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Children's Attributions of Beliefs to Humans and God: Cross-Cultural Evidence

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Abstract

The capacity to attribute beliefs to others in order to understand action is one of the mainstays of human cognition. Yet it is debatable whether children attribute beliefs in the same way to all agents. In this paper, we present the results of a false-belief task concerning humans and God run with a sample of Maya children aged 4 to 7, and place them in the context of several psychological theories of cognitive development. Children were found to attribute beliefs in different ways to humans and God. The evidence also speaks to the debate concerning the universality and uniformity of the development of folk-psychological reasoning.

Children's Attributions of Beliefs to Humans and God: Cross-Cultural Evidence

Humans routinely attribute intentions, beliefs, and desires in order to interpret the behavior of others. Other humans are seen as agents, that is, as entities that pursue goals in accordance with their beliefs and desires. Attributions of agency are so ubiquitous that they are typically taken for granted in everyday life. These attributions are not always correct in identifying the beliefs and desires that underlie a specific action of an agent; yet, if people did not see others as agents, the capacity to understand their behavior would be severely impaired. For example, people would be surprised when others got up and moved.

Abundant research documents children's acquisition of human agent concepts over the first several years of life (Astington et al., 1988; Perner, 1993; Wellman, 1990), but there is little work available on the development of non-human agent concepts. Yet, people often attribute intentions, beliefs and desires to animals as well as to ghosts, gods, demons, and monsters. Scholars have long assumed that children first acquire concepts of human agency and then use them as templates to understand all nonhuman agents. One exception in this regard is found in the work of Barrett and collaborators (Barrett et al., 2001; Richert & Barrett, 2002; see also Atran, 2002, for an evolutionary account of why children cognize nonhuman agency).

In this article, we offer further support for Barrett's position, showing that Yukatek children do not reason in the same way about the agency of humans and God. In the first part, we discuss the development of human agent concepts, specifically with regards to the false-belief task. Then, we outline the predictions implied by several theoretical positions concerning the development of children's understanding of humans' and God's beliefs. After that, we present experimental evidence from a Yukatek Maya sample to support the hypothesis that children do not reason about God strictly in human terms. Finally, we discuss the theoretical positions and

their predictions in light of the results and place the evidence in the larger context of theory of mind research.

<center>The Development of Human Agent Concepts</center>

The scientific literature on child development usually distinguishes three phases in the development of understanding of agency (see for example Csibra et al., 1999; Gergely et al., 1995; Gopnik & Meltzoff, 1997; Wellman, 1990). During the first year or so, children are believed to apply a principle of rational action – that is, they begin to appreciate that humans do not merely propel themselves, but do so in purposeful and rational ways. By the second or third year, children incorporate simple mentalistic attributions into this rational principle: the purposeful and rational action is understood to be driven by desires. Finally, during the fourth or fifth year, the principle of rational action is coupled with representational attributions: agents are seen as pursuing goals in accordance to their <u>beliefs</u>.

The emergence of this representational stage, which is a necessary condition for attributing a full-fledged theory of mind to an entity, is the most relevant to the arguments and experimental results presented in this article. Exactly when this transition takes place has been a matter of considerable debate generating an abundance of research (e.g., Astington et al., 1988; Carruthers & Smith, 1996; Whiten, 1991). Although some evidence has emerged for the presence of representational reasoning in 3-year-olds (Chandler et al., 1989; Hala et al., 1991; Lewis & Osbourne, 1990; Siegal & Beattie, 1991), the bulk of the data available suggests that this ability is neither stable nor robust until children are five or older (Flavell et al., 1990; Perner et al., 1987; Wellman & Bartsch 1988; Wellman & Wooley 1990; Wimmer & Perner, 1983).

Since Premack and Woodruff (1978) started experimenting with non-human primates in order to establish the possibility that they had a 'theory of mind,' different ways of testing for this have been designed and tried out. As Dennett (1978) pointed out, you can credit an entity with a conception of belief only if there is evidence that it is able to understand that others may entertain <u>false</u> beliefs. Therefore, to probe children's representational understanding of agency – whether they have a conception of belief – it is necessary to ascertain that they figure out that people can have false beliefs and that these beliefs can motivate behavior.

A variety of false-belief tasks have been developed in the last twenty years to test children's understanding of beliefs. One such experiment is known as the 'Sally-Ann' test (Wimmer & Perner, 1983). In this test, the child is made to look at a scene in which two dolls are animated by experimenters.[1] The two dolls enter the stage; one of them (Sally) places an object in one of two containers and leaves the room. While Sally is out, the second doll (Ann) moves the object into the second container. Sally re-enters the stage; at that point, children are asked where Sally, who is unaware that the switch took place, will look for the object. Children, therefore, are asked to infer whether Sally will act according to her false belief (that the object is still in the original container) or not.

Another false belief task, the one used in the experiments that will be presented later, is known as the 'surprising contents' task. In it, children are shown a closed container (usually a cracker box with a conspicuous picture of its contents on it) and asked what they believe is inside. The experimenter then opens the box to reveal that the crackers have been removed, and that small rocks (or a similarly unexpected item) have been put in their place. After reclosing the box, the experimenter checks that the children are still clear on what the box contains. The

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[1] The dolls are used to represent human beings. Wellman et al. (2001) have shown in a meta-analysis of false-belief studies that using a doll as a proxy for an actual human being does not affect the results of the task.

experimenter then introduces a doll who has not seen the inside of the box, and asks what the doll would think is in the container. Again, the point of the experiment is to establish whether children are capable of figuring out that other agents may have false beliefs and act accordingly.

The Development of God Concepts

By and large the research pertaining to children's understanding of agent concepts deals exclusively with <u>human</u> agent concepts: how children's concepts of human agency become increasingly specialized. In false-belief tasks, as well as in most other studies of children's understanding of agency, experimenters have asked children to reason about human actions, beliefs, desires, and emotions. Very little available research addresses the generalizability of children's understanding of agency to non-human agents in general, and to God in particular. However, by looking at the assumptions of several theoretical positions, we can envisage their predictions concerning the understanding of God in comparison to humans in a false-belief task.

In Figure 1 we offer a tree diagram to show how these positions are related to each other. The graphs outline predictions of false-belief task performance in relation to humans and God. To illustrate the graphs, we will use a surprising contents task: suppose children are presented with a closed cracker box, shown that the box contains small rocks, and then asked what a human and God, who did not have a chance to look inside the box, would think is inside.
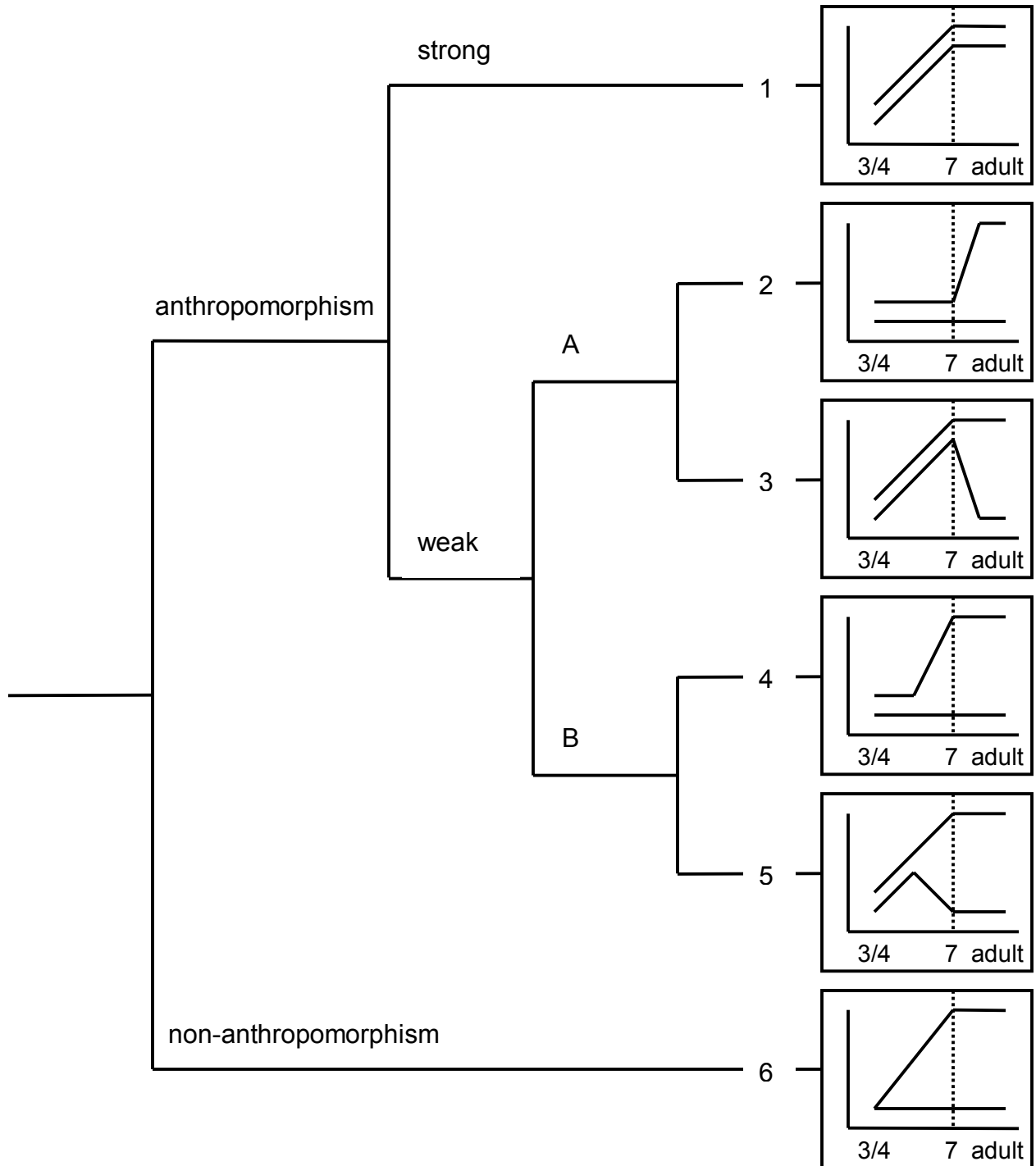
Figure 1. Predictions of False-belief Task Performance.

In all graphs, the top line represents attribution of false beliefs to humans, and the bottom line represents attribution of false belief to God. On the Y axis, performance is mapped; the higher the line, the more likely it is that a child would attribute false beliefs to the agent in question – to say that a human or God would think that the box contains crackers. The X axis shows the developmental time frame. The age range of 3/4 to 7 is the most relevant to our discussion, since it is then that children, according to the current literature, come to attribute false beliefs to human agents. The dotted line at age 7 signifies that developments that take place after it fall outside of the time frame that is most relevant to our arguments.

At the highest level of the tree, the opposition is between anthropomorphic and non-anthropomorphic positions. From a non-anthropomorphic perspective, children would start to differentiate humans and God (attributing more false beliefs to humans than to God) from the very beginning of the developmental stage of our concern. From an anthropomorphic perspective, on the other hand, children in general would attribute either true beliefs or false beliefs to both humans and God <u>in equal measure, initially, and for at least some part</u> of this developmental time frame.[2]

Not all anthropomorphic positions postulate the same sort of developmental course. At the very least, we can distinguish two anthropomorphic stances: a weak and a strong one. Strong anthropomorphism (graph 1) suggests that there is no differentiation in the attribution of beliefs to humans and God throughout the entire developmental course, from childhood to adulthood.

A strong anthropomorphic position is best exemplified by pure simulationism.[3] A pure simulation-based account of how children answer the false-belief task would say that, when

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[2] We would like to emphasize that we are using the opposition anthropomorphism/non-anthropomorphism only as far as the attribution of beliefs goes – we are not implying that children (and humans more generally) do not consider God and humans similar in other respects (see for example the experiments in Barrett & Keil, 1996).

[3] Here we use the notion of pure simulationism as characterized by Nichols et al. (1996).

asked about what other agents would think about the contents of the container, children would put themselves in the situation of the other agent. That is, they would use the information that the other agent has about the task (i.e., that an opaque, closed cracker box was presented, and that a question about its contents was asked), [4] take it as if it were the information they themselves have about the task, and reason accordingly (i.e, that the cracker box should contain crackers). Once their off-line false-belief conclusion is reached, children attribute it to the agent in question. In graph 1, the two lines do not separate. The fact that the lines climb from age 3 or 4 to age 7 simply reflects the fact that children are improving their ability to simulate. If children had acquired this capacity by age 3 or 4, the two lines would be at ceiling throughout.

Weak anthropomorphism (graphs 2 to 5) instead postulates that children initially use humans as a basis to understand God's beliefs but then, after a time lag, start to differentiate them. It can be further specified that 'weak' anthropomorphism actually covers two slightly different positions. The first position (A) is perhaps best represented in Piaget's work (1960). There are two possible interpretations of Piaget's understanding of the development of God concepts. In graph 2, an infallible parent (who is capable of knowing what is inside the box without having to see it) is used as the basis to understand God until quite late in development. At some point, children start to recognize that parents can entertain false beliefs but they do not transfer this characteristic to God. For example, children would initially say that both agents believe that rocks are inside the box, then, by age 7, they would say that humans believe that crackers are inside the box. Conversely, in graph 3, a fallible human being is used as the basis to understand God until quite late in development. Then, upon reaching adolescence, children start

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[4] In a pure simulationist account, children would not be able to use theoretical information about the other agent (such as that God is omniscient) in their reasoning about the task. We will return to this point in the final discussion.

to learn that God possesses certain characteristics – such as omniscience – that set God aside from common humans.

A second weak anthropomorphic position (B) postulates that children initially use humans as a basis to understand God's beliefs but start to differentiate them earlier in development than Piaget postulated – before being able to reliably attribute false beliefs to humans. In other words, we are envisaging the possibility of Piaget being wrong simply in terms of the onset of the differentiation. In graph 4, an omniscient human is used as a basis to understand God. In graph 5, a normal human is instead used as the basis. This explains why both the human and the God line stay flat for some time in the first instance, and climb immediately in the second. Although these positions are not well established in the literature, they are possibilities that one should consider when dealing with cross-cultural data. For example, graph 5 can be seen as a plausible representation of people living in a society where the concept of God as omniscient is not very widespread.

Finally, moving on to the last graph in Figure 1, a non-anthropomorphic perspective would predict that children being tested on the false-belief task would start differentiating between humans and God very early in development. This is the position that Justin Barrett and collaborators have been advocating (Barrett et al., 2001; Richert & Barrett, 2002; Atran, 2002). In graph 6, the God line remains close to floor level, which signifies that children from an early age attribute mostly true beliefs to God – i.e., that God knows that there are rocks in the box. The human line, on the other hand, starts at the same level as the God line but then steeply increases reaching a level reliably above chance by the age of about 5 or 6 – children increasingly say that humans believe that the box contains crackers, as their capacity to attribute false beliefs improves. Experimental data from the United States supports the prediction of this non-

anthropomorphic position (Barrett et al., 2001). In figure 2, the results of a surprising contents

experiment run with a sample of American children recruited from Reformed and Lutheran

Protestant churches are presented.
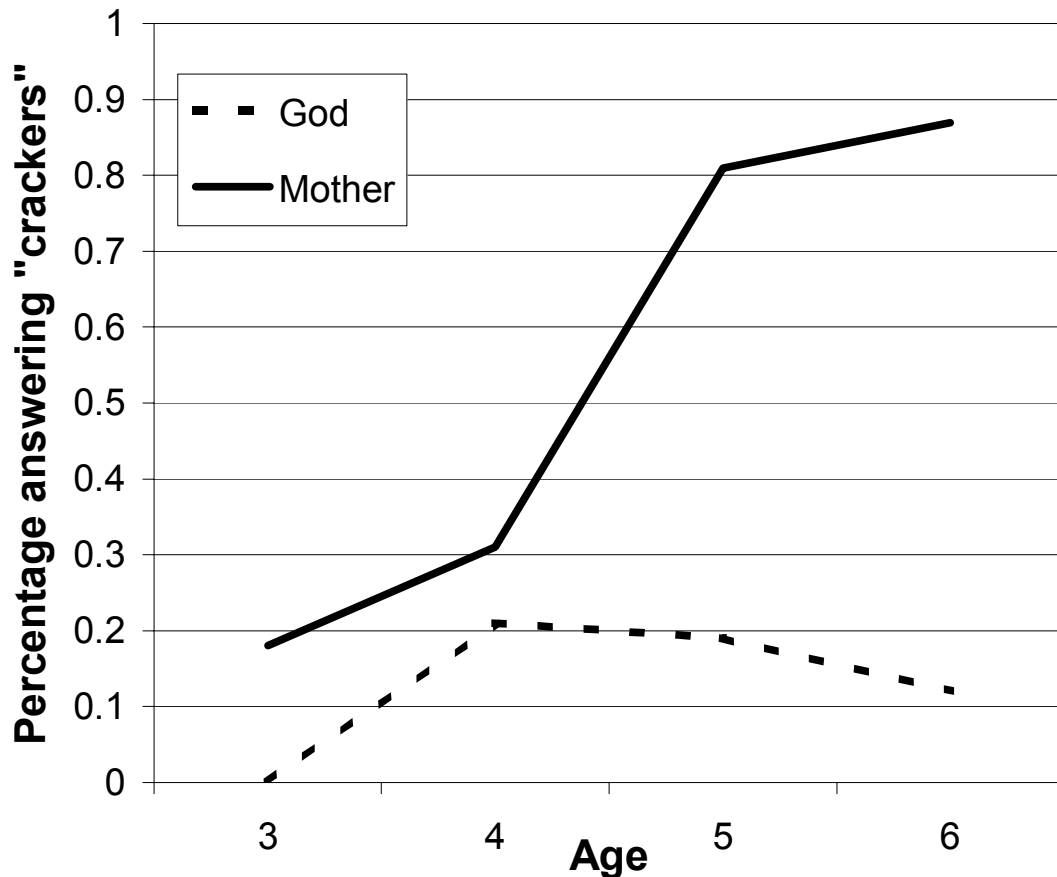
Figure 2. False-belief Task – US Children

Children in the US sample can be seen to treat humans and God in the same way up to

age 4. By age 5, they sharply differentiate between the two agents.[5] These results provide

evidence for this non-anthropomorphic perspective. However, there is no available cross-cultural

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[5] The divergence between God and the mother took place as children started to attribute false beliefs to the latter. A
Wilcoxon Signed-Ranks Test for matched pairs comparing "crackers" responses between mother and God at each
specific age detected significant differences only for 5- and 6-year-olds ([*z = 2.93, p = .003*], [*z = 2.37, p = .018*],
respectively).

evidence concerning this question. In the next section, we present data on a similar false-belief

task run with a sample of Yukatek Maya children, in order to provide a test of these theoretical

predictions.

Results

The Maya sample consisted of 48 children divided in four age groups: eleven 4-year-olds

(4,0-4,11), twelve 5-year-olds (5,0-5,11), twelve 6-year-olds (6,0-6,11), and thirteen 7-year-olds

(7,0-7,10). Twenty-six children were male, and twenty-two female. The experimenter piloted the

protocol with some 3-year-olds, but as most of them seemed to have difficulty in concentrating

long enough, their results were dropped from the analysis. The children resided in four small

rural villages in the Quintana Roo state in the Yucatán peninsula (Southeastern Mexico). The

overwhelming majority of people living in the rural interior of Quintana Roo are ethnic Maya.

The children generally began attending preschool when they were four or five years old,

and started primary school when they turned six. Both the preschool and the primary school offer

bilingual education, in Spanish and Yukatek Mayan. Although many individuals below the age

of 50 are reasonably proficient in Spanish, the favored language in the domestic environment is

Yukatek. For this reason, most of the children who enter preschool are virtually monolingual in

this language. All children were interviewed in Yukatek by a native speaker, who has

participated in several other studies in the region and is known to many of the participants'

families.

The experiment consisted in a version of the surprising contents task. Participants were

interviewed either in the hut of the experimenters or in their family's hut. The agents used were a

doll named Soledad and the Catholic God (the Maya have adopted this religious entity into their

pantheon several centuries ago). The researchers used a container made out of a dried squash,

known in Yukatek as ho'ma, which keeps maize tortillas warm after cooking them. The ho'ma

has a small opening carved out on top, just large enough to put one's hand through. Every house

visited had at least one and usually several of these containers. Although they may be

occasionally used to store other objects, there was high consensus among the participants that the

normal, appropriate content was indeed tortillas, as measured by control questions asked at the

beginning of the experiment.

The ho'ma's opening was closed with a piece of cardboard, so that children could not tell

what was inside. One of the experimenters then opened the container to reveal a pair of shorts, a

most unusual content. The container was closed again and the experimenters then asked the set

of questions about the doll and God, in the following form: "What does X think is in the ho'ma?"

Answers were coded as 1 when children said "tortillas" and 0 when they said "shorts." The

percentage of children answering "tortillas" in each age group for the doll, the animals, and God
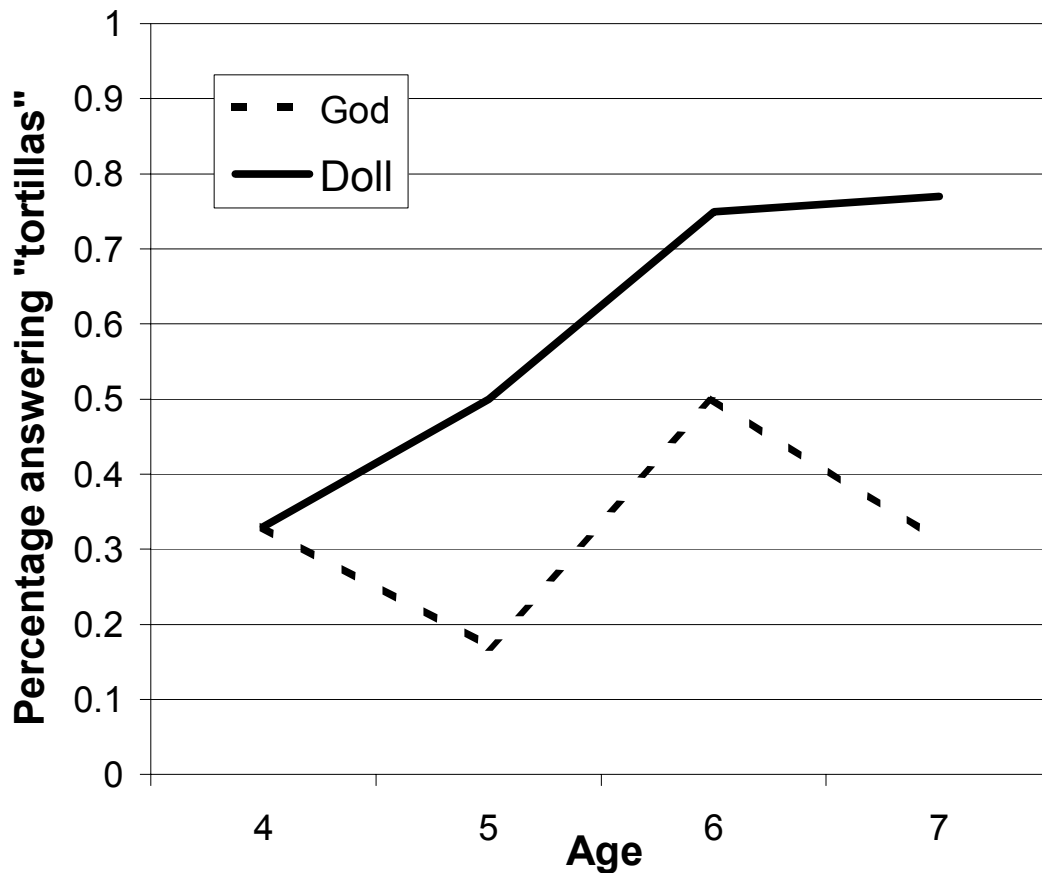
is shown in figure 3.

Figure 3. False-belief Task – Maya Children

The answers for the doll showed a statistically significant positive correlation with age [*r(46) = .341*]. Therefore, as age increased, Maya children were more likely to attribute false beliefs to the doll. For example, 33% of the 4-year-olds said that the doll would think tortillas were in the container compared to 77% of 7-year-olds. In contrast, children clearly treated God differently from the doll – as in the US, no significant correlation was detected between answers for God and age [*r(46) = .066*]. A Wilcoxon Signed-Ranks Test for matched pairs comparing "tortillas" responses found significant differences between God and the doll for 5-year-olds [*z = -2.000, p = .046*] and 7-year-olds [*z = -2.449, p = .014*] .

When looking at the results, some patterns become apparent. The human line follows the same developmental course in both samples, but the Maya children seem to reliably pass the task about a year later than the American children. The God line is statistically flat (as for the US sample); however, in the Maya sample the difference between God and humans is not significant for 6-year-olds, while it is both for 5- and 7-year-olds.

Discussion

The vast majority of developmental studies of false-belief understanding focus on samples of Euro-American children, often from relatively high SES backgrounds. The cross-cultural evidence available so far is incomplete and inconclusive. At any rate, the two available cross-cultural studies (Avis and Harris, 1991, Vinden, 1996) and those presented here seem to show that there is some uniformity in the way false belief understanding develops. However, even a brief inspection of the data presented above reveals that Yukatek children seem to be able to reliably pass a false-belief task only at age 7 (although their performance level is extremely close a year before); furthermore, they do not seem to reach the near-ceiling levels that are reported for many Euro-American samples of the same age.[6] It is possible that in small-scale societies with a collectivistic orientation the patterns of behavior will be more standardized than in large-scale ones. In such societies, mental and emotional states of single individuals are likely to be de-emphasized, and thus to become relatively unimportant. In this case, it might not be adaptive to be individualistic or to think of others in mentalistic terms (Lillard 1998; Vinden & Astington 2000). To fully account for the delay reported here further studies are needed.

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[6] The *p*-values for the test against chance for the performance of 6- and 7-year-olds on the 'doll' false belief question were .082 (mean: .75) and .047 (mean: .77), respectively.

Now turning to the discussion of the theoretical positions and their predictions, we can see first of all that the Maya results add to the American results in giving strong evidence against pure simulationism. Generally, there are two general ways of explaining children's performance in false-belief tasks – one simulation-based, the other information-based (see Nichols et al., 1996). The first argues that children run an off-line simulation of the behavior to be predicted and/or the thought to be interpreted.[7] The second, instead, argues that children use <u>at least some</u> theoretical information about the relevant agent's knowledge in order to predict its behavior and interpret its thought. Take the following example (from Harris, 1992; also see Nichols et al., 1996): you are given a list of grammatical and ungrammatical sentences in your language and you are asked whether other speakers of the same language would judge them as grammatical or ungrammatical. According to the simulation-based view, you would use your own grammaticality system off-line to identify the judgments of others. That is, you would read the sentence to yourself, see what your own judgment would be, then assume that the other speakers would make the same judgments. According to the information-based view, you have a body of theoretical knowledge about the grammaticality judgments of other speakers in your linguistic community, which you use in making your interpretation. It is for this reason that children, if they are pure simulationists, cannot be expected to use the theoretical information that God is omniscient in order to predict what he would think is inside the container.

When we say that the results give strong evidence against simulationism, it is only in the context of this general opposition. We are not at all implying that the results give evidence against all types of simulationism, since they could be explained by any information-based

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[7] In the experiments described above, children were not asked questions about other agents' behavior. However, Barrett et al. (2001), obtained similar results when a sample of US children were asked a question about behavior – "Where would agent X look for object Y?" instead of "Where would agent X think the object is located?"

approach, including both the theory-theory perspectives[8] or hybrid (theory contaminated) versions of simulationism.

Secondly, while our results do not address the question of whether chidren consider the mother as a special kind of agent,[9] they add to the US findings in speaking against weak anthropomorphism. More generally, the results add to the growing literature that provides evidence against Piaget's notion that children cannot treat other agents as importantly different from humans. For example, contrary to Piagetian artificialism (Piaget, 1969), Petrovich (1997) found that, although 4-year-olds know that humans make machines and God does not, when asked to account for the origins of natural objects such as large rocks or mountains, they gave God the credit and not people. Similarly, several studies have uncovered evidence that 4-year-old (and, in some cases, older) children believe magicians are a special type of agent able to perform actions that apparently violate natural causation (Chandler & Lalonde, 1994; Rosengren & Hickling, 1994). Further, recent research suggests that 4- and 5-year-olds appreciate differences in perceptual abilities of different agents across sensory modalities (Richert & Barrett, 2002) and appreciate that God is more likely than humans to possess various forms of perceptual knowledge (Barrett et al., 2001).

Finally, the Maya results give the first cross-cultural evidence for the hypothesis advanced by Barrett and collaborators that children do not treat God and humans in the same way, as far as the attribution of beliefs is concerned. That children truly understand God as a different sort of agent, and not just a human with a few strange properties (e.g. infallible beliefs,

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[8] In the most general sense, this label covers the position of those who argue that our folk psychology is similar in some respects to scientific theories (for example Gopnik and Meltzoff, 1997; Wellman, 1990), as well as those who argue that our folk psychology is a type of modular system (Baron-Cohen, 1995; Scholl & Leslie, 1999).

[9] We decided not to use the mother as stimulus in Yucatán as it proved impossible to interview the children while their mother was away. In this situation, it would not have been feasible to control for the possibility of the child thinking the mother had a chance to see what was inside the container.

ability to make mountains) is difficult to disambiguate. Also, by no means do the data here support the claim that children's concepts of God are independent of their understanding of people in general and their parents in particular. Christian theology teaches about a God who practiced self-anthropomorphization by becoming human in the form of Jesus of Nazareth. The present results, however, clearly demonstrate that Yukatek children, as well as American children, do not treat God as merely human.

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