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Chapter 12 Cognitive Foundations in the Development of a Religious Mind

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Abstract Evolutionary explanations for the existence of religious concepts have generally been based on the premise that the transmission and acquisition of religious concepts is a cognitively easy process because religious concepts build on natural cognitive predispositions. These predispositions evolved as cognitive tools essential to human survival. Theories have focused on several candidate cognitive processes that provide the cognitive foundations of religious beliefs: agency detection, folk-psychology, attributions of causality, and the animacy/inanimacy distinction. In this chapter, we review theories and studies outlining children's development of religious concepts such as supernatural agents, creation, religious rituals, afterlife beliefs, and the soul. These studies are discussed within the context of the contributions of ordinary cognition in religious belief, as well as the importance of also considering the cultural influences in the strength and content of belief.

12.1 Introduction

A common question within the study of religion concerns how the structure of human cognition contributes to the acquisition and transmission of religious concepts. As Boyer (2001) outlined, attempts to explain the persistence of religious beliefs over evolutionary history have focused on religion as providing explanations, providing comfort, providing social order, or as a cognitive illusion. Boyer criticized these explanations for relying on functionalism and for assuming the function of religious concepts is equivalent to an explanation for why that concept exists. An understanding of the development of human cognition can uncover how religious concepts are both acquired and transmitted if, as Boyer suggested, the function of a concept is separated from the explanation for its existence.

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Examining the cognitive foundations of religious concepts allows for the exploration of the evolution of religious concepts. A developmental approach can identify the aspects of human cognition that contribute to religious concepts, prior to the cumulative effects of cultural input. As is outlined below, research into the ontology of religious concepts has suggested human cognition, even that of young children, is naturally equipped to receive religious concepts (e.g., Barrett 2000; Barrett and Richert 2003; Boyer 1994, 2001). Barrett argued,

The cultural phenomena typically labeled as 'religion' may be understood as the product of aggregated ordinary cognition (Barrett 2004, p. 86).

Theories addressing the evolutionary explanations for the existence of religious concepts stem from the basic premise that religious concepts are not cognitively difficult to either transmit or acquire. In fact, most theorists have argued religious concepts are easily acquired because they build on natural cognitive predispositions. These predispositions evolved as cognitive tools essential to human survival. Some theorists would argue the overattribution of these predispositions resulted in the evolution of religious concepts which were followed by religious systems supporting these concepts (e.g., Boyer 2001). Other theorists would argue the action systems related to religious practice came first and were then filled in with religious concepts (e.g., Whitehouse 2004). Regardless of the order in which religious systems evolved, a cognitive approach to understanding religious belief would argue the existence of religious concepts relies on default cognitive processing.

Numerous theories have focused on several candidate cognitive processes that provide the cognitive foundations of religious beliefs. These theories have tended to focus on agency detection, folk-psychology, attributions of causality, and the animacy/inanimacy distinction. In this chapter, we review various theories and studies related to the development of religious concepts. In particular, we describe studies outlining children's development of religious concepts such as supernatural agents, creation, religious rituals, afterlife beliefs, and the soul. In the end, we suggest future research should continue to explore both the cognitive foundations of religious concepts and the cultural influences contributing to the content of religious concepts and belief itself.

12.2 Agency Attributions and Folk-Psychology

The largest body of research into the cognitive foundations of religious concepts has focused on folk-psychology and the human tendency toward agency attribution in concepts of supernatural agents. Theorists have argued these concepts become transmitted when they are minimally counterintuitive, meaning they violate some, but not all, cognitive intuitions about ontological categories (Barrett and Keil 1996; Boyer 1994). These slight violations make the concepts both attention-demanding and extraordinary, which lead to motivation for transmission (Sperber 1994). However, by relying primarily on ontological categories, the concepts require minimal processing capacity, which makes them likely to be accessed on a regular basis

(Boyer 1994). Similarly, Boyer and Ramble (2001) have suggested children are equipped with evolutionarily adaptive survival characteristics that promote the easy transmission of particular violations of cognitive expectations, including violations of human constraints.

Similarly, the preparedness hypothesis is a theory specifically based on the role of folk-psychology in God concepts and argues children are cognitively equipped from an early age to develop concepts of God (and other non-humans) independently from their concepts of people (Barrett and Richert 2003). The preparedness hypothesis claims children acquire concepts of God and God's extraordinary powers relatively easily because these concepts capitalize on default assumptions children have about intentional agents in general. Support for hypotheses that religious concepts stem from early agent concepts comes from research showing children can represent some of God's special characteristics, such as omniscience and immortality, quite easily and quite differently from their human representations.

12.2.1 God's Omniscience

Findings over the past two decades have converged on the conclusion that young children have an early bias to overestimate the knowledge and belief-accuracy of others (Wellman et al. 2001). This bias to assume extraordinary knowledge of others may allow young children (e.g., 3- to 4-year olds) to reason more accurately about God than about their parents, because unlike their parents, God is indeed omniscient. A series of experiments conducted by Barrett and colleagues with 3- to 7-year olds both in the United States (Barrett et al. 2001, 2003; Richert and Barrett 2005) and in Mexico among the Yucatec Maya (Knight et al. 2004), have demonstrated that even when children begin to understand the fallible nature of beliefs and limitations on knowledge, they continue to reason about God as omniscient.

Barrett et al. (2001) tested preschoolers' predictions about what various entities would claim were the contents of a cracker box that actually contained rocks. Most 3- and 4-year-old children claimed all characters would not be misled by the appearance of the box and would know there were rocks in the box. On the other hand, most 5- and 6-year-old children only attributed false belief to the other characters, but did not attribute false belief to God. Interestingly, when children were in the process of understanding human false belief, their understanding of God's belief remained stable and technically accurate.

Barrett et al. (2003) tested children's expectations about what their mother, a dog, and God would know about a visual display. In three experiments, 3- to 7-year-old children viewed a visual display that could not be fully understood (e.g., a partially occluded picture). They were then given relevant information for understanding the display (e.g., saw the full picture) and predicted whether the characters would understand the display without having the relevant information. The majority of 3- and 4-year-old children reported all the characters would understand the displays, but the older children revised their responses for their mother and the dog. Again, children's

responses that God would understand the display remained stable, suggesting that even 3-year olds can discriminate between God's mind and ordinary minds (Barrett et al. 2003).

In another study, Richert and Barrett (2005) had children aged 3–7 predict the visual, auditory, and olfactory perspectives of humans, animals with special senses, and God. The preschoolers distinguished God and the special animals as having greater perceptual access than humans and normal animals, who were predicted to have limited perceptual access. Interestingly, even for cases in which children were unsure about their own and others' perceptions, most children were more certain about the perceptions of God and the special animals. Furthermore, children easily incorporated into their animal concepts the perceptual implications of the animals having special eyes, ears, and noses. That this came easily for children, and that responses remained stable across age groups, offers support for the suggestion that it is not the "special" features of these concepts that call for a cognitive adjustment. Rather, the difficulty for children is in accounting for the limited perspectives of humans and ordinary animals.

12.2.2 God's Immortality

Harris (2002) interviewed 3- to 5-year-old children, and found that as children aged and their understanding of psychological and biological constraints on humans increased, they more frequently referenced ordinary constraints on mortality and knowledge when they were talking about their friends. In contrast, references to extraordinary violation of constraints on mortality and knowledge only increased with age in reference to God, and not to friends. These findings suggest that in terms of attributions of mortality, children resist the tendency to anthropomorphize God and continue with their previous assumptions of immortality.

Giménez-Dasí et al. (2005) asked 3½-, 4½-, and 5½-year olds from religious and secular schools in Spain to consider the omniscience and immortality of their best friend or God. The results indicated that only the 5½-year olds consistently appreciated that God, and not their best friend, was omniscient and immortal. This effect was not influenced by school. By 5½ years of age, children in both religious and secular schools made this distinction; whereas younger children did not make this distinction, regardless of school. These results support the interpretation that the violations of cognitive expectations in religious ontologies, such as omniscience and immortality, are easily spread across generations – regardless of early religious schooling. Furthermore, even though the oldest children did not treat God with the same constraints as humans, they generally defended their responses by indicating an understanding of God's extraordinary powers and some degree of anthropomorphism. Although Harris (2002) and Giménez-Dasí et al. (2005) argued that children tended to resist anthropomorphic reasoning, it seems that to some degree, children relied on default assumptions of human perceptual and biological processes – much in the same way adults do (Barrett and Keil 1996).

12.2.3 Afterlife Beliefs

Related to the issue of God's immortality is whether children believe humans experience immortality in an afterlife. Beyond considering how folk-psychology contributes to supernatural concepts, other research has considered how folk-psychology contributes to an understanding of death and a belief in the afterlife. One way to address the possibility of cognitive biases toward belief in an afterlife is to examine young children's beliefs about what happens after death. If belief in an afterlife is primarily the result of sociocultural immersion, we should see a developmental pattern indicating stronger belief of the continuation of physical and mental processes with age. This belief would be related to input from religious and cultural institutions teaching continuation of human processes after death. However, if there are inherent biases in our cognitive structure, we should see that with age, children are more selective in the processes they claim continue after death, a modification of their inherent biases as a result of explicit learning about the nature of biological and psychological processes and religious teaching.

Bering and Bjorklund (2004) investigated this question in three experiments. In the first two experiments, American children from diverse backgrounds between the ages of 4½ and 12 were shown a puppet show of an alligator eating a mouse. Following the show, they were asked questions about the continuation of specific biological processes (e.g., growing old), cognitive processes (e.g., thinking), and psychobiological processes (e.g., being hungry). The results demonstrated that both older and younger children claimed the discontinuation of biological processes. In contrast, older children were significantly more likely than younger children to claim cognitive and psychobiological processes did not continue after death, reflecting an initial assumption of continuation. In addition, the oldest children were more likely to claim psychobiological processes ended rather than cognitive processes. Furthermore, although children responded that the dead mouse did not need to drink (biological), similarly aged children were likely to claim that the dead mouse was capable of feeling thirsty (psychological assessment of a biological state).

To investigate this counterintuitive finding, Bering and Bjorklund (2004) conducted a third experiment in which 5- and 12-year olds, as well as college undergraduates, viewed the same puppet show and responded to questions about the continuity of processes after death in six distinct categories: biological, psychobiological, perceptual, emotional, desire, and epistemic states. The youngest children were most likely to claim biological processes stopped at death, compared to the processes in the other five categories. The older children and adults were likely to claim that biological, psychobiological, and perceptual processes did not continue after death, but claimed a high degree of continuation for the mouse's emotion, desire, and epistemic questions.

These findings indicate two important points. First, young children were likely to provide answers consistent with the continuity of many non-biological processes, suggesting an assumption about psychological continuity after death. Second, older children and adults continued to respond in favor of psychological continuation, although their responses varied systematically as a function of the type of process:

Thus, once death is understood at an explicit, biological level, there is still resistance to complete discontinuous reasoning about mental states after death. These results indicate the importance of considering the roles of early cognitive architecture and the socio-cultural influences of belief. This point will be discussed in more detail below.

To address the role of religious instruction and to evaluate potential cross-cultural differences, Bering et al. (2005) presented 6-, 9-, 12-year olds from Spain the same scenario of a mouse being eaten by an alligator. Children answered questions about the continuation or discontinuation of biological, psychological, perceptual, emotional, desire, and epistemic states. Half of the children attended a secular school and the other half received religious instruction. The results replicated Bering and Bjorklund's initial findings. The states children argued would and would not continue after death varied systematically in the same direction as the American sample. Moreover, although children who received religious instruction generally provided more responses supporting continuation, this was a reliable difference only for the oldest age group. In other words, despite a social setting that would promote belief in the continuation of processes after death, younger children receiving religious instruction were not reliably more likely than the children receiving a secular education to argue for the continuation of these processes. This finding provides more support for the argument that particular aspects of belief in an afterlife derive from natural cognitive assumptions.

Whereas Bering and Bjorklund (2004) and Bering et al. (2005) examined the specific processes children believed persisted after death, Harris and Giménez (2005) studied how children reconcile a biological and metaphysical understanding of death. To address this question, Harris and Giménez (2005) investigated if older children were more or less likely to adhere to a religious perspective of death than younger children, as well as if children perceived these perspectives as incompatible and how their reasoning (e.g., holistic or dualistic) influenced these perspectives. Seven- and 11-year-old children from public schools in Spain were given two stories about a grandparent who died. The language in one story was designed to evoke religious reasoning; the language in the other story was designed to reflect a biological (secular) stance on death. The results indicated that the older children were less likely to claim processes stopped after death. This finding was especially strong in the context of the religious narrative and for questions related to mind processes, compared to the secular narrative and questions related to body processes. Furthermore, children's justifications, coded into biological and metaphysical responses, further supported these findings. Biological justifications were more frequent in the secular story, for body questions and among the younger children. Metaphysical justifications, on the other hand, were used equally for body and mind questions, but were more common in the religious story and among older children.

Harris and Giménez (2005) argued the discrepancy between the results of their study and those of Bering and colleagues stem from two primary differences. First, the previous studies used a mouse and an alligator. However, in Christian theology it is clear that people, and not animals, have souls and an afterlife. Second, the predator/prey situation in previous studies may have primed children to provide more

biologically driven responses. In the current study, the use of a family member may have evoked more metaphysical reasoning about death. This is consistent with the authors' interpretation that as children mature in their understanding of the finality and completeness of biological death, the religious concept of death and the after-life is increasingly persuasive. This study indicated that while children are capable of maintaining dual concepts of death, this is probably not completely explained by a natural propensity to dualistic thinking. Again, the importance of considering the cultural influences on religious beliefs will be discussed more thoroughly below.

12.3 Causality and Origins

Although the large majority of the research discussed thus far has been based on children's agency attribution and folk-psychology, more recent research has addressed other cognitive processes involved in religious concepts. In particular, it has been argued that people are strongly prone to anthropomorphism, which leads them to detect intentional agency in the environment (Guthrie 1993). In other words, people are biased to assume that there is intentional action as the underlying cause of an event. Research has suggested even young children are prone to the bias for attributing causality, and this bias serves as a foundation for belief in a supernatural being who causes unexplainable events (Bering 2005). Although the past research into the role of folk concepts in religious concepts has outlined factors related to memorability and transmission, theories related to causality have begun to address issues of motivation for belief (Bering 2006). This tendency to attribute intentional causality has been used to explain children's understanding of creation, prayer, and religious rituals.

12.3.1 Creation vs. Evolution

Past research has suggested children have a tendency to prefer creation rather than evolutionary explanations for origins. Petrovich (1997) interviewed preschool children about the origins of plants, animals, the sky, the earth, and large rocks. Children were asked to choose from three possible creators: people, God, or nobody knows/unknown power. The preschoolers in this study were about seven times more likely to attribute responsibility for the natural world to God, and not to people. Furthermore, Evans (2001) found that regardless of religious affiliation (fundamentalist Christian communities vs. non-fundamentalist communities) a large majority of 5- to 8-year-old children preferred creationist accounts for the origins of the natural world to either evolutionary, artificialist (created by humans), or emergentist accounts.

Kelemen (1999, 2004) has examined the cognitive basis of children's preference for creation explanations. Kelemen (2004) found that young children have strong inclinations to understand both living and non-living things as purposeful. They

asked to consider “how bad” it would be if the protagonist of a story did not conform to specific norms in a church, such as spinning before sitting down or singing on one leg. Some of the children heard a story in which the protagonist was given a justification for the norm, making it a functional action. Others children heard a story in which the protagonist was told that action has always been done that way, making it a ritual action. Although older children were less likely to view the breach of a functional action as bad, children of all ages generally agreed it would be at least “a little bad” to violate the ritualistic action.

In the second experiment, Richert (2006) investigated ritual and functional actions that would be familiar to 6- and 8-year-old children from a Christian background: a bath and a baptism. The results mirrored the findings from the first study. The youngest children were more rigid about a breach of the norms for both a bath and a baptism action, whereas the older children were more flexible about the functional action than the ritual action.

In the third experiment, 5-, 7-, and 10-year-old children were asked to consider how effective a ritual action, a baptism, would be if it was done incorrectly. Again, the youngest children were more likely to claim that the baptism was ineffective if it was done incorrectly, indicating a heightened rigidity than the older children. Although children were generally inflexible as to the conscious breach of ritualistic actions, the oldest children were more flexible in considering the outcome of the action, even if done incorrectly. This tendency may reflect a similar trajectory to children’s belief in prayer. In other words, prioritizing the intentionality of the ritual actor over the ritual actions may reflect a changing understanding of the role of mental–physical causality. Importantly, these findings suggest that children’s early understanding of rituals builds on their belief in causality; that effects have causes (e.g., being “saved” is the result of some kind of action) and that causes have effects (e.g., ritual actions produce a cause, even if it is invisible).

12.4 Psychological Essentialism and Dualism

Developmental research into cognitive foundations of the concept of the soul recently has received an increasing amount of attention. Bloom (2004) has argued early animacy and inanimacy distinctions by infants develop into a dualistic understanding of humans consisting of distinct and separate bodies and minds. However, as is outlined below, dualistic explanations of a mind/body distinction have often grouped together the concepts of the mind and the soul. Recent research has addressed whether and at what ages children begin to differentiate a third aspect of humanness: the soul.

12.4.1 Soul

In two experiments, Richert and Harris (2006) disentangled children’s developing concept of the soul, with a particular emphasis on its differentiation from the mind

see living and non-living things as possessing attributes purposefully designed to help them or serve themselves or other things. For example, 4- and 5-year-old children often claim mountains are “for climbing” or clouds are “for raining” (Kelemen 1999). Related to the relationship between cognitive foundations and cultural input, Kelemen (2004) has suggested the possibility that children naturally develop as “intuitive theists,” and religious instruction merely fills in the forms that already exist in children’s minds.

Kelemen and DiYanni (2005) specifically examined whether children’s assumptions about the purposeful nature of natural phenomena are related to their intelligent design reasoning. They interviewed 6- through 10-year-old children for their intuitions about the origins of artifacts, animals, natural events, and natural objects. Regardless of age, children tended to prefer teleological explanations for the origins of artifacts, animals, and natural objects. In addition, children’s teleofunctional intuitions about the origins of artifacts, animals, natural events, and natural objects were significantly correlated with their claims about whether the first things (i.e., artifacts, animals, natural events, and natural objects) just appeared or were made by someone or something. A conclusion from this research might be that developing a concept of a purposeful Creator God is not cognitively demanding for children because this concept builds on their intuitive assumptions about the teleological nature of the world.

12.3.2 Wishing vs. Prayer

Another aspect of religious concepts related to causality is the relationship between belief in mental–physical causality and belief in the efficacy of prayer. Woolley (2000) suggested children do not necessarily outgrow their belief in mental–physical causality, but rather it changes from belief in the efficacy of wishing to belief in the efficacy of prayer. Woolley examined this proposal by interviewing 3- to 8-year-old children about their definitions of wishing and praying, who can wish and pray, and whether wishes and prayers come true. She discussed this research in the framework of children’s belief in mental–physical causality, or the belief that people can cause something to happen in the world just by thinking it in their minds. Woolley (2000) found an interesting age by causality type interaction. When children stopped believing in the efficacy of wishing, their belief in the efficacy of prayer was maintained and even increased. Thus, belief in the efficacy of prayer may be easy and natural because it stems from an initial bias towards belief in mental–physical causality.

12.3.3 Religious Rituals

A third aspect of religious experience related to causality is children’s intuitions about the causality in religious rituals. In three experiments, Richert (2006) investigated children’s flexibility in reasoning about functional and ritualistic actions. In the first study, 5-, 8-, and 10-year-old children from a Protestant church were

and the body. In the first experiment, children from Lutheran churches between 4- and 12-years old were asked to consider what changes occur as a result of baptism. Specifically, children were asked if there was internal or external change, in other words if the change could be seen and/or touched. Additionally, children were asked to consider if the baptism was associated with changes in the brain, mind, and/or soul. Children provided more theologically correct answers with age (e.g., baptism resulting in an internal change that cannot be seen or touched). Moreover, children of all ages were much more likely to claim that the soul changes after baptism, compared to the brain or the mind.

A second experiment examined more specifically how children differentiate the soul, mind, and brain. First, third, and fifth graders from Catholic schools were asked to think about the brain, mind, and soul of a newborn baby. Although many of the youngest children believed that a newborn baby had a soul, the older children were even more likely to agree with that statement. Additionally, although the younger children agreed a baby would not be the same without her or his brain, mind, or soul, the belief that individuals would not be the same without their soul was strongest for the oldest children (Richert and Harris 2006).

This finding was related to children's understanding of the function of the brain, mind, and soul. At all ages, children said that a baby could not perform cognitive functions without a brain; however, non-cognitive and biological functions could continue without the mind or brain. The soul, however, had no clear role in cognitive, non-cognitive, or biological functions. Children's open-ended responses indicated the soul was most likely to be associated with spiritual functions (Richert and Harris 2006). Another way children differentiated the brain, mind, and soul concerned perceived stability over time. All of the children tended to agree that minds and brains change over time, whereas souls stay the same.

This work demonstrates previous conceptions of simple mind/body dualism do not fully capture the complexity with which young children reason. By as early as first grade, children differentiate the mind and the soul according to both function and stability. These results may clarify why it is common for individuals to report that biological functioning does not continue after death, yet attribute continued mental processes (see also Bering and Bjorklund 2004; Bering et al. 2005). Whereas previous explanations for this contradiction (e.g., if the body stops working, so does the mind) have pointed to the context (Harris and Astuti 2006) or nature (Bloch 2006) of the questions, or a general lack of sensitivity to the contradiction, these results indicate children may understand that both the body and the mind stop working at death. It is possible children attribute the continuing processes to a separate entity – the soul. The authors argued these findings provide support for the role psychological essentialism plays in the developing a concept of a soul as a distinct type of spiritual essence.

To evaluate if the concept of the soul is a distinct form of psychological essence, Richert and Harris (2008) examined how adults conceptualized the mind and the soul. Specifically, they were interested in if the concept of the soul is merely a maturation of "mind traits" (p. 100), or if it remains something distinct even in adulthood. Undergraduates from diverse backgrounds answered questions about the

ontology and function of the mind and the soul. Most adults asserted the existence of the mind, claiming it begins at conception, changes over the life-span, and ends at death.

Respondents were less certain about the existence of the soul (Richert and Harris 2008). Those who did affirm the existence of the soul were likely to claim it would continue to exist after death. In addition to the differences in the form of the soul and the mind, individuals were likely to ascribe differences in function. Particularly, the mind was more likely to be associated with cognitive functions, whereas the soul was more likely to be associated with spiritual functions.

In sum, the brain appeared to be conceptualized according to the life cycle, constrained by birth, growth, and death (Richert and Harris 2008). The soul, however, was dissociated from the cycle of conception, life, and death. These findings do not support the idea that the soul is merely a by-product of developing concept of the mind. The authors argued individuals consider the soul an "invariable essence" across development, one that is associated with spiritual matters. It is important to note, however, that although these participants constituted a diverse religious group, it is unclear to how and to what extent differences in religious teaching and involvement influence these findings.

12.5 Summary and Conclusions

As the above research has suggested, there is no single cognitive starting point for religious concepts. As with other kinds of concepts, religious concepts derive from a variety of sources and predispositions. Concepts of supernatural agents likely derive from early agent concepts. Belief in an afterlife likely draws from assumptions based on folk-psychology. Early assumptions about causality likely form the basis for belief in creation and the efficacy of prayers and rituals.

Thus, a developmental approach has helped researchers identify the cognitive bases for religious concepts, which can inform discussions about how and why people have acquired and transmitted religious concepts over the course of evolutionary history. However, from a cognitive developmental perspective, there is much more that needs to be explained in regard to individual belief in religious concepts. Though research has yet to address at what age and based on which input children begin to question the truth value of the concepts they have received. Without cultural input and support, it is unclear whether religious concepts would disappear or simply relegate to the fantasy realm. However, it seems clear that the function of the concepts would drastically change.

As outlined above, research into the cognitive foundations of religious concepts has built a strong foundation for arguing religious concepts are the result of natural cognitive predispositions. What often gets lost in the shuffle of these research programs has been the uniqueness of religious concepts. Although religious concepts may have evolved from natural cognitive processes, so have all other "supernatural" concepts, such as fairies and ghosts; it is important not to forget that religious

concepts and activities hold a "special place" in the lives of religious people. Furthermore, although all people have the capacity for receiving religious concepts, not all people believe in the truth of them. Although less studied in this area of research, the cultural factors that propagate the content and belief in religious concepts will be an important next step to further our understanding in this area.

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