constructing religious beliefs. As a result of this developmental process, it is therefore likely that children only develop a truly religious sense during middle childhood (Boyer & Walker, 2000), although different subcomponents of religiosity begin emerging slightly earlier than this.

We therefore propose that children's intuitive religiosity is reliably acquired, but not inherent from early on and not necessarily likely to emerge in a child stranded alone on a desert island. Instead, it emerges from a predictable ontogenetic course in which religious ideas are gradually elaborated in relation to more naturalistic ideas about the world. This is in part a nativist view, insofar as it emphasizes some canalization and predicts that religious beliefs and concepts are heavily constrained by initial cognitive biases, reliably unfolding developmental processes, and recurrent environmental inputs. However, it is also in part a constructivist view, in that children are proposed to actively build religious ideas from their experiences in the world. We do not believe development to consist entirely of maturation, in which traits unfold according to a predetermined schedule, but rather as a complex process that itself plays a major explanatory role. While other writings on this topic have tended to ignore the possible mechanisms by which religious cognition emerges, we argue that the devil (or god) is in the details of development. Without understanding how religion develops, we will never be able to understand why it exists.

In order to explore these claims more closely, we will move beyond the limits of anthropomorphic assumptions and carefully scrutinize the evidence regarding the early emergence of religious beliefs. Specifically, we will focus upon several areas that have received the most attention in

the cognitive science of religion: God concepts, agency detection, notions about purpose and design, folk dualism, and mental-physical causality. We will then turn to a brief overview of religious emotions and experiences in childhood. We note again that throughout this review of research, our generalizations are restricted by the restricted cultural and demographic profile of the children who have generally been under study.

UNDERSTANDING OTHER MINDS

Three decades of research on children's understandings of other people's mental states, which has been termed "theory of mind," has been taken to demonstrate that children are not able to fluently and explicitly reason about other minds until about four years of age. Children below this age are particularly poor at thinking about beliefs that do not directly mirror the current state of reality. For example, when told a story about a person reentering a room after a chocolate bar has been surreptitiously moved from one location to another, children under four years old think that this ignorant person will accurately search for the chocolate in its current location rather than holding a false belief about where it was before, leading to a fruitless search in the old location (Wimmer & Perner, 1983). This so-called "false belief task" has been accepted as the gold standard of whether children have developed the capacity to understand mental states as subjective representations of the world, rather than direct reflections of reality, and as such this provides a test of whether children have acquired a "representational theory of mind" (but see Bloom & German, 2000, for a critique of this paradigm). Experiments using the classic false belief task have repeatedly shown that three-year-olds over-attribute knowledge when consciously reasoning about beliefs (Wellman, Cross, & Watson, 2001).

The fact that young children tend to over-attribute reality-consistent beliefs in a false belief task is potentially consistent with the strong nativist view that children naturally assume others to possess much greater powers of knowledge than adults would consider humanly possible. This observation led Barrett et al. (2001) to conduct a false belief task with several different kinds of entities, including a human, a bear, and God. As predicted, three-year-olds over-attributed knowledge to these entities since they could not successfully reason about false beliefs. Crucially, while five-year-olds attributed ignorance to the human and the bear, the attribution of complete knowledge demonstrated by younger children remained stable across age groups in the case of God. This finding has also been replicated in a sample of Yukatek Maya children (Knight, 2008; Knight

et al., 2004). A similar study, which examined children's understanding of perceptual abilities rather than beliefs, also produced comparable findings. Specifically, this experiment demonstrated that attributions of super-perception remained stable across age groups in the case of God and changed with age for fallible agents like a human (Richert & Barrett, 2005).

Barrett and his colleagues have used this evidence to argue for a strong nativist position in which young children are more "prepared" to reason about an omniscient God than about animals and people with limited mental capacities. According to this line of reasoning, because children are biased to overestimate the amount of knowledge or perceptual access that others possess, and do not understand that an agent can possess counterfactual beliefs, a God concept is very easy for them to attain (Barrett & Richert, 2003).

This conclusion can be challenged, of course. A more traditional interpretation of the failure on the false belief test is that children under five years of age attribute other agents with the same knowledge that they themselves possess simply because they are incapable of explicit metarepresentation and only have a single, egocentric way of understanding beliefs, not because they have a bias to think that all agents know everything (Pyysiäinen, 2003). According to this reading of the data, because the task used by Barrett et al. (2001) and Knight (2008; Knight et al., 2004) was one in which the children were given more knowledge than the entities they were reasoning about, the three-year-olds' attributions of omniscience were simply a methodological artifact or reflect an inability to inhibit their own egocentric knowledge. In other words, they were merely drawing conclusions based on their own understanding of reality, not based on any elaborated conceptions of super-knowledge. In order to test this hypothesis, Makris and Pnevmatikos (2007) conducted a version of the false belief experiment in which they ensured that their participants were ignorant about a particular state of reality (i.e., the content of a darkened box) and thus were not aware of the content of the knowledge that an omniscient being would be expected to possess. Instead of finding over-attributions of knowledge at three years of age, their data indicated that young children tended to attribute ignorance to all entities, including God. It wasn't until five years of age, when children are able to reason about the contents of other minds as being different from their own, that children correctly attributed God with more knowledge than they themselves possessed. In consequence, when a young child knows more than other agents, leading her to egocentrically over-attribute knowledge, she will seem equipped to reason properly about an omniscient God. However, when this child knows *less* than another agent, she will reason correctly about people and

incorrectly about God. This demonstrates that children without a fully developed theory of mind tend to overextend their own knowledge—not a general omniscience about the objective state of the world—to other minds. Their degree of preparedness to cogitate about supernatural beings is entirely a product of the context in which they are reasoning.

It should be noted that the pattern found by Makris & Pnevmatikos (2007), with their sample of Greek Orthodox children, might not hold across all cultures. Their paradigm has recently been used in a study with British and Jewish Israeli children, and this yielded different results (Burdett & Barrett, 2010). Specifically, the participants in these samples were able to correctly distinguish between a person and God by the age of three (in Israel) or four (in Britain) and did not show a bias toward egocentrism. This is an interesting result, suggesting that children might sometimes be able to solve ignorance tasks at a young age and are able to do so differentially for distinct agents. This finding is potentially due to the fact that they are not presented with the difficult problem of inhibiting current knowledge, as is the case in a false belief task. Importantly, however, there was no period in which over-attributions of knowledge were made to humans in Burdett and Barrett's study. It is therefore not obvious that these data support a strong preparedness theory in which children are more cognitively equipped to reason about God than other agents.

Lane et al. (2010) have also challenged the preparedness theory in terms of children's understanding of supernatural minds. In a false belief study modeled after Barrett et al. (2001), but with denser sampling of participants within a narrow age range, Lane et al. found that there is a brief period during which God is treated as fallible, and that this occurred immediately after a representational (i.e., non-egocentric) theory of mind was acquired. Even though God is understood as omniscient shortly after this period, the developmental continuity between three and five years of age is not as smooth as Barrett and his colleagues suggested; the God concept does indeed undergo some change as a child develops a theory of mind. A similar U-shaped developmental trend was found in a study with Spanish children, again demonstrating increased attributions of ignorance to God in four-year-olds compared to younger and older children (Giménez-Dasí, Guerrero, & Harris, 2005). Crucially, then, it seems that the pre-representational, egocentric concept used by three-year-olds to reason about God's mind is not the same as the representational concept used by five-year-olds, and therefore mature concepts of God do not necessarily emerge before mature concepts of people or animals.

Recent findings in the infancy literature have dealt another blow to the preparedness theory. Developmental psychologists now have reason

to think that a representational theory of mind is acquired much earlier than the fourth year of life (see Baillargeon, Scott, & He, 2010, for a review). For example, Onishi and Baillargeon (2005) have found evidence of implicit false belief understanding in 15-month-old infants. Additionally, Buttelmann, Carpenter, and Tomasello (2009) have demonstrated that 18-month-olds account for false beliefs in the context of helping others achieve goals. Although an early representational understanding of minds may not reach conscious awareness, these studies suggest that even infants are able to reason about minds with human fallibilities. Therefore, research must be conducted with one-year-olds in order to fully substantiate strong claims about a default bias to over-attribute epistemic states.

In summary, it seems that children are able to reason accurately about superhuman minds very soon after they acquire the competence to think about human minds. It is important to emphasize the point that children are therefore not more "prepared" to reason about gods than about humans. However, it is also important to underscore the fact that five-year-olds are able to form concepts of religious agents that are qualitatively different from their concepts of other types of agents—a fact that cannot be accounted for by the anthropomorphism theory. While children are not initially committed to concepts of all-powerful or all-knowing agents, they do reliably develop many types of agent concepts, some of which are human-like, some of which are god-like, and some of which are neither human-like nor god-like. This is true across a range of different cultural settings.

AGENCY DETECTION

Despite claims to the contrary by Durkheim (1912/1995), many contemporary scholars agree that ideas about supernatural agency are a cornerstone of religious belief worldwide (e.g., Atran, 2002; Bering, 2011). Therefore, over-attributions of intentionality and agency (i.e., goal-directed, self-guided behavior by rational beings) are expected to serve as fundamental human biases that form a basis for religious thought (Atran, 2002; Barrett, 2000, 2004; Bloom, 2007; Guthrie, 1993).

Along with other animals at least as evolutionarily distant as chickens, newborn babies preferentially attend to biological motion (Simion, Regolin, & Bulf, 2008), a bias that is independent of the entity's morphological form (Bardi, Regolin, & Simion, 2011). This attentional predisposition toward animate beings may lead to the expectation that agents are more ubiquitous than is the case in reality. Also confirming the idea that humans have an innate tendency to over-detect agency in the world, infants liberally

attribute goal-directed behavior to a wide range of ambiguous or underdetermined stimuli, as briefly described above (Gergely et al., 1995; Luo, 2011; Shimizu & Johnson, 2004). This ascription of agency occurs in the presence of behavioral cues such as self-propulsion and equifinality, and does not require static cues suggesting personhood (Bíró & Leslie, 2007). Even more remarkably, infants not only attribute agency to perceivable entities, but they also have the ability to infer the existence of hidden agents. Specifically, infants expect the presence of an unseen intentional agent (a "launcher") when they see an inanimate beanbag launched into the air from behind an occluder (Saxe, Tenenbaum, & Carey, 2005; Saxe, Tzelnic, & Carey, 2007). It therefore seems that infants have an early-developing, if not innate, expectation that the motions of inanimate objects must ultimately be caused by agents.

In addition to being endowed with a "hyperactive agency detection device" (Barrett, 2004), children also have a strong bias to interpret actions as being intentionally caused (Donovan & Kelemen, in press; Rosset & Rottman, 2011). Young children have a very difficult time understanding that behaviors can be accidental or caused by biological or physical factors as opposed to psychological ones. For example, four-year-old children believe that actions such as sneezing are done on purpose (Smith, 1978), and three- and four-year-olds think that involuntary knee-jerk reflexes are every bit as intentional as voluntary leg kicks (Shultz, Wells, & Sarda, 1980). Additionally, when blindfolded three- and four-year-olds have their hands guided by an experimenter to produce a drawing, they insist that they have intentionally created the artwork themselves (Montgomery & Lightner, 2004).

Despite the existence of an early intentionality bias and infants' incontestable abilities to attribute agency to a wide range of animate and nonliving entities, even when these entities are not immediately perceivable, this is far from demonstrating that they can attribute agency or intentionality to nonphysical, supernatural beings. Inferring the existence of such noncorporal religious agents may require additional skills, because such inferences cannot rely on information grounded in the basic percepts that trigger many automatic interpretations of agency (Dittrich & Lea, 1994; Scholl & Tremoulet, 2000). Even in the case of Saxe's hidden agent studies (Saxe et al., 2005, Saxe et al., 2007), the parabolic trajectory taken by the beanbag strongly suggests a nonphysical cause. These types of cues are not often present in cases where supernatural agency is inferred, and therefore the detection of religious agents may require deductions to be made from much more subtle and indirect forms of evidence. The behaviors of supernatural agents are often manifested in ambient events, such

as thunderstorms or chance occurrences, which must be construed as embodying symbolic, communicative meaning (Bering, 2006, 2011). It is therefore important to study the age at which children infer the existence of nonnatural agents.

The detection of agents in highly underdetermined circumstances has been tested in an experiment conducted by Bering and Parker (2006). In this study, children were told about an invisible woman named Princess Alice who would give the children clues to help them win a prize in a game. These children were then tested to see whether they would interpret unexpected events, such as a framed portrait falling from the wall, as indicating Alice's benevolent assistance. The data showed that children could not attribute these unexpected events to supernatural agency until the age of five, and could not understand them as indicating the referential content of supernatural intentions until the age of seven. Rather than over-attributing agency and intentionality at a young age, three- and four-year-olds understood the unexpected occurrences as happening because of purely physical causes. This finding does not bode well for the strong naturalness theory (Evans & Wellman, 2006), although it is still striking that seven-year-olds are able to make such abstract inferences about surprising events. Additionally, it is notable that even the oldest participants in this study had to be told about Princess Alice in order for them to infer signs of her communication. This highlights the role of testimony in detecting the presence of supernatural agency and suggests that certain basic religious ideas are not purely endogenous (e.g., Harris & Koenig, 2006). Inferences about supernatural agency may not be fully realized in the absence of appropriate cultural frameworks.

In sum, even though young children do possess a bias to overextend intentionality when it comes to real-world events, over-attributions of supernatural agency do not obviously occur until later in childhood. There is a major need for more developmental (and cross-cultural) evidence to determine exactly how a bias toward supernatural agent detection emerges. Based on the study by Bering and Parker (2006), it seems that bias is not evident in very young children but rather builds upon an innate predisposition to over-attribute natural forms of agency.

BELIEFS ABOUT PURPOSE AND CREATION

Considerations of supernatural designs and purposes and their metaphysical implications are recurrent features of religions and their creation myths worldwide. Once again, the source of such preoccupations can be traced to early childhood. Four- and five-year-old children tend to view

most, if not all, of their environment in purposeful terms. For example, they claim that clouds exist "for raining" and lions exist "for walking" or "to go in the zoo" (Kelemen, 1999b; but see Greif, Kemler Nelson, Keil, & Gutierrez, 2006), and they judge entities that can longer perform particular functions (e.g., a cloud that can no longer provide rain) as "broken" and in need of fixing or replacement (DiYanni & Kelemen, 2005). In addition to this promiscuous teleological tendency, five- to seven-year-old children have also been found to show a creationist bias, rating strong agreement with creationist statements of the origins of living phenomena whether or not they are from strongly religious family backgrounds (Evans, 2001). Other studies have shown that children invoke God as a creator of natural kinds at least by the age of four (Gelman & Kremer, 1991; Petrovich, 1997). While evidence of these tendencies has been amassed independently, results also suggest that the logically complementary promiscuous teleological and creationist biases explicitly cohere in children's thinking in a manner that is consistent with religious accounts of origins. Specifically, 6- to 10-year-old children's notions that natural phenomena are intentionally created (usually by God) are reliably associated with their beliefs that natural entities exist for purposes (Kelemen & DiYanni, 2005).

Both of these tendencies likely have their roots in biases to overattribute agency and intentionality (described in the previous section) and intuitions, evident from infancy, that only intentional beings can create order (Newman, Keil, Kuhlmeier, & Wynn, 2010). But even as notions of creation and purpose seem to capitalize on basic cognitive biases that are present and pronounced in early childhood, caution should be exercised before concluding that the patterns observed in current research are more consistent with the strong naturalness theory than the developmental constraints view.

First, while a general intentionality bias may be present from early on, a sophisticated understanding of intentional design is not itself a foundational element of cognition (Kelemen & Carey, 2007). Instead, it has to be constructed from other knowledge, such as an understanding of goal-directed action and the physical affordances of objects (Kelemen, 1999a, 2004). Two-year-olds, while construing human-made artifacts in terms of intrinsic purposes (Casler & Kelemen, 2005, 2007), do not initially understand those purposes as resulting from the intentional historical process of design. Indeed, despite suggestions that children spontaneously reason about design as early as two years of age (Kemler Nelson, Holt, & Egan, 2004), most evidence now suggests that a "design stance" is not fully elaborated until four years of age or older (Kelemen & Carey, 2007; Kelemen, Seston & St. Georges, 2011). Moreover, cross-cultural variability

in children's tendency to construct a "design stance" is also unknown despite cross-cultural evidence consistent with universality in adults (German & Barrett, 2005; Barrett, Laurence & Margolis, 2008).

Current findings suggest that children do not begin to broadly generalize notions of function or to favor teleological over physical explanations of natural entities until after they have already constructed an understanding of human artifact design (Kelemen, 2004, in press). Therefore, crucial developmental milestones must be achieved before children can become "intuitive theists" when reasoning about natural purposes and supernatural creation. In short, the strong naturalness theory is certainly correct in claiming that creationist and promiscuous teleological ideas are intuitive and untutored. Parental explanations, parental religiosity, and cultural religiosity do not appear causal in any straightforward way (Evans, 2001; Kelemen, 2003, in press; Kelemen, Callanan, Casler, & Pérez-Granados, 2005; but see Diesendruck & Haber, 2009; Harris & Koenig, 2006). However, rather than simply saying that the promiscuous teleological bias is inherent or innate, an explanation of its existence must make note of the developmental details and evidence of its construction. Among Western children raised in artifact-saturated environments, teleological intuitions are initially tied to the domain of human-made objects. Only later are they overextended to aspects of the natural world (Kelemen, in press). Furthermore, while the preparedness hypothesis might predict that beliefs about intentional creation should have privileged ties to notions of supernatural rather than human agency, this pattern is also not supported. Children's emerging ideas about supernatural creation do not seem to precede their understanding of human creative abilities, and at most they seem to emerge simultaneously (Gelman & Kremer, 1991; Evans, 2001; Kelemen & DiYanni, 2005).

These data support the notion that biases with core relevance to religious and supernatural thinking piggyback on prerequisite understandings of the natural world. The emergence of the creationist and promiscuous teleological biases must therefore be characterized as developmentally constrained rather than endogenous, automatic, and "strongly natural." Exactly how developmentally constrained and predictable these biases are remains for future cross-cultural developmental work to uncover.

MIND-BODY DUALISM

Another primary aspect of religious thinking is the tendency to conceive of the world in terms of material and immaterial elements, and this goes even beyond speculations about invisible agents. Many, if not all,

religions assert that humans have nonphysical souls that survive biological death and continue to exist in an afterlife, and that immaterial beings such as ghosts and spirits inhabit the earth and/or the heavens. This is a very abstract capacity that goes well beyond children's direct experience, and it is therefore important to examine children's ability to reason about these concepts.

Bering (2011) and Bloom (2004) have argued at length that humans are innately Cartesian dualists, but there has been astonishingly little empirical research to support these claims. One exception is a study conducted by Kuhlmeier, Bloom, and Wynn (2004), which demonstrated that five-month-old infants were not surprised when a human showed discontinuous motion by disappearing between two barriers and then reappearing again. This is especially interesting in light of the fact that infants of this age do exhibit a robust surprise reaction when their expectations are violated after seeing a box breach this basic law of physics (Spelke, Kestenbaum, Simons, & Wein, 1995). Kuhlmeier and her colleagues interpreted their finding as an indication that infants do not understand that people are subject to physical continuity, thus revealing a conception of humans as fundamentally mental, rather than material, entities. However, Saxe, Tzelnic, and Carey (2006) demonstrated that infants of the same age expect humans to be solid physical objects, therefore weakening Kuhlmeier et al.'s conclusion that infants' natural representations of agents are continuous with those found in adults' religious representations. The strong naturalness theory has therefore not been satisfactorily tested in this domain. The jury is clearly still out on whether "babies are natural-born dualists" (Bloom, 2004, p. xiii) or, similarly, whether dualism is "likely the default cognitive stance" (Bering, 2006, p. 454).

Dualistic thinking does develop at some point during early childhood, however, and at least in the context of reasoning about death, this may come about as early as four years of age (Bering, Blasi, & Bjorklund, 2005). When asked questions about the types of processes that continue after death, especially after hearing death described in a religious narrative, children exhibit dualism by believing that mental functions persist while bodily and psychobiological functions cease, a finding that has held true in American (Bering & Bjorklund, 2004), Spanish (Bering et al., 2005; Harris & Giménez, 2005), and Vezo (native Madagascar) populations (Astuti & Harris, 2008). The developmental trajectory of this understanding is currently under dispute, however. Bering and his colleagues have found evidence that the number of mental functions believed to continue after death decreases with development (Bering & Bjorklund, 2004; Bering et al., 2005). These data support the preparedness theory by suggesting a trend

in which humans move from a naturally dualistic conception of death to a more scientific, materialistic conception of death. However, other studies have instead found that biological explanations decrease over time while religious understandings increase, suggesting that a biological conception of death is primary, and that a religious understanding of death may rely upon naturalistic understandings first being in place (Astuti & Harris, 2008; Harris & Giménez, 2005; Lane et al., 2011). Evidence against a strong preparedness theory also comes from data showing that children develop a biological understanding of death at an early age (Barrett & Behne, 2005; Slaughter, Jaakkola, & Carey, 1999; Speece & Brent, 1984).

Therefore, although afterlife beliefs are acquired early in development, it is currently an overinterpretation to assume that a metaphysical conception of death is more natural than a biological understanding. Further developmental studies must be conducted on this point. Regardless, it is noteworthy that young children can quickly acquire a dualistic understanding of death that is similar to the concept found in adulthood. This once again underscores the strong possibility of religion in childhood.

It is also worth pointing out that children's conceptions of the soul may be more nuanced than this coarse notion of dualism between the material and immaterial worlds may suggest. For example, children make a sharp distinction between the immaterial mind and the immaterial soul, saying for example that the soul is more immutable than the mind (Richert & Harris, 2006). Additionally, Hodge (2008) points out that souls and dead people are often thought of as embodied beings. Therefore, while the mind and soul are attributed with distinct nonphysical properties, they may not be conceptualized as being purely immaterial substances existing entirely apart from the physical realm.

NON-NATURAL CAUSALITY AND FANTASTICAL THINKING

Piaget (1926/2007) characterized children as living in a world that is dominated by magical and fantastical ideas. Indeed, they invent imaginary companions (Taylor, 1999), believe in fantastical entities (Rosengren, Kalish, Hickling, & Gelman, 1994; Woolley, Boerger, & Markman, 2004), and are sometimes credulous toward certain forms of magic that few adults would ever entertain as being plausible (Johnson & Harris, 1994). With these observations in hand, a preparedness theorist might want to make the claim that certain impossibilities, such as those implicated in many religious actions, comprise part of a default understanding of the world. For instance, a strong nativist might predict that mental-physical

causality—the notion that the mind can exert effects on the world, and which is a purported mode of communication between the natural and supernatural realms—might be a natural and common way of construing events.

Indeed, young children do possess beliefs in the efficacy of fantasy, magic, and other forms of mental-physical causality such as prayer. However, evidence suggests that these are not intuitive or commonly utilized stances at any age (Harris, 1994; Woolley & Phelps, 2001). Young children do not generally expect the world to operate according to magical forms of causality, and react with surprise when physical laws are violated (Chandler & Lalonde, 1994; Harris, 1994). Magic is never regarded as mundane (Woolley, 1997), and children as young as three can make a principled distinction between natural and fantastical events (Johnson & Harris, 1994). Natural explanations of events are common, even for unusual or extraordinary circumstances, and supernatural explanations tend to increase, rather than decrease, with age (Legare & Gelman, 2008; Woolley, Cornelius, & Lacy, in press). Additionally, even if young children are not always able to explicitly distinguish between real and fictional entities in categorization tasks, this competence is revealed in induction tasks that ask children to make attributions of novel properties (Sharon & Woolley, 2004). Furthermore, the childhood tendency to believe in fictional characters is strongly related to the direct encouragement of these beliefs by adults (Rosengren et al., 1994; Sharon & Woolley, 2004). Therefore, although young children do in fact engage in thinking about nonnatural forms of causality, and also possess beliefs in various fantastical entities, this is not necessarily a default stance they adopt toward the world.

CONSTRAINED DEVELOPMENT

The evidence presented above demonstrates that children are able to fluently reason about supernatural agents, intelligently designed purposes, the afterlife, and other fundamental religious ideas well before the onset of adolescence. The human mind predictably develops a cognitive architecture that is well suited for reasoning about these concepts. Additionally, children's ideas are not very different from the concepts possessed by adults. This commensurability between religious thinking in childhood and adulthood suggests that cognitive immaturity cannot be invoked as a reason for neglecting the study of religion in early childhood.

But while religious cognition emerges reliably in childhood, even in the absence of explicit tutoring, it is not itself an initial default for encountering the world. Nor are religious ideas more intuitive than ideas about the

physical world. Rather, religious ideas are constructed from a suite of innate biases and motivations, such as a tendency to over-attribute agency and intentionality (Barrett, 2004; Guthrie, 1993; Rosset, 2008) and perhaps also a drive for explanation and causal understanding (Gopnik, 2000). Religious concepts capitalize upon these biases but are not "prepared" in the sense of being preformed in the absence of a suite of crucial developmental factors above and beyond merely growing up in a typical human environment.

Although young children do predictably develop religious ideas, it seems that certain cognitive capacities must be in place before many religious beliefs are constructed, such that "an awareness of the extraordinary must be predicated on knowledge about what is ordinary" (Woolley, 1997, p. 998). Indeed, religious concepts are elaborated in accordance with the existence of other intuitive ontological frameworks used for reasoning about the natural world (Boyer & Walker, 2000; Harris, 1994). Despite Piagetian claims that the construction of scientific knowledge gradually eradicates nonscientific construals of the world, more recent evidence suggests that coming to understand the limitations of other explanatory theories, such as folk physics or folk biology, makes room for explanatory theories invoking supernatural agents or processes (Rosengren & Hickling, 2000). Indeed, beliefs about nonnatural causality may actually help children to maintain resolute beliefs in natural causality; by designating strange occurrences as magical or fantastical, children may be less inclined to view this evidence as undermining their commitments to naturalistic understandings of the world (Chandler & Lalonde, 1994). Religious beliefs may therefore consist of a temporary suspension of normal causal understanding.

This argument dovetails with Boyer's (1994, 2001) suggestion that religious beliefs are characterized by being "counterintuitive" insofar as they violate fundamental intuitions about the natural world. Other cognitive scientists of religion have supported this view (e.g., Atran, 2002), and some have even gone as far as to identify counterintuitiveness as the "hallmark of religiosity" (Pyysiäinen, Lindeman, & Honkela, 2003). This intuition has been demonstrated empirically; adults judge unfamiliar counterintuitive concepts to be more religious than closely matched intuitive concepts (Pyysiäinen et al., 2003). The fundamental counterintuitiveness of religious concepts provides additional support for the developmental constraints theory by suggesting that children cannot acquire truly religious concepts without first possessing intuitions about natural ontological domains (Boyer & Walker, 2000). There is an intriguing possibility that even though young children can think about a wide array of agents, including supernatural ones, these ideas may not be classifiable as being religious

until they become counterintuitive. Children's seemingly religious way of making sense of the world may at first be only "superficially approximating adult theism" (Kelemen, 2004:297). That is, even if these concepts are indistinguishable in content from their adult analogues, they may not promote the kind of phenomenological distinction that is made by adults if they are not demarcated from natural agents by their characteristic violations of natural laws. The same idea goes for actions such as prayer or other religious rituals.

In sum, religion is surely a part of human nature, but it is also a developmental achievement. Current research suggests that nondevelopmental explanations of its prevalence are incomplete. Specifically, children come into the world with a set of proclivities that bias them to develop various religious concepts, but the formation of these ideas is dependent upon other complex factors. Truly supernatural beliefs do not appear until middle childhood, and it is an open question whether religion would emerge at all in the absence of certain kinds of testimony and recurrent environmental inputs. However, it is notable that the majority of people throughout history have tended to accept religious ideas. Furthermore, the recurrent cognitive structures supporting religiosity tend to emerge in a predictable manner and develop in ways that bias children toward constructing certain types of religious construals. Therefore, although we do not adopt the extreme nativist view put forth by the strong naturalness theory, we do argue that there are certain evolved, canalized constraints that lead a majority of people around the world to effortlessly form religious beliefs during their youth. According to the literature reviewed above, it seems that the "developmental constraints theory" is an accurate way of understanding religion in childhood.

RELIGIOUS FAITH

This review has demonstrated that young children do in fact possess the mental capacities to think about abstract religious ideas. However, this can be only one aspect of an argument that religion exists in childhood. Although it is notable that children are able to form nonanthropomorphic conceptions of supernatural agents and that they develop other religious concepts (e.g., ideas about teleology and dualism) by an early age, this is not sufficient for full-blown religious belief. Children must also endorse the reality of these unseen entities and possess the motivations to employ these concepts in their everyday lives. In order to address the existence of religion in childhood more broadly, topics such as faith, existential needs, religious emotions, and religious experiences need to be addressed.

Boyer and Walker (2000) have argued that counterintuitive entities that are regarded as existing in reality are prime candidates for religious belief. However, this raises the question of why certain counterintuitive entities, such as carnivorous plants and endorsed fantasy figures such as the Tooth Fairy, do not induce religious faith. To some extent, the distinctions that are made between these religious and nonreligious entities may be properties of the concepts themselves. For example, it seems that religious beings elicit more inferences and attention due to their enhanced access to strategic, reputation-relevant information and their abilities to exert real-world effects (Barrett, 2008b). However, conceptual content cannot explain why people believe in some gods and not others, and these explanations will have to resort to explanations of cultural transmission (Gervais & Henrich, 2010).

Of course, the degree to which a child actively has faith in a particular entity relies at least somewhat upon parental endorsement, commitment, and encouragement (Harris & Koenig, 2006; Rosengren & Hickling, 1994; Rosengren et al., 1994), or at least minimally, hearing information about the supernatural entity's existence from an adult (Woolley et al., 2004). Preliminary evidence also suggests that growing up in a religious family environment may elevate levels of credulity for all nonnatural entities and events, including even fictional fantasy figures (Corriveau, Chen, & Harris, 2011). The influence of parental testimony is far from straightforward, however. This is nicely highlighted by the fact that American Jewish three- to five-year-olds profess fairly strong beliefs in Santa Claus (Prentice & Gordon, 1987). Indeed, Prentice and Gordon found that Santa Claus beliefs in Jewish children were not significantly different from beliefs in the Tooth Fairy at any age between three and nine (despite greater familial participation in the Tooth Fairy myth), and these beliefs were independent of parental encouragement or religious traditionalism. Parental faith and endorsement is therefore not an easy proxy for children's faith.

As with any trait, there is individual variation in religious faith, and different children have varying propensities to form beliefs in supernatural beings. This depends in part on factors such as belief in other fantastical beings, the desire to believe, participation in rituals, and age (Woolley et al., 2004). It is likely that faith also depends upon possessing relevant existential motivations, emotions, and experiences.

EXISTENTIAL NEEDS

Johnson and Boyatzis (2006) have argued that despite the religious foundations that are provided by basic cognitive capacities present in

early childhood, full-fledged religiosity awaits later meta-cognitive developments, such as engaging in reflective spiritual practices. Uhlmann, Poehlman, and Bargh (2008) present a similar view, suggesting that, while the cognitive bases of religious thought are evident in childhood, the existential needs that contribute to religiosity—such as the desire for meaning and a fear of death—are identifiable primarily in adulthood.

Religion is often understood to arise in order to meet certain cognitive or existential needs, such as alleviating anxiety about impending death or discovering a meaning to one's life (e.g., Elkind, 1970), an idea that has been echoed by terror management theorists (e.g., Jonas & Fischer, 2006). As Boyer (2001) points out, however, the need to soothe existential worries cannot fully explain the existence of religious belief, as many religions fail to impart much comfort, and may even have the opposite effect.

Also, contrary to the arguments made by Johnson and Boyatzis (2006) and Uhlmann et al. (2008), it seems that the existential needs relating to religion actually do emerge in childhood. For instance, Reed (1970) found that 80 percent of childhood fears are related to death. Children also ask many existential, metaphysical questions about ultimate concerns like the meaning of life (Harris, 2000; Hart, 2006; Hyde, 2008). As Johnson (2000) asserts, "In their persistent 'why' questions, young children are already oriented to the existence of 'something more' beyond the given world...children's 'thirst for absolute truth' leads them to metaphysics" (p. 208). Therefore, evidence suggests that children do in fact experience existential needs and uncertainties at a precocious age, and these may well drive them toward religion.

EMOTIONAL AND EXPERIENTIAL ASPECTS OF RELIGION

Many scholars have emphasized the emotional or experiential component of religion as being primary (e.g., James, 1902/1982; Livingston, 2005; McNamara, 2001; Otto, 1923/1950; Thagard, 2005). Lamentably, very little research has been conducted on how children's emotions might contribute to early forms of religiosity. However, the meager evidence that does exist suggests that children do in fact experience emotions that are commonly associated with religion. Hyde (1990) has reviewed evidence that young children can experience wonder and awe when thinking about God. Hart (2006) also asserts that the emotions of wonder and awe are a large component of childhood religiosity and has shown that a majority of adults recall experiencing these emotions as young children. Given that wonder is a major driving force for metaphysical thinking about the world and religiosity more generally (Fuller, 2006), this is an area ripe for future investigation.

Similarly, few people have studied children's religious experiences. Nevertheless, recent research has demonstrated that children do experience religiosity in their daily lives (Adams et al., 2008). Tamminen (1994) found that 84 percent of Finnish seven- and eight-year-olds reported to have experienced God's nearness. This number remained high throughout childhood but actually began to drop off in early adolescence. Tamminen (1991) also found that most Finnish first- through fifth-graders felt that God had answered their prayers, and this response also declined with age. Additionally, although verbal report is an imperfect way of studying religious experience, especially in children (Harms, 1944), interviews and questionnaires have still shown that children have rich spiritual lives that may include transcendent, mystical experiences (Coles, 1990; Hay & Nye, 2006; Klingberg, 1959). Hoffman (1992) and Scott (2004) have also collected many retrospective reports of spiritual experiences in childhood. Finally, despite the fact that early investigators (e.g., Hall, 1904; Starbuck, 1899/2010) agreed that conversion was primarily constrained to adolescence, a 2004 poll conducted by The Barna Group found that 43 percent of Evangelicals and 66 percent of Catholics who become "born again" (i.e., accept Jesus Christ as their savior) do so before the age of 13. There is thus a strong reason to believe that powerful religious experiences do occur in childhood, and that this is not uncommon.

CONCLUSION

This review has provided sufficient evidence that "the great variety of religious experience which surprises us in adults is already to be discovered in children" (Bovet, 1928, p. 9). Therefore, there is reason to think that children and adults have similar, rather than qualitatively distinct, religious ideas (Barrett, 2001). Furthermore, religion is indisputably an important component of childhood (e.g., Tamminen, 1991), and this is likely true across cultures.

The fact that children can clearly entertain religious ideas has important real-world consequences. For instance, children as young as six form social preferences based on religious identity, such that Christians show an implicit preference for other Christians over non-Christians (Heiphetz, Spelke, & Banaji, 2011). Children's ability to form religious concepts is also of great import to both religious educators (e.g., Nelsen et al., 1977; Ratcliff, 1988) and those on the polar extreme who are worried about religious indoctrination (e.g., Dawkins, 2006; Dennett, 2006). It is therefore an undeniably important field of study, regardless of one's metaphysical views.

However, as this review has shown, there is an unfortunate dearth of research on children's religiosity. Much more work needs to be done, especially concerning the nature of early religious experience, the contexts that evoke religiosity, and the factors leading to faith. Cross-cultural research is absolutely necessary, especially in non-Westernized countries, as this will address the important issue of which, if any, features of religion are truly universally recurrent and whether they develop on the same ontogenetic schedule around the globe. Children growing up in atheist families are also an interesting subpopulation that should be studied in order to more closely determine the relationship between parental testimony and religious belief. Perhaps most importantly, the *development* of religiosity in childhood and the mechanisms that allow this to occur need to be further explored (Evans & Wellman, 2006), perhaps longitudinally. As the developmental constraints theory states, religion is inherently a product of development as well as evolution. This idea, while indirectly supported by work in the cognitive science of religion, emphasizes the potential for a great deal of research addressing the question of *how* children come to be religious.

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