

Conceptualizing a Nonnatural Entity: Anthropomorphism in God Concepts

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We investigate the problem of how nonnatural entities are represented by examining university students' concepts of God, both professed theological beliefs and concepts used in comprehension of narratives. In three story processing tasks, subjects often used an anthropomorphic God concept that is inconsistent with stated theological beliefs; and drastically distorted the narratives without any awareness of doing so. By heightening subjects' awareness of their theological beliefs, we were able to manipulate the degree of anthropomorphization. This tendency to anthropomorphize may be generalizable to other agents. God (and possibly other agents) is unintentionally anthropomorphized in some contexts, perhaps as a means of representing poorly understood nonnatural entities. © 1996 Academic Press, Inc.

There has been increasing interest in uncovering how we represent the categories of existence. Our notions of what sorts of things there are, that is, our ontological knowledge, may undergird in largely implicit ways much of how we categorize and make sense of the world (Sommers, 1963; Keil, 1979). The nature of ontological knowledge and its degree of distinctiveness from other forms of knowledge remains an active area of inquiry (Chi, 1992); but one critical question rarely addressed asks how entities that do not conform to existing ontological knowledge are conceived by adults. Developmentally, it is often assumed that children learn how to incorporate such new entities by restructuring their ontological knowledge (*ibid.*); but there is much less consensus on how adults might conceive of a widely discussed entity that is nonetheless apparently not conforming to any other ontological kind. No entity poses the problem more clearly than God.

In contrast to the ancient Greeks, contemporary Western theologies suggest the existence of a gaping ontological chasm between God and humans: "On this view, God and the world are two distinct realities. The difference is not merely quantitative but qualitative. God is not simply more of what we are.

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There is an essential discontinuity . . .” (Spykman, 1992, p. 64). One way to appreciate this “essential discontinuity” is to consider the descriptions of God offered by the three monotheisms that have most influenced Western thought about God.

Catholic and Protestant teachings describe God as being: infinite, limitless, all-perfect, all-powerful, unchanging, nonmaterial, all-knowing, and perfectly simple (Smith, 1955). Similarly, Judaism speaks of God as omnipotent, omniscient, omnipresent, and eternal (Kohler, 1918). God is neither bound nor limited by space or physical laws. Within Islamic theology the same essential themes are repeated: human existence is entirely different than God’s (Allah’s). Indeed, Islamic theologian Mohammad Zia Ullah discusses the distinction in terms of its psychological consequences: “God is infinite, pervasive, and man finite and limited to a locality. Man cannot comprehend God as he can other things. . . . God is without limits, without dimensions. . . . How can a limitless, infinite being be contained in the mind of a limited being like man?” (1984, p. 19).

If these religions, which have had a profound impact on Western theological concepts, attribute to God a vastly different type of existence than our own, how do we cross this ontological gap and understand God? Theologically this problem may be addressed by what in Christianity is called revelation: God allows self-disclosure in terms that people can understand and appreciate. The specifics of this doctrine are an interesting study for theologians, but the general notion of revelation raises particular questions for psychologists as well.

If God is revealed through naturalistic means and in naturalistic terms, how then do we make sense of this revelation? How do we incorporate natural features into our representation of a nonnatural¹ entity? An analogous problem might be to consider what it would be like to be a bat (Nagel, 1974). The other state of being is so different that the task seems impossible. However, we know many things about bats, and so this problem is trivial when compared to comprehension of a being that is invisible, immaterial, atemporal, and so on. As natural creatures, we can only draw upon natural experiences in our attempts to characterize God.

Unfortunately, the canonical texts of Western religions do not simplify matters much. Information about God in these texts take the form of either proclamations of God’s vast ontological differences from us, or characterizations of God in natural and often anthropomorphic terms. The implication of the ontological gap is that this second class of canonical data is metaphorical

¹ God is termed a “nonnatural” rather than a “super-natural” entity to emphasize the theological claim that God has a completely different state of being. God is not a part of nature or simply “above” nature. “Nonnatural” is also chosen because of the potential family resemblance concepts of God might have with other attempts to conceptualize entities of unusual but perhaps not “super” ontological categories.

to a great extent. In order to understand these metaphors we must have some basis for application. For example, understanding the statement “God is loving” requires us to make some preliminary assumptions about what type of being God is in order for that statement to be useful. If we cannot agree that God is the type of thing that can be referred to—an ontological assumption—then “God” would be meaningless in this context, and so “God is loving” would also be meaningless. Apparently “able to be referred to” is one property that is nearly universally attributed to God. Surely there must be others. The words we choose to describe God or the activities of God are not random or arbitrary, suggesting some basic, commonly held conceptions of God.

The problem of understanding God can now be recast as the problem of finding these basic underlying assumptions and where they come from. One possible solution suggested by an examination of religious language and the psychological literature is anthropomorphism: making God in the image of ourselves.

God is often spoken about in very naturalistic, human-like terms, as if God is a super-human. Sometimes God-talk is blatantly anthropomorphic as in “the hand of God,” and sometimes it is subtle as in “God sees.” Even more subtle are instances of assigning natural properties to God in our discourse, as in “Then God. . . .” Simply prefacing a phrase about God with “then” places an atemporal being in a temporal framework. Although this language is generally considered metaphorical, it could be the case that this language actually expresses the underlying conception of God. The needed basic assumptions for understanding discourse about God are supplied by ignoring the ontological distance.

Psychologists have long assumed that anthropomorphic language reflects underlying cognitive anthropomorphism. Freud initiated this line of thought most dramatically with the suggestion that God concepts are projections of one’s father and that the start of religion is the “humanization of nature” (Freud, 1927, p. 20). Since Freud, other authors have suggested similarities between God concepts and images of a parent (Argyle, 1975), both parents in conjunction (Justice & Lambert, 1986; Birky & Ball, 1988), or of the self (Jolley & Taulbee, 1986).

Other psychologists of religion have assumed that the adjectives used to describe God are more than metaphorical. Benson and Spilka (1973) reported a positive correlation between self-esteem and loving images of God. Others suggest a relationship between loneliness and the concept of a “wrathful God” (Schwab & Petersen, 1990), while locus of control may be positively correlated with a “loving God” (deJonge, 1993). Subjects attribute particular personality dispositions to God—not merely dispositions analogous to particular human traits. Congruence between human personality and God’s “personality” is implicit.

It may seem easy enough to accept that God is anthropomorphized when

it comes to personality traits and dispositions, but these studies suggest that our anthropomorphism goes much farther. Perhaps anthropomorphism, as Guthrie argues (1980; 1993) is an integral part of religious thought. If people anthropomorphize God's "personality," then more fundamental anthropomorphism may be needed to form God concepts. If we think of God's existence as wholly different from our own, how do we even think of God as loving? The thought is somewhat analogous to calling a quark "charming" or a pile of sand "treacherous." Are we committing a category mistake by suggesting cross-ontological properties? If we do assign personality to different ontological groups while fully comprehending the incongruity, this practice would still represent a bizarre cognitive activity worthy of further investigation. Alternatively, we may not perceive the incongruity.

Cognitive accounts of religious ideas argue that God concepts must be comprised of naturalistic and nonnaturalistic properties and cannot only include one or the other. Sperber (1994) has emphasized the role counterintuitive characteristics play in contributing to the "cultural robustness" of religious ideas. Boyer has expanded this observation into a well-developed cognitive theory of religion (1994).

In short, Boyer argues that religious ideas are propagated if they (1) violate some cognitive intuitions regarding characteristics of members of their particular ontological categories, while (2) adhering to the bulk of these intuitions. If religious ideas do not fit with a large number of common intuitions, they will be difficult to hold coherently and use to generate predictions and inferences. Too many violations of cognitive intuitions would cause an enormous processing strain. However, as Sperber (1994) has pointed out, some violations are necessary to make the ideas extraordinary and attention-demanding; otherwise they would not be interesting enough to pass on as "religious" ideas.

Although Boyer (1994) has applied this theory to explain supernatural agents of the Fang people (Cameroon), the theory has some difficulty accounting for the Abrahamic God of the Western world. The main difficulty is that the cognitive inductions that are to be maintained or violated are based on an ontological category membership. In the case of the *bekong* (ghosts/ancestors) of the Fang, they are classified as sentient beings, the ontological category humans occupy. As has been suggested above, it is common in the Abrahamic religions to assign God to a different ontological category than people. This category does share some properties in common with sentient beings (e.g., intention), but it is no more in the same category with humans than dogs are with rocks, even though those categories also share some properties (e.g., physical structure). Since God occupies a different ontological category, it is unclear what cognitive intuitions apply to God's ontology.

God concepts held by common people might actually characterize God as a sentient being. If so, Boyer's theory would predict that they would

take the specific form of a prototypical “sentient being” with some unusual or counterintuitive properties, probably a super human.

A different cognition-based account of religious thought has been advanced by Guthrie (1993), who stresses the centrality of anthropomorphism. The tendency to anthropomorphize is seen as a fundamental cognitive bias in which novel or ambiguous stimuli are processed as anthropomorphic until other evidence is made available to prove this bias wrong. This strategy is generalized to natural concepts and processes and, consequently, becomes a foundation for all religious thought. All religious ideas, including the Western God, are anthropomorphic by nature under this model.

Despite theological descriptions, people seem to incorporate anthropomorphic and naturalistic characterizations into their intuitive God concepts. This study asks whether anthropomorphic and naturalistic language about God is more than a simple literary device. Perhaps conceptions of God must be anthropomorphic, even while theological beliefs maintain otherwise. It may be that the “theological God” is radically different from the “intuitive God” normally described in everyday discourse. Even individuals who explicitly endorse the theological version of God might nonetheless implicitly embrace a very different version in most of their daily thoughts.

The first study described in this paper uses a variation of a well-known story comprehension paradigm (Bransford & McCarrell, 1974). With this method Bransford and McCarrell showed that information expressed by a sentence cannot always be equated with what is comprehended. Subjects’ prior beliefs can distort their recall of the information actually provided in sentences and resolve ambiguities. In the present study, subjects were read a battery of short stories in which God was an agent. After each story, subjects were asked to recall if particular pieces of information had been included in the story. Prior assumptions and beliefs were examined by considering errors in subjects’ memory for the stories and how potentially ambiguous information was interpreted.

We chose this indirect method for getting at subjects’ God concepts because it avoided the problem of “theological correctness.” If subjects were asked directly what they believed about God, responses would tend to fit into an abstract theology. Even if people use an anthropomorphic God concept in daily life, they would be hesitant to articulate this as their personal theology because it might appear juvenile. By using stories, we hoped to tap into the God concepts that subjects use in their daily lives to make judgements in real time, rather than into their theological knowledge. Moreover, in day-to-day life, the vast majority of thoughts about God seem to be framed in casual, story-like discourse rather than in abstracted theological discourse.

Barrett and VanOrman (1996) have successfully used this method to detect differences in degree of anthropomorphism between Christians who use images of God for worship and those who do not. Image users were found to anthropomorphize to a greater extent than nonimage users. Consequently, we

were hopeful that this method would also be sensitive to differences between theological concepts and everyday concepts of God used in real time.

Study 1A evaluates differences between theological expressions about God and everyday God concepts by examining differences between professed theological characterizations of God as measured by a questionnaire and concepts revealed by a story–recall task. Study 1B looks to see if these differences are peculiar to God concepts or if similar differences are found with other nonhuman, super agents. In this condition, God was replaced by a super-computer called “Uncomp.” Because Uncomp was completely novel for the subjects, entirely different than existing super-computers, they could not bring any preexisting concept of Uncomp to bear on the task. Consequently, if the results of Study 1A were due to an artifact of the task, the language of the stories should prompt subjects to anthropomorphize Uncomp to the same degree that they anthropomorphized God in that condition. Study 1C is an attempt to make subjects’ theological concepts more salient to see if performance in the story–recall task can be manipulated in this way. If so, this is strong evidence that concepts of God are what is important in determining subjects’ performance and not some artifact of the task.

Study 2 investigates the importance of memory and potential bias in Study 1 by allowing subjects in five different conditions to perform the story–recall task with transcripts of the stories right in front of them. To demonstrate how spontaneous use of anthropomorphic concepts might be, subjects in Study 3 were asked to write paraphrased versions of some of the narratives used in Study 1.

STUDY 1

If theological God concepts are used in everyday activities, then subjects’ reported theological concepts regarding God’s properties should match the God concept revealed by how subjects remember short narratives. Alternatively, subjects’ theological God concepts may place few if any physical or psychological constraints on God, but in the processing of stories, limitations on God similar to those experienced by people and other natural entities might be imposed. To illustrate this distinction, one story reads:

A boy was swimming alone in a swift and rocky river. The boy got his left leg caught between two large, gray rocks and couldn’t get out. Branches of trees kept bumping into him as they hurried past. He thought he was going to drown and so he began to struggle and pray. Though God was answering another prayer in another part of the world when the boy started praying, before long God responded by pushing one of the rocks so the boy could get his leg out. The boy struggled to the river bank and fell over exhausted.

Subjects whose everyday God concept is anthropomorphic may infer that God finished answering one prayer before attending to the boy. If so, they would tend to misreport that this is actually what the story said. Subjects

who employ a God concept in which God performs many tasks simultaneously would be unlikely to report that the story said God finished answering one prayer before saving the boy. It is just as likely that God rescued the boy **while** answering the other prayer.

Method: 1A

Subjects. Subjects for the first three studies were 52 volunteer graduate and undergraduate university students of various majors, ranging in age from 17 to 28 with a mean age of 20.0 years. Sixty percent of the subjects were female. Subjects represented many different religious affiliations including Bahaim, Buddhism, Christianity (Catholic and Protestant), Hinduism, and Judaism. Many subjects reported being atheist or agnostic. Subjects were randomly assigned to one of the first three studies: 22 to the first (1A), and 15 each to Studies 1B and 1C.²

Materials. A questionnaire of beliefs about God was composed and given to 18 subjects. The questionnaire included ratings of self-religiosity and religious affiliation, and a number of multiple choice and yes–no questions targeted at specific properties God might possess. The written instructions asked subjects to answer the questions using their own concepts of God assuming that God exists. Freedom to use one’s own concept of God was also included on the subjects’ consent form. Although the questionnaire included a number of questions, the ones of interest for this study were those that asked whether or not (a) God can read minds; (b) God knows everything; (c) God can do multiple mental activities simultaneously; (d) God needs to be near something to see, hear, smell, taste, or feel it; (e) God is spatial (in a particular place or places) or nonspatial (no where at all); and (f) God can occupy space with another object without in any way distorting it.

Eight short narratives (approximately 100 words each) in which God was an agent were composed and recorded on audio cassette. Recall items for each story were also recorded with brief pauses following each item. For example, a recall item for the story given above included “The boy was swimming alone,” followed by a pause. The pauses were intentionally brief (approximately 2 s) so that subjects would be forced to answer whether or not the information of the given item was included in the story based on their conceptual representation of the story. Six of the eight stories were followed by eight recall items and the remaining two stories had nine, for a total of 66 recall items: 44 “base” items that were concerned with the basic facts of the story including God’s activities (see example above), and 22 “God” items that were concerned with how God was conceptualized. For 21 of the 44 base items, the correct answer was “yes.”

² The first three studies were conducted simultaneously with subjects selected from a common sample. Consequently, they can be understood as one three-group experiment. For the sake of clarity they are presented as separate studies.

For the God items, the correct answer was always “no” due to the nature of the items. An example of a God item is “God had just finished answering another prayer when God helped the boy.” A representative set of stories and recall items are shown in Appendix A.

Because this protocol relies on mistaken comprehension, all God items included information not in the stories but suggesting particular dimensions of an anthropomorphic concept (e.g., sequential agency as in the God item given above). A “yes” answer on any of these items was considered evidence for the attribution of particular property to God that was not expressed in the story, even if an omnipotent God could exhibit some of these properties. The possibility of behaving in a certain way does not entail that the behavior or particular property was exhibited in the story. These properties included God moving, being in a particular place, requiring sensory input to gather information, performing only one task at a time, having a single focus of attention, having sensory limitations, and being unable to process competing sensory stimuli distinctly. To illustrate, it is an anthropomorphic assumption to infer that when the sound of a jet makes it impossible for two birds to hear each other, God cannot hear the birds over the sound of the jet either.

The stories and corresponding recall items were played on a standard audio cassette player in the same random order for all subjects. Subjects were asked to circle “Yes” when the subject thought the information conveyed by the recall sentence was included in the story, and “No” when it was not.

Procedure. It was intended for questionnaire–story task presentation to be counterbalanced across subjects. However, after running seven subjects each in the two presentation orders, it appeared that answering the questionnaire first was improving performance on the God items of the story task. Perhaps this is due to priming subjects’ theological concepts (see Study 1C). Consequently, the remaining subjects completed the story task first. Four of these subjects left before completing the questionnaire. Analyses for Study 1A were performed on the 18 subjects who participated in both tasks. The 15 subjects who completed the story task before the questionnaire (including the four who did not complete the questionnaire) were used as the control group for comparisons with Studies 1B and 1C.

Subjects were encouraged to think of “God” in any way they wished for the duration of the task. The stories were then played. After each story, the experimenter asked three questions, pausing for subjects to write answers: (1) Who or what do you think was the main character in the story? (2) Do you think the author of the story was female or male? (3) Do you think the author of the story was older than 30 or younger than 30? The function of these questions was twofold. They were intended to increase the delay between the telling of the story and its recall and to give subjects reason to reflect on the story on a conceptual level. Pilot work suggested that if there were no such delay, some subjects would remember specific words and phrases better than the general narrative content.

After the filler questions, the experimenter said, "Now I would like you to tell me which of the following pieces of information were included in the story," and then played the recording of the recall items for the preceding narrative. This process was repeated for all eight stories. Subjects were then asked to fill out the questionnaire at their leisure.

Method: 1B

Materials. There were only a few differences between this task and the first condition. Most importantly, "God" was replaced by "Uncomp" in all the stories and recall items, and subjects were not told that the study was about God concepts. Additionally, a few minor changes in the stories had to be made to accommodate the change in character. Wherever a form of "pray" appeared in the original stories, it was replaced by a form of "call." One story also includes God helping an angel work on a crossword puzzle. This was replaced with Uncomp helping a U.N. delegate work on a crossword puzzle.

Procedure. Before the stories were played, Uncomp was described to the subjects. As much as possible with a physical entity, Uncomp was attributed properties that the questionnaires suggested are commonly attributed to God. However, two God recall items had to be omitted from the analysis. Both items asked if the story included information about the location of Uncomp (God). For the God-stories, no information about location was included but for the Uncomp-stories, the information is implicitly included. Subjects were read the following description of Uncomp twice:

The year is 4093 A.D. Uncomp is a super-computer which was built by the United Nations to help keep peace and do good in the world. Uncomp is a system of pairs of microscopic disks: one a sensor and one an effector. The sensor disk of each pair gives Uncomp abilities roughly similar to hearing, seeing, smelling, tasting, and feeling even when an object is not in direct contact with the sensors. The sensors also perceive heat, electric, and chemical activity with great sensitivity. Uncomp can use these capabilities to understand what a person does even without seeing or hearing them. Uncomp can even track the electric activity of the brain and thus read minds. The effector disks make use of electromagnetic and antigravity emissions to act on the world. These effectors enable Uncomp to move anything without touching it or being near it. Uncomp can even effect how people think and feel. These pairs of disks cover every square centimeter of the earth and so no information escapes processing. The disks do not move. Uncomp has no other components. The disks are electrically linked with any other part of the system at any time. Uncomp has no central processor and so is not anywhere in particular. Uncomp has been given a program for ethics and a program for emotions as well which run in the entire network at once. Uncomp runs independently all the time and can perform many different functions in many different places at the same time. Uncomp can retrieve information from many different places simultaneously.

After hearing the description of Uncomp, subjects were given a short, seven-item multiple choice quiz testing whether they understood the description. Only one of the 15 subjects missed any items and this subject only

missed one. The correct answer was given in this case. Subjects then listened to and responded to the questions as in 1A.

Method: 1C

Materials and procedure. Subjects in the salience condition were given the story–recall task after completing a questionnaire concerning relevant characteristics of God. The questionnaire included five free-form thought questions intended to encourage subjects to reflect on their beliefs about God, thereby making more salient their theological beliefs. Again, subjects were encouraged to answer based on their own concept of God assuming that God exists. The questions were: (1) Can it be said (using your concept of God) that God can be in two places at the same time? Why or why not? (2) Can it be said (using your concept of God) that God can do more than one thing at a time, like prevent a flood, work on a crossword puzzle, and listen to 1000 people's prayers at the same time? Why or why not? (3) Can it be said (using your concept of God) that God can act on objects or perceive things without being near them? Why or why not? (4) Can it be said (using your concept of God) that God can see, feel, taste, smell, or hear more than one thing at a time? (5) Can it be said (using your concept of God) that God does not need to use senses to gather information? Why or why not?

Subjects were given 10 min to complete the questionnaire. They then participated in the story task as in the first condition.

Results and Discussion: 1A

As predicted, answers to the questionnaires showed substantial intersubject agreement, suggesting theological concepts in which God is subject to few if any physical and psychological constraints. However, in the story task, there was a strong tendency for subjects to think of God exhibiting human limitations. Subjects showed an overwhelming tendency to agree that God can read minds, knows everything, can perform multiple mental activities at the same time, does not need to be near something to receive sensory information about it, and has nonnatural spatial properties. Table 1 lists the results of the questionnaire.

In striking contrast to the results of the questionnaire, the results of the story recall items suggest an anthropomorphic everyday God concept. For the God items, subjects incorrectly reported that the information was included in the story 61.2% of the time on the average, for a mean accuracy of 38.8%. This compares to an average accuracy of 86.2% on the base items. This difference was significant by a Mann-Whitney U test, $z = 5.139$, $p < .00001$, indicating that most of the time subjects falsely remembered particular anthropomorphic characteristics of God being mentioned in the story.

In the implausible case that subjects had no God concept available to understand and remember the stories, or the information was completely ambiguous, we would expect the God item accuracy to be at the 50% chance

TABLE 1
Answers to Questionnaire Items Regarding Characteristics of God

Characteristic of God implied by question	Percent agreed	
Can read minds	94.4 ^a	
Knows everything	94.4 ^a	
Performs multiple mental activities	94.4 ^a	
Nearness is <i>not</i> important for	Vision	100.0 ^a
	Hearing	100.0
	Smell	93.3
	Taste	93.3
	Touch	93.3
Is everywhere	75.0	
Is many places at once	6.3	
Is nowhere	18.7	
Is at one place at a time	0.0	
Does not occupy space	68.7	
Occupies space with another object	31.3	
Does not occupy space with another object	0.0	

^a Eighteen subjects answered these items. Sixteen responded to the remaining items.

level. Using this extremely conservative criterion and assuming a roughly normal distribution, a Student's *t* gives 47.9% as the upper boundary of the 95% confidence interval for God item accuracy ($M = 38.8\%$). Therefore, God item accuracy was significantly poorer than base item accuracy and also less than 50%.

One interpretation of the difference in performance on the God items and the base items is that God items were simply more difficult. The God items may just be more subtle, not because of the presence of an anthropomorphic God concept, but because the items emphasize very slight distinctions. Although this explanation may account for some of the difference in performance, it is unlikely that it explains the bulk of the difference. If the God items were conceptually no different than the base items, then it would be expected that those subjects who perform well on the base items would also perform well on the God items. In fact, a Pearson's correlation shows that performance on the two types of items was not correlated, $r = .092$, supporting the conclusion that the two types of items are qualitatively rather than just quantitatively different.

In this task, subjects apparently used anthropomorphic God concepts to process and remember the stories, even though these concepts did not agree with the "theological" characterizations of God implied by the questionnaire. Specifically, subjects seemed to characterize God as having to be near something to receive sensory information from it, not being able to attend differen-

tially to competing sensory stimuli, performing tasks sequentially and not in parallel, having a single or limited focus of attention, moving from place to place, and sometimes standing or walking. God was not conceptualized as completely free of constraints. However, it is unclear if subjects brought this anthropomorphic God concept to the task or if this concept is artifactual. Perhaps the language of the stories offers enough anthropomorphic suggestion (e.g., "God watched . . .") that subjects discard their actual everyday God concept in favor of one they think better fits the story context. Under this interpretation, the stories do not draw on any preconceived anthropomorphic ideas about God, but apply only to the character in the stories who happens to be called "God." The context of the story would prompt subjects to anthropomorphize any character. This does not contradict theological characterizations of God at all.

Results and Discussion: 1B

As hypothesized, subjects made fewer errors in recalling the Uncomp (God) items in this condition than in the previous condition.³ Mean accuracy on these items was 49.1% for the Uncomp group, compared to only 38.8% in the control condition. After adjusting each subject's God item accuracy to account for base item performance,⁴ the mean accuracy of the control group was 45.1%, compared to 59.9% for the Uncomp group. The difference between the groups was significant as measured by a Tukey–Duckworth test, $T = 7$, $p < .025$ (Tukey, 1959; Gans, 1981).⁵ This difference in subject performance was also manifest across the majority of the individual God items. The Uncomp group had higher average accuracy on 15 of the 20 God items. On four items, the first group was more accurate and there was one tie. This difference is significant as measured by a Wilcoxon Signed Rank test, $z = 1.977$, $p = .024$.

It is not the case that the Uncomp variation was simply more attention demanding, resulting in enhanced performance. The accuracy on base items was slightly, but not significantly, *worse* for the Uncomp condition. The mean accuracy on base items was 81.5% for the Uncomp group, compared to 86.2%

³ Two of the God items were dropped from the Uncomp analysis because they had to do with Uncomp's particular location, and unlike God, Uncomp was stipulated as being everywhere at the same time.

⁴ For comparisons of God item accuracy between groups, God item accuracy was adjusted to account for subjects' base line accuracy. The assumption is that a subject's accuracy on base items is the highest we can expect performance on God items to be. To take this information into consideration, subjects' God item accuracy was expressed as a proportion of their own base accuracy. Therefore, a score of 100% would indicate that the subject answered all of the God items correctly that would be expected given that subject's particular recall error rate. The computation is simply God item accuracy divided by base item accuracy.

⁵ These data did not fit parametric assumptions. This nonparametric test was chosen for its power with relatively small sample sizes.

for the control group. Taken together, these findings suggest that the language of the stories is not the only factor contributing to the anthropomorphic God concept revealed in the first study.

Although the results for God and Uncomp are markedly different, it is still the case that subjects anthropomorphized Uncomp. Subjects' mean accuracy on the Uncomp items was 49.1%, which is much poorer than would be expected, based on the description of Uncomp and the mean accuracy on the base items ($M = 81.5\%$). Some subjects misremembered that the stories described Uncomp as moving, even though it is explicitly stated in the description of Uncomp, and all subjects (except for one who was immediately corrected) answered correctly on the preliminary quiz that Uncomp cannot move.

These curious findings could have many different explanations. It could be that because Uncomp was a novel concept (unlike God), it had no stability or resilience. Through the course of hearing the stories and being asked if they remember Uncomp doing things that are anthropomorphic, subjects modified their concept of Uncomp into a human-like agent. The data do not speak to this possibility.

A more likely possibility is that, even though subjects could correctly answer a multiple choice test about Uncomp immediately after hearing the information, the concept was too new and complicated for most subjects to accurately apply to the story task context. Subjects may have anthropomorphized Uncomp as a default mechanism because processing Uncomp as such is easier. A third possible explanation of why subjects used an anthropomorphic concept of Uncomp is that on some level, subjects found it difficult to digest the Uncomp cover story because Uncomp is a natural entity, albeit a super-human one. Had Uncomp been a nonnatural entity without the constraints of explicit mechanisms and spatial properties, subjects might have been able to process Uncomp without using a human-like representation.

All three explanations follow from Uncomp not being comparable to God in an important sense: God is nonnatural. Consequently, Uncomp cannot be a proper substitute for God in this paradigm. The results of this study can only suggest that anthropomorphic concepts play a larger role for stories about God than stories about Uncomp. That is, the story context cannot account for all of the anthropomorphism in the control group.

Results and Discussion: 1C

Subjects in the salience manipulation group showed less evidence for anthropomorphic everyday God concepts than did the subjects in the first study. Mean accuracy on each God item was 47.3% as compared to 38.8% in the first group. A Tukey–Duckworth test detected a significant difference between the adjusted scores of each group, $T = 7$, $p < .025$. This difference in performance can be seen in the differences between items as well. Of the 22 items, the salience manipulation group performed more accurately on 15 items, the control group was more accurate on five items, and there were two

ties. This difference was significant by a Wilcoxon Signed Rank test, $z = 2.409, p = .008$. No differences were found on base item accuracy between the two groups, denying the difference can be accounted for by the questionnaire somehow making subjects generally more attentive to the stories.

Although the Uncomp study suggests that the anthropomorphism revealed in the first study is not merely artifactual, the differences between God and Uncomp make it unclear if the existence of anthropomorphic concepts in both conditions is due to the same underlying processes. Two conflicting explanations must still be distinguished. It could be that the subject's theological and everyday God concepts are actually distinct, context-dependent concepts: one that is engaged when discussing God in abstract, theological terms (as in the questionnaire task) and one that is active when processing informal, real-time discourse (as in the story task). Subjects then bring these two God concepts, and any connections they have with each other, to the task. Alternatively, there may be some properties of the story task that, when paired with a super-agent that is nonnatural (like God), yield an anthropomorphic concept. That is, the tendency to anthropomorphize is a product of the task and the agent's ontological category membership and independent of actual concepts of God.

The results of the salience manipulation contradict this second explanation. Under this account, it would be expected that no manipulation of God concepts before entering the task should have an effect on the results. Alternatively, assuming that subjects' theological God concepts are not anthropomorphic, priming of these concepts would encourage subjects to rely less on their anthropomorphic everyday God concepts in processing the stories, thereby making fewer recall errors on God items, which is what happened. This demonstrated link between subjects' theological concepts and their performance on the story task is also strong evidence that the results are a measure of the subjects' own concept rather than the stories' author's concept.

As in the Uncomp study, subjects as a group still exhibited poorer accuracy than expected, based on theological beliefs as measured by the questionnaire in Study 1 and base item accuracy. This implies the persistence of an anthropomorphic concept in many of these subjects. Inability to wholly remove the effect is not surprising. It is likely that for a large number of subjects, the questionnaire did not succeed in making a theological God concept more salient. The answers to the salience questionnaire suggest that some subjects did not have a clear, preexisting God concept on which to draw, so the salience manipulation provided no competition for an anthropomorphic concept. Assuming that people often do hold at least two parallel God concepts, one for use in formal settings and one used in informal discourse, the connections between these two concepts might have been weak and strongly context-driven. For some subjects it is possible that the questionnaire only made the theological concept salient while yielding no effect on the everyday concept. A third possibility is that some subjects simply did not take the questionnaire

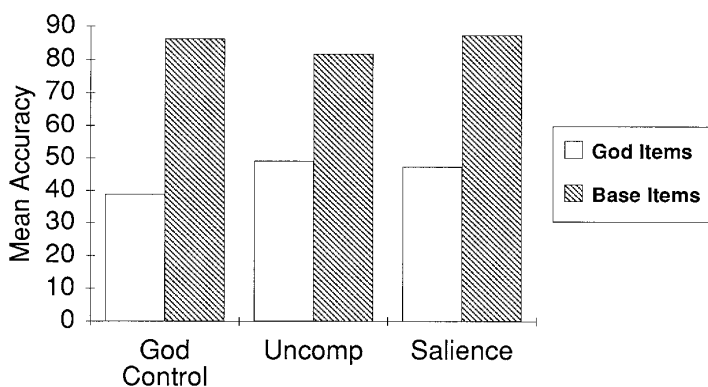


FIG. 1. Mean subject accuracy on God items and base items for Study 1. All three groups performed significantly better on base items than on God items.

seriously and it therefore failed to make their theological God concepts salient.⁶

Furthermore, some subjects admitted to having a very anthropomorphic theological God concept. This being the case, the salience manipulation may have actually made the everyday concept more anthropomorphic in these subjects, resulting in more mistakes in the recall of God items. Perhaps this explains why the salience manipulation group showed greater variance (using a normal approximation) in God item accuracy ($SD = 20.6\%$) than the subjects in the first group ($SD = 14.9\%$). Despite these problems with the salience manipulation, the two groups were clearly different.

A summary of the results of Study 1 can be found in Fig. 1.

STUDY 2

In an attempt to establish more firmly during what process anthropomorphism takes place and to more directly address whether or not subjects anthropomorphize due to biases in the stories, subjects in Study 2 were asked to

⁶ The differences between various classes of subjects can be illustrated by looking at three different subjects' answers to question 5, "Can it be said that God does not need to use senses to gather information?" One subject answered, "I wouldn't limit God to our 5 senses, so I guess it doesn't need to "see" anything. But, I suppose I've imagined God as all-seeing, -tasting, -smelling, -hearing, and -feeling, so I guess it doesn't really have the option of not seeing something." This is the type of thoughtful answer it was hoped the questions would elicit. This subject had a God item accuracy of 90.9%. An example of a subject who did not seem to have any clear God concept to draw upon answered, "Perhaps. These issues have never been foremost in my thoughts." A subject who did not seem to take the task seriously simply answered, "See above question/answer." These subjects had God item accuracies of 54.5% and 27.3%, respectively.

perform the story recall task using printed transcripts. Subjects were allowed to answer the recall items at their own pace, with the narratives right in front of them. If anthropomorphism in the first task were due to the stories introducing an anthropomorphic God concept that subjects then adopted for the task, subjects would be expected to anthropomorphize in this task as well, regardless of whether the agent was God or novel fictitious super-agents. If the findings of Study 1 were a result of memory distortion, subjects would not be expected to anthropomorphize in this task.

To address these possibilities, five different conditions of the task were performed: (1) "God"—a simple replication of the original task: Similar results as in Study 1 with God as the main character would suggest that the anthropomorphism is not just a form of memory distortion. (2) "Nonhuman God"—a version of this task in which subjects are asked to think of God as very different from humans: If the anthropomorphism is profoundly reduced, this would suggest the presence of general bias to think of God in human-like terms in the original task. (3) "Super-agents"—God replaced by super-agents with relevant properties similar to God's: If the stories are constructed such that subjects are compelled to treat God anthropomorphically, regardless of their own theological beliefs, then replacing God with super-human agents assigned relevant God-like properties should not change the level of anthropomorphism. If God is only anthropomorphized because of bias in the text, then these agents should also be anthropomorphized. If God is anthropomorphized because subjects' concepts of God are anthropomorphic, then new agents should be treated differently. (4) "Survey God"—A version in which the God stories were preceded by a rating of particular properties: In the case that the explicit descriptions required to introduce new agents in group 3 unfairly primed subjects to be mindful of particular properties, the same descriptions offered as applicable to God should provide the same priming. Consequently, performance of conditions 3 and 4 should not be different. (5) "Superman"—Superman as the main character: For the sake of seeing if God is even treated as different from highly anthropomorphic super-agents, a version of the task with Superman as the main character was also performed.

Method

Subjects. Eighty-one college students were recruited to participate in this study. They were randomly assigned to one of five groups, four with 16 subjects and one with 17 subjects due to a miscount.⁷

Materials. Transcripts of the stories and recall items from Study 1 were prepared in three different ways: with God as the main character, with Super-

⁷ One subject did not complete the task and was dropped from the analysis, leaving one condition with 15 subjects.

man as the main character and necessary adjustments to the text made, and with three fictitious characters (Mog, Beebo, and Swek) endowed with relevant properties commonly attributed to God. Mog occupied the “God” role in three of the eight stories, Beebo was in three, and Swek was in two stories. Three agents were used to help subjects keep clear the God-like properties of each one. Although this makes the task slightly different, if anthropomorphism is due to biased language in the story, it would persist in this condition as well.

For the Super-agents condition, descriptions of the three fictitious characters were also prepared. These descriptions explicitly endowed Mog, Beebo, and Swek with properties that would lead to nonanthropomorphic responses in the recall task. These descriptions appear in Appendix B.

For one variation using the original “God” stories, a short questionnaire was created using the same properties that were attributed to Mog, Beebo, and Swek. These properties were made into agree–disagree Likert scales. Because a theologically correct answering of the questions would lead to mostly “agree” answers, a few distracter items that would be more likely to receive “disagree” responses were included.

Procedure. Subjects in the “God” group each received a transcript of the story recall task and were asked to read the stories and answer the recall items construing God in any way they wished. Subjects in the “Nonhuman God” condition were asked to complete the task construing God as “radically different from a human,” in an attempt to bias subjects away from using an anthropomorphic concept. Subjects in the “Survey God” group completed the questionnaire of God’s properties and then performed the story recall task. They were assured that they could use the ratings from the questionnaire to perform the task if they wished. “Superman” subjects simply performed the recall task using that variation of the narratives. In the final condition subjects read the Super-agents descriptions and then performed the recall task using that version of the narratives. They were allowed to refer to the descriptions whenever they wished. Subjects in all five conditions were allowed as much time as needed to complete the task, and could check over or change answers as they deemed fit.

Results

As in Study 1, the measure of anthropomorphism used was the percentage of accurate God items for each subject, adjusted for base item accuracy. These data roughly fit parametric assumptions and so each groups’ performance was compared to every other using multiple *t*-tests. A Bonferroni correction for multiple tests was then performed. The *p*-values reported below are the pre-correction values for tests that remained significant after correction. The results of these tests are illustrated in Fig. 2.

The Super-agents group’s mean performance ($M = .925$, $SD = .134$) was significantly better than each of the other four groups: Superman, $M = .461$,

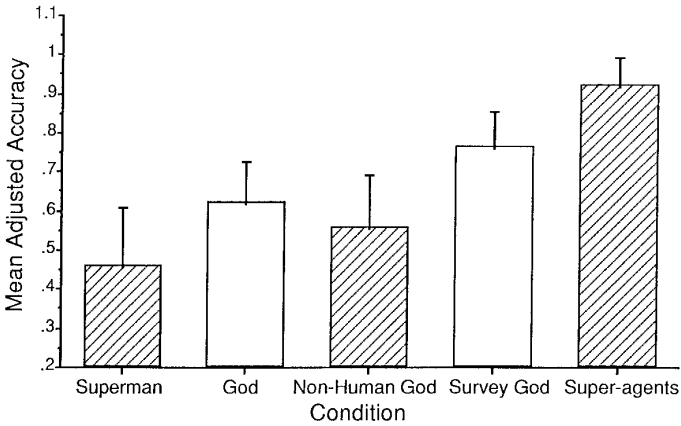


FIG. 2. Mean adjusted God item accuracy and 95% confidence limit error bars for Study 2. The Super-agents group performed significantly better than the other four groups. The Survey group performed better than Superman. No other differences were significant.

$SD = .28$, $t(31) = 6.14$, $p < .00001$; God, $M = .622$, $SD = .198$, $t(31) = 5.181$, $p < .00001$; Nonhuman God, $M = .559$, $SD = .248$, $t(31) = 5.319$, $p < .00001$; and Survey God, $M = .766$, $SD = .154$, $t(29) = 3.07$, $p = .0046$.⁸

The Survey God group performed significantly better than only the Superman group, $t(28) = 3.63$, $p = .0011$. The Superman, God, and Nonhuman God groups showed no significant differences from each other. Incidentally, only the Survey God and Super-agents groups showed significantly better performance than the "God" condition in Study 1A, $t(27) = 4.403$, $p = .0002$; $t(30) = 7.645$, $p < .00001$; respectively.

These differences do not seem to be the result of base item accuracy differences. A one-way, five factor ANOVA detected no significant differences between the groups, $F(4,74) = .584$, $p = .6754$. Consistent with the results of Study 1, for all of the groups' God item accuracy was poorer than their base item accuracy. The Super-agents group's mean base accuracy was 92.6%, compared to its God item accuracy of 85.6%, $t(16) = 2.408$, $p = .0284$.

Discussion

These results support the conclusion that anthropomorphism in Study 1 takes place with the reading or hearing of the stories and not as a consequence of recall error. Even though all five conditions of Study 2 are reading tasks

⁸ One subject's confusion over directions forced removal from these analyses. This is reflected in the degrees of freedom for tests involving the "Survey God" group.

in which subjects have the stories right in front of them, subjects still provided evidence of anthropomorphizing the main character. In fact, God was treated no differently than Superman in this task except when subjects were primed to think of God nonanthropomorphically by the survey manipulation. Even when subjects were encouraged to think of God as “radically different than a human” the anthropomorphism persisted at the same levels.

The influence of the stories’ biasing subjects seems very small at best, given these results. An active attempt to bias subjects against thinking of God anthropomorphically (Nonhuman God condition) was unsuccessful. In fact, the results tended in the opposite direction.

Subjects are not compelled by the stories to make anthropomorphic errors. The Super-agents group demonstrated that if subjects can keep in mind the relevant nonanthropomorphic properties of a nonnatural agent, anthropomorphism can be nearly erased. If subjects really have theologically correct concepts of God, these nonanthropomorphic properties are available. The small difference between the God item performance of Super-agents subjects and their base item accuracy (approximately 7%, or 1.5 God items) may be due to a combination of subtlety in the items and anthropomorphic bias, but this remaining difference to be explained is negligible, compared to the massive differences in all of the God conditions. Super-agents is the only condition in which some subjects had no God item errors but did have base item errors.

The inability of the Survey God group to have the same effect as the Super-agents group is strong evidence that the results are due to subjects’ applying their own anthropomorphic God concepts to the task. It does not appear to be the case that the differences between these two groups were due to subjects’ rejection of God’s nonanthropomorphic properties. Of the seven important properties included in the Super-agents’ descriptions and the Survey God scales, Survey God subjects expressed agreement (a score of 1 or 2) 80% of the time on average. Reminiscent of the questionnaire in Study 1, 10 of the 15 subjects agreed with six or all seven items, and only one subject expressed agreement less than half the time. A simple regression relating these scores to anthropomorphism scores was not significant, $r = .131$, $F = .211$, $p = .6542$.

These studies should not be taken as evidence that with training people can easily process narratives involving nonnatural entities in real-time. Study 2 was a slowed-down reading task allowing subjects time for reflection and modification of intuitive responses. What Study 2, and the Super-agents group in particular, does demonstrate is that (1) it is very difficult to keep from anthropomorphizing nonnatural agents, but (2) it is possible in some contexts. The story recall task does seem to be one context in which it is possible to avoid anthropomorphizing. Regardless, subjects persist in anthropomorphizing God.

STUDY 3

Because Studies 1 and 2 relied on recall items as a measure of anthropomorphism, it is not clear how spontaneous or automatic the tendency to anthropo-

morphize God is. Also of interest is the quality of the anthropomorphic inferences and how they affect the character of the narratives. Study 3 is a preliminary attempt to address these issues and to amplify the findings of the first two studies by asking subjects to paraphrase stories involving God.

If subjects in Study 1 anthropomorphized in response to the prompting of recall items, because of demand characteristics, or a "Yes"-answer bias, subjects would not be expected to use anthropomorphic language when paraphrasing the narratives. Additionally, spontaneous use of anthropomorphic language in paraphrasing would suggest the anthropomorphic concept is used at the stage of initial processing and not in recall, supporting the interpretation that subjects bring the concept to the task.

Method

Materials. Four of the eight stories from Study 1 were selected on the basis of general dissimilarity from each other. Transcripts of these stories were presented on a page alternated with space enough for subjects' paraphrases.

Procedure. Thirteen new subjects were instructed to rewrite each of the narratives in their own words, adding or omitting details as they deemed fit to clarify and preserve the meaning of the original. Subjects were allowed as much time as needed. Again, subjects were encouraged to construe God in any way they wished.

Results and Discussion

Two scorers familiar with the concepts of anthropomorphism and theologically correct God concepts were independently asked to check each subjects' paraphrased stories for (1) the inclusion of language not in the original story that suggested anthropomorphic inferences, (2) the inclusion of language not in the original story that seemed to clarify God's theologically correct properties, and (3) general errors in preserving the facts of the narratives. Interscorer agreement was 94.9%. Disagreements were resolved through discussion.

Most of the time subjects gave almost exact restatements of the original narratives with only slight modifications. However, when subjects did provide information not in the original stories, it was almost exclusively anthropomorphic in nature. Twelve of the 13 subjects retold at least one of the stories using anthropomorphic language quite similar to the God items of the previous studies. This compares to only one subject adding details to make clear God's nonanthropomorphic properties. For example, it was common for subjects to write something like "The noise was so loud God couldn't hear the birds," for the first story. Table 2 lists some of these responses.

Summing across subjects, of the 52 paraphrases, 26 showed anthropomorphic intrusions. Two paraphrases included details to clarify God's nonanthropomorphic properties, and four others had factual errors. Overall, subjects showed evidence of treating God as a being that requires the use of sensory information, has a limited focus of attention, performs tasks serially, has a

TABLE 2
Excerpts from Subjects' Paraphrased Narratives

It was a clear, sunny day. Two birds were singing back and forth to each other. They were perched in a large oak tree next to an airport. God was listening to the birds. One would sing and then the other would sing. One bird had blue, white, and silver feathers. The other bird had dull gray feathers. While God was listening to the birds, a large jet landed. It was extremely loud: the birds couldn't even hear each other. The air was full of fumes. God listened to the jet until it turned off its engines. God finished listening to the birds.

"God was listening to two birds singing in a tall tree next to an airport. When a large jet landed, God listened to it because he could no longer hear the birds. Then he listened to the birds again."

". . . A jet came and began destroying the beauty and even took God's attention away . . ."

". . . The noise was so loud God couldn't hear the birds . . ."

". . . God could only hear the jet until it turned off its engines . . ."

A boy was swimming alone in a swift and rocky river. The boy got his left leg caught between two large, gray rocks and couldn't get out. Branches of trees kept bumping into him as they hurried past. He thought he was going to drown and so he began to struggle and pray. Though God was answering another prayer in another part of the world when the boy started praying, before long God responded by pushing one of the rocks so the boy could get his leg out. The boy struggled to the river bank and fell over exhausted.

"This story suggests that God cannot listen to more than one prayer at a time, however, he will get to each prayer and answer it in time. Much like Santa Claus delivers toys to all houses in one night."

Somewhere in Asia, a master chef was preparing a gourmet dinner at a fancy restaurant. There was a waterfall coming through the roof in the middle of the restaurant and small groves of tropical plants in each corner. The kitchen was alongside one of the walls. The chef seasoned the meal wonderfully and the aroma filled the place. God enjoyed the smell. Then a sewer line broke beside the restaurant filling the air with a horrible and powerful stench. The chef complained that he could no longer smell his masterpiece. God appreciated the chef's disappointment. A boy in London began praying to God so God answered the prayer by helping the boy find his way home.

"In a fancy restaurant in Asia, with tropical plants and a waterfall, a master chef was preparing a spectacular meal. It smells fantastic, and God liked the smell. Then, to his dismay and the dismay of the chef, a sewer line broke, giving off an awful smell, so bad that they could no longer enjoy the meal . . ."

On a dry, dirt road in Australia was a beautiful and interesting rock. One day, God was looking at the rock. It was green with blue, red, and gold flakes. While God was looking at the rock, a stampede of brown, long-horned cattle came charging down the road over where the rock was. God watched them go. They were kicking up dust and bellowing. The noise was thunderous. God finished looking at the rock which was then dust covered and had hoof prints all around it.

"On a dirt road in Australia lay a beautiful rock. God looked down and admired the rock. Suddenly, a herd of cattle came along, stirring up the dirt and trampling where the rock lay. God admired the herd as they went, and after they passed, God once again looked at the now dust covered rock and thought it was beautiful."

"God looked down from heaven admiring a green rock with blue, red, and gold flakes. As he admired this rock, a stampede of long-horned cattle ran by and obscured the rock . . ."

Note. The paragraphs in bold type are the original stories.

particular location, and cannot always differentiate competing sensory information.

One subject even transformed God into a person in his paraphrases, referring to God as “a homeless man,” “the president of a major corporation,” and “a local aborigine” in different stories. However, in one story this subject referred to God as “an unthinkable force.”

Interestingly, subjects expressed these anthropomorphic properties without being prompted or cued. These appear to be specific, subject-generated applications of an anthropomorphic God concept.

This study suggests that at least some of the anthropomorphism takes place with the reading of the stories and not just as a result of memory errors or at the prompting of the recall items. Evidence from this study is consistent with the hypothesis that subjects engage the story processing tasks with their own anthropomorphic concepts of God, concepts that can be explicitly elaborated without cuing.

GENERAL DISCUSSION

These three studies reveal that subjects do use anthropomorphic concepts of God in understanding stories even though they may profess a theological position that rejects anthropomorphic constraints on God and God's activities. It appears that people have at least two parallel God concepts that are used in different contexts, and these concepts may be fundamentally incompatible.

Although this set of studies offer some insights into how people conceive of God, the conclusions have several restrictions due to the design of the studies. The stories were designed to fit with an agent-God who interacts with the natural world and people. People or contexts that do not assume such a basic property may not exhibit the same phenomenon. Further restrictions include problems with the sample. Because the sample was relatively small and heterogeneous with regard to religious affiliation, the questions raised by Barrett and VanOrman (1995) regarding differences among religious groups cannot be addressed, except that there is no obvious difference between theists and nontheists. Finally, the design of the task does not allow us to make any firm conclusions regarding specific properties that are attributed to God. We may only report that the corpus of characteristics are more consistent with an anthropomorphic concept than with a strictly theological concept from the traditions best represented. Questions about specific properties must be left for future studies.

Keeping in mind these restrictions, at least five general conclusions can be drawn from the data. First, it appears that the concept of God used in the context of listening to and remembering stories is not the same as the concept of God that is claimed in a more abstract, theological setting. The “God” condition of the first study showed a great disparity between the theological beliefs about God and the properties attributed to God in the course of processing stories.

Second, the effects demonstrated are not merely artifacts of the task. The Uncomp study and the Mog, Beebo, and Swek task showed that novel characters placed in the same task will not necessarily evoke the same anthropomorphic representation. There is something specific to subjects' representation of God that is instrumental in this anthropomorphic characterization.

The salience study and the Survey God condition of Study 2 demonstrated that performance on this task is manipulable through priming subjects' theology, implying that the way one thinks of God when approaching the task is important in determining the God concept used to process the stories. The concept used in the story context is not independent of one's personal theology. A natural extension of this finding is that people seem to possess and use more than one concept of God in real-life activities, and these parallel concepts have some markedly different properties.

A stronger form of this conclusion may also be argued. It may be that some subjects actually have only an anthropomorphic concept of God, and in response to the social demands of a formal context, the vocabulary of theological correctness is employed to mask this concept. That is, the "theological" concept is actually hollow, lacking any power to facilitate meaningful representations. Perhaps the tendency to anthropomorphize God cannot be resisted because it inevitably follows from a human necessity to conceive of deity in terms of natural categories (Brandon, 1970).

Fourth, as the overwhelming majority of subjects in all five studies used anthropomorphic concepts to process stories about God, Uncomp, Superman, or Mog, Beebo, and Swek, the demands of story processing seems to make it difficult to avoid anthropomorphization. This is not just an uninteresting problem with the method. The characteristics of these stories that facilitate use of an anthropomorphic God concept are likely to be present in other real-time, real-life discourse about God and other agents. If a person's theological God concept shows no resilience in this task, how would it do so in the face of real life situations similar to this? To take an example from a specific religious tradition, if people are inclined to use anthropomorphic processing in a story context, then do those in the Judeo-Christian tradition read stories about God in the Bible this same way, despite the contradictions with their professed theology?

A final conclusion that may be drawn from these studies is that anthropomorphization in discourse-processing contexts is not restricted to God. As Uncomp demonstrated, other agents may be treated in a similar way, regardless of previous exposure to the agent. These studies have shown that God and a fictitious super-computer are anthropomorphized during story processing, but is this effect limited to super-agents? One problem for future research is to find what properties are necessary for an anthropomorphic representation to be used. Perhaps it is the case that any intentional agent is conceptualized using an agent-concept based on people, thus yielding an anthropomorphic representation. Another possibility is that only vaguely un-

derstood agents are treated in this way (Caporael, 1986), since well-understood agents have firm enough representations to make the use of an anthropomorphic concept as a default schema unnecessary. It is also unknown in what contexts agents are anthropomorphized.

It has been suggested that two of the most fundamental ontological kinds are simple mechanical physical objects and psychological agents. So fundamental are they, that infants may have intuitive physics and psychologies for grasping them (Carey & Spelke, 1994). If so, folk psychology may offer a highly constrained view of the mind as a serial processor, with single focused window of attention. Similarly, intuitive physics may suggest that entities are normally bounded objects in one place at a time and move on spatio-temporally continuous paths (*ibid.*). Concepts of God may be strongly pressured to fit into these two ontologies, as other alternatives are too cognitively laborious to employ in real-time discourse.

It may be that the pressure to fit into these ontologies is a form of cognitive constraint even prior to those constraints suggested by Boyer's theory of religious ideas (1994). Boyer's theory begins with the assumption that when a particular entity fits into a natural ontological category such as "sentient beings," it is then constrained by the intuitive cognitive expectations of this category. Theological treatments of God generally assert that God does not fit into one of these natural ontological categories, and consequently the concept cannot be constrained by cognitive intuitions. However, it may be that intuitive physics and psychology encourage the processing of any entity as part of the natural ontological category which most closely matches the entity's perceived properties.

Usually represented as a being with a mind, desires, and the ability to communicate, God seems to best fit in the category of sentient beings. Once this is established, Boyer's balance of satisfying most intuitive expectations while violating a small number seems to fit the results of the present studies. God is treated as meeting many of the expectations of folk psychology and intuitive physics while possessing a few unusual properties such as being able to receive sensory information at an enormous distance and move from place to place very quickly.

In these ways Boyer's theory can be modified to offer an explanation of the two parallel God concepts: (1) The theory applies to the real-time concept and not the theological concept. (2) A prior source of cognitive constraint, perhaps intuitive physics and psychology, pressure the theological concept to conform to one natural ontological category. This gives rise to a sentient being which looks very much like a human being, the most salient example of this specific ontology.

Similarly, the results of these studies could be understood as a case of structured imagination (Ward, 1994; 1995). If there exists some pressure to fit God into the ontological category of sentient beings, under the theory of structured imagination, specific properties of God would then be generated

based on properties of known sentient beings. With humans as the most outstanding exemplar of this category, it would be expected that God would share many properties in common with humans.

Alternatively, it may not be necessary for God to be classified into a specific ontological category before anthropomorphism takes place. It has been suggested that anthropomorphic God concepts illustrate analogical reasoning (Holyoak & Thagard, 1995). God's unknown properties can be understood through analogy with human properties. Under this interpretation, the data presented would suggest that analogical reasoning can be so internalized and automatic that it can generate understandings of God used in on-line processing that are inconsistent with theology and are difficult to inhibit.

The interpretations by way of analogical reasoning, structured imagination, and Boyer's theory of religion all require some a priori reason for pairing God with human properties as opposed to properties from some other ontology. Such a reason is not necessary to explain these findings in terms of Guthrie's theory (1993). Under Guthrie's model, novel or ambiguous objects are first processed as human unless there is sufficient counterevidence. Therefore, in a real-time task, God (or even the novel agent Uncomp) is automatically treated anthropomorphically; and it is only through conscious effort or priming that this is avoided, as in the salience condition, Super-agents, and the Survey God condition of Study 2. Furthermore, because God is of a different ontological category and surrounded by a great deal of mystery, the necessary counterevidence to disengage the tendency to anthropomorphize may not be very powerful. Perhaps this is why it was more difficult for subjects to avoid anthropomorphizing in the Survey God condition than in the Super-agents condition. Unfortunately, the very premise of Guthrie's theory, that anthropomorphism is a general and fundamental cognitive bias is in need of empirical support before any confident conclusions may be drawn.

These studies also raise some questions specifically for the study of God concepts. The data suggest that subjects possess and use at least two different parallel God concepts depending on the context (although one may actually be an empty concept), but there is no obvious reason why these two concepts exist. Perhaps stories involving an atemporal and omnipotent agent create processing difficulties, and an efficient way to deal with the problem is to use a simpler God concept to understand stories. Whether or not this is the case, the relationship between the two concepts needs further investigation. The salience manipulation suggested that there are some points of contact between the two concepts. Making the theological God concept more salient seemed to inhibit use of the anthropomorphic everyday God concept in at least some of the subjects. It may just as well be the case that it was not inhibition but modification of the everyday concept that occurred.

These studies challenge previous work in the psychological study of God concepts or "images" in two ways. First, it seems important when making claims about God concepts to differentiate between the theological concept

and the concept used in everyday life. Research methods are likely to probe different concepts depending on the nature of the task. This is not a commonly made distinction.

Second, the cognitive development literature has almost unanimously supported the notion that God concepts undergo a concrete to abstract shift from early childhood to adolescence (Gorsuch, 1988). One study has even noted a shift from anthropomorphic to symbolic representations of God depending upon the level of mental impairment (Bassett et al., 1994). The present studies raise some doubts about these purported shifts. At least concepts of God used in processing narratives appear to be concrete and anthropomorphic even in young adult college students. Rather than practical concepts of God becoming more abstract with age, perhaps children learn better skills for inhibiting this concept in favor of a more theologically correct one.

Although many questions remain, these studies provide a first step in answering the question of how it is we understand God, and by implication, how we understand some nonnatural beings. At least on one level, the problem created by the ontological chasm between humans and the supernatural is solved by ignoring the difference. It appears we accept information about God quite literally. No longer is God a wholly different being, inexplicable and unpredictable. God is understood as a super-human and likely to behave as we do. The problem is addressed by creating God in the image of ourselves, and using the constraints of nature and humanity as our basic assumptions for understanding God. So it appears that the God of many people today is not quite so different from Zeus as it might at first seem.

APPENDIX A: NARRATIVES AND RECALL ITEMS

These are examples of the narratives and corresponding recall items as presented to subjects. "God items" are in bold. Four additional stories appear in Table 2.

(2) One day while God was helping an angel work on a crossword puzzle, a woman in South America got lost in a large, dense forest. It was hot and humid with insects buzzing about wildly. Only thin rays of light trickled to the fungus-covered forest floor. She was terribly afraid that she would not get out and so she prayed to God for help. God comforted her and showed her a path which led between two hills, around a small lake, and out of the forest. God helped the angel finish the crossword puzzle.

2. No a. The woman was in a jungle.
- Yes b. The path led between two hills.
- No c. God was working on a crossword puzzle.
- No d. The woman was a South American.
- No e. There were insects hopping around.
- Yes f. The woman prayed because she was afraid.
- No g. **God stopped helping an angel work on a crossword puzzle to help the woman.**

No h. After answering the woman's prayer, God finished helping the angel on the crossword puzzle.

(3) A young girl was playing in a forest of birches and oaks when she came across a baby bird. It was chirping loudly because it had fallen from its nest. The girl carefully picked up the bird using some strips of birch bark so that she would not leave her scent on the bird. She climbed the old oak tree where the nest was. She placed the bird in the small gray nest. She climbed down and went on her way. God was aware of girl's deed and was pleased by it so God gave her a happy feeling.

3. Yes a. The bird's nest was in an oak tree.
No b. **God was pleased by seeing the girl put the bird in its nest.**
No c. There were only oaks in the forest.
No d. The bird chirped quietly.
No e. The bird was a robin.
No f. The girl picked up the bird with her hands.
Yes g. God gave the girl a happy feeling.
No h. The girl was playing in a jungle.

(5) A woman was exploring a cave when she got lost. The woman was terrified. She was alone in a dark, small, damp cave. There was not even enough room for her to stand upright. The walls had a bumpy texture with patches of fungus. Out of fear she started praying aloud for someone to come help her. As she prayed, her voice echoed mockingly in the cave. She then fell asleep. God responded by pushing a large stone from behind the woman to reveal a tunnel out of the cave. When she awoke, she saw no one, but the rock had been moved. She left the cave.

5. No a. The woman fell asleep while praying.
Yes b. There was fungus on the walls of the cave.
No c. The woman cried when she discovered she was lost.
Yes d. God responded to the woman's prayer by moving a rock.
Yes e. The cave was dark, damp, and small.
Yes f. The woman got lost in a cave.
No g. **God heard the woman's prayer and helped her.**
No h. **When the woman awoke, God had already left but the rock was moved.**

APPENDIX B: DESCRIPTIONS OF MOG, BEEBO, AND SWEK

Mog, Beebo, and Swek are beings from another dimension of existence that can have some contact with our world. They have some fairly unusual characteristics that you should try to keep in mind when reading the stories about them:

Mog. Mog is not spatial which means that Mog has no location. It doesn't make sense to say Mog is at any particular place, or moves from

place to place. Mog also has no sensory limitations. This means that there is never a situation in which Mog cannot see, hear, taste, touch, or smell something. Furthermore, Mog can process sensory information from more than one source without the info blending or competing with the other info. Finally, Mog has no limits on attention. Therefore, Mog can pay attention to any number of things at the same time without them competing with each other.

Beebo. Beebo, like Mog, is not spatial and cannot be said to move or be in a particular location. Also like Mog, Beebo has no attention limits and so can pay attention to and do any number of tasks at the same time. Beebo can affect people's thoughts and emotions and can also affect the physical world (e.g., move things).

Swek. Like Beebo, Swek can affect people's emotions. Also like Beebo and Mog, Swek has no limits on attention and so is never distracted. Swek can process sensory information (see-watch, hear-listen) but does not have to. Swek can read minds and electromagnetic waves and other forms of energy, so Swek can know what is going on at any moment without using sensory information (like seeing, hearing, tasting). Unlike Beebo and Mog, Swek can have a location if it wishes, though Swek does not have a solid, physical body that is subject to gravity and other physical forces.

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