



Invited article

The role of religious context in children's differentiation between God's mind and human minds

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The current study examined the cultural factors (i.e., religious background, religious participation, parents' views of prayer, and parents' concepts of God) that contribute to children's differentiation between the capabilities of human minds and God's mind. Protestant Christian, Roman Catholic, Muslim, and Religiously Non-Affiliated parents and their preschool-aged children were interviewed ($N = 272$). Children of Muslim parents differentiated the most between God's mind and human minds (i.e., human minds are fallible but God's is not), and children who had greater differentiation between God's and humans' minds had parents who had the least anthropomorphic conceptions of God. Additionally, there was a unique effect of being raised in a Religiously Non-Affiliated home on the degree of children's differentiation between God's and human minds after religious context factors had been accounted for; in other words, children of Religious Non-Affiliates differentiated between humans and God the least and their differentiation was unrelated to religious context factors. These findings delineate the ways in which religious context differences influence concepts of God from the earliest formation.

Statement of contribution

What is already known on this subject?

- Children's concept of God develops during the preschool years.
- The degree of anthropomorphism in children's concept of God varies.

What does this study add?

- Muslim children have a strong differentiation between what God's mind and human minds can do.
- Religiously Non-Affiliated children have almost no differentiation between God's and human minds.
- Parent anthropomorphism explains variance in children's God concepts, both within and across religious groups.

Religious context plays an important role in the extent to which children differentiate God from humans. For example, Israeli Jewish children are less likely than British Christian children to associate life-cycle traits to God, explained by the fact that God is not represented in human form (as Jesus) in Jewish traditions (Burdett & Barrett, 2016). Additionally, American Muslim preschoolers are less likely to anthropomorphize God

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along biological, physical, or psychological dimensions compared with their American Protestant, Catholic, and Religiously Non-Affiliated counterparts (Richert, Shaman, Saide, & Lesage, 2016). As children come to differentiate the capabilities of God's mind from human minds during the preschool years (Barrett & Richert, 2003), the current study utilized a sociocultural approach (Vygotsky, 1978) that examined the relation between preschoolers' differentiation between God's mind and human minds and three aspects of children's religious context: general religious exposure, parents' views on communication with God (i.e., prayer), and parents' anthropomorphic concept of God.

Developing an understanding of God's mind

From a developmental perspective, the concept of God falls into the category of intangible concepts, or 'mental representations that organize experience' (Gelman, 2009, p. 117) and are of phenomena that are not available to the physical senses (e.g., God cannot be seen, touched). As children cannot directly observe God, the developing concept of God's mind can highlight how differences in cultural (religious) contexts support children's development of this nearly ubiquitous abstract concept.

Much research into children's developing concept of God's mind has compared children's attribution of false beliefs to God to their attribution of false beliefs to humans. False-belief understanding is the understanding that the human mind can have a false representation of the state of reality (Flavell, 2004). This representational understanding of the mind develops over the preschool years, with about 50% of 4- to 5-year-olds and nearly 100% of 8- to 9-year-olds passing standard false-belief tasks (Wellman, Cross, & Watson, 2001), a developmental pattern that has been replicated in Canada, India, Peru, Samoa, and Thailand (Callaghan *et al.*, 2005) and in China (Lui, Wellman, Tardif, & Sabbagh, 2008; Sabbagh, Xu, Carlson, Moses, & Lee, 2006).

As is outlined in Table 1, several studies have compared children's concepts of God's mind and human minds using traditional theory-of-mind tasks. In some studies, with American Protestant (Barrett, Newman, & Richert, 2003; Barrett, Richert, & Driesenga, 2001; Richert & Barrett, 2005; Wigger, Paxson, & Ryan, 2013) and Yucatec Mayan participants (Knight, Sousa, Barrett, & Atran, 2004), children rarely attributed mental state limitations to God even as their understanding of the limitations of human minds improved. In other studies, with Spanish children in secular or religious schools (Giménez-Dasí, Guerrero, & Harris, 2005), Greek Orthodox children (Makris & Pnevmatikos, 2007), American children in secular or Protestant schools (Lane, Wellman, & Evans, 2010, 2012), or Austrian children in Catholic schools (Kiessling & Perner, 2014), for some period during the preschool years or depending on the way in which questions are phrased, children attributed human-like limitations to God's mind.

Only one of these prior studies explicitly examined children's exposure to religion or understanding of God as it related to their attributions of mental state limitations to God. Lane *et al.* (2012) found religiously schooled children tended to pass false beliefs and knowledge-ignorance tasks a few months later than non-religiously schooled children but also were less likely to attribute false beliefs or ignorance to God than secularly schooled children. Additionally, for children who correctly attributed constraints (i.e., false beliefs, ignorance) to human minds, their knowledge of God (i.e., the child's description of God) was significantly correlated with their attribution of correct beliefs (i.e., no false beliefs or ignorance) to God (Lane *et al.*, 2012).

The ways in which children differentiate God's mind from human minds have implications for the mechanisms of concept development (Knight *et al.*, 2004). If

Table 1. Prior studies examining children's developing theory of God's and human minds (presented chronologically)

Citations	Participant ages	Religious affiliation	Measure of religious exposure	Agent(s)	Theory-of-mind tasks	Finding
Barrett et al. (2001)	Exp. 1 2;11 to 6;11	American Protestant	None	Parent, Bear, Ant, Tree, God	Unexpected contents false belief	Age correlated with attributing false belief to Parent but not to God; children less likely to attribute false belief to God than Parent
	Exp. 2 3;5 to 6;11	American Protestant	None	Parent, Bear, Ant, Snake, Elephant, Tree, God	Unexpected contents false belief	Age correlated with attributing false belief to Parent but not to God; 76% of children who passed task for Parent did not also attribute false belief to God
	Exp. 3 3;2 to 8;5	American Protestant	None	Monkey, Cat (with special eyes), Girl, God	Level 2 visual perception	Age correlated with attributing limited perception to Girl and Monkey but not to Cat and God

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Table 1. (Continued)

Citations	Participant ages	Religious affiliation	Measure of religious exposure	Agent(s)	Theory-of-mind tasks	Finding
Barrett et al. (2003)	3;3 to 7;9	American Protestant	None	Parent, Dog, God	Occluded drawing, secret code, secret game (before and after child knows)	Before child knows: 60% of 3-year-olds, 83% of 4-year-olds and all older children attribute knowledge to God; 40% of 3-year-olds, 20% of 4- and 5-year-olds, and less than 5% of older children attributed knowledge to Parent After child knows: 73% of 3-year-olds, 83% of 4-year-olds and all older children attribute knowledge to God; 70% of 3-year-olds, 60% of 4-year-olds, and <20% of older children attributed knowledge to Parent 4-year-olds attributed ignorance to God and Friend; 5-year-olds only attributed ignorance to Friend
Giménez-Dasí et al. (2005)	3;0 to 5;10	Spanish secular and religious	Secular vs. religious school	God, Friend	Omniscience	

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Table 1. (Continued)

Citations	Participant ages	Religious affiliation	Measure of religious exposure	Agent(s)	Theory-of-mind tasks	Finding
Richert and Barrett (2005)	3;2 to 7;11	American Protestant	None	Self, Eagle (special sight), Fox (special hearing), Dog (special smell), Monkey, Girl, God	Visual perspective taking	3- to 5.5-year-olds more likely to attribute perspective to God than chance; 5.5-8 more likely to attribute perspective to God than Girl
Knight et al. (2004)	4;0 to 7;10	Yucatec Mayan	None	Doll, God	Unexpected contents false beliefs	About 35% of 4-year-olds, 20% of 5-year-olds, 50% of 6-year-olds, 30% of 7-year-olds attribute false belief to God; About 35% of 4-year-olds, 50% of 5-year-olds, 75% of 6- and 7-year-olds attribute false belief to Doll

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Table 1. (Continued)

Citations	Participant ages	Religious affiliation	Measure of religious exposure	Agent(s)	Theory-of-mind tasks	Finding
Makris and Pnevmatikos (2007)	3;3 to 7;11	Greek Orthodox	Children indicate they know who God is	Human, God	Visual perspective taking; unknown contents	<p>Child knows: Approximately 40% of 3- and 4-year-olds, 30% of 5- and 6-year-olds, and 20% of 7-year-olds attribute perceptual limitations to God; Approximately 40% of 3- and 4-year-olds, 70% of 5- and 6-year-olds, and 100% of 7-year-olds attribute perceptual limitations to Human</p> <p>Child does not know: Approximately 70% of 3- and 4-year-olds, 40% of 5-year-olds, and 20% of 6- and 7-year-olds attribute perceptual limitations to God; Approximately 70% of 3-year-olds, 80% of 4- and 5-year-olds, and 90% of 6- and 7-year-olds attribute perceptual limitations to Human</p>

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Table 1. (Continued)

Citations	Participant ages	Religious affiliation	Measure of religious exposure	Agent(s)	Theory-of-mind tasks	Finding
Lane et al. (2010)	3;4 to 6;1	Not indicated	Children indicate they know who God is	Mom, Girl, Mr. Smart, Heroman, God	Unexpected contents false belief (FB); knowledge/ignorance (K/I)	FB: 20% of 40–52.5-month-olds, 60% of 52.5–58.9-month-olds, and 40% of older children attribute FB to God; 20% of 40–52.5-month-olds, 70% of 52.5–58.9-month-olds, and 80% of older children attribute FB to Girl K/I: 50% of 40.4–49.4 months, 80% of 49.5–54.5 months, 50% of 54.6–73.4 months attribute I to God; 40% of 40.4–49.4 months, 80% of 49.5–54.5 months, 80% of 54.6–73.4 months attribute I to Girl

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Table 1. (Continued)

Citations	Participant ages	Religious affiliation	Measure of religious exposure	Agent(s)	Theory-of-mind tasks	Finding
Lane et al. (2012)	3;2 to 6;4	American Protestant	Attend Christian preschool; Children indicate they know who God is; Knowledge of God Interview	Mom, Girl, Mr. Smart, Heroman, God	Unexpected contents false belief; knowledge/ignorance	FB: 10% of 37.9–55.4 months, 50% 55.6–59.7 months, 20% 59.7–76.5 of month-olds attribute FB to God; 20% of 37.9–55.4 months, 65% 55.6–59.7 months, 70% 59.7–76.5 of month-olds attribute FB to Girl K/I: 5% of 37.9–51.0 months, 55% of 51.2–59.6 months, 30% of 59.7–76.5 months attribute I to God; 20% of 37.9–51.0 months, 70% of 51.2–59.6 months, 75% 59.7–76.5 months attribute I to Girl
Wigger et al. (2013)	2;10 to 8;2	American Catholic and Protestant	None	Visible friend, Invisible friend, Dog, God	Occluded picture; background knowledge; unexpected contents false belief	Age positively related to attributing limited knowledge to all agents but God; By age 5, children indicated God knows more than an Invisible Friend, but the Invisible Friend knows more than a Visible Friend or a dog

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Table 1. (Continued)

Citations	Participant ages	Religious affiliation	Measure of religious exposure	Agent(s)	Theory-of-mind tasks	Finding
Kiessling and Permer (2014)	3;0 to 6;6	Austrian Catholic	Attend Christian Kindergarten; Children indicate they know who God is and locate God in heaven	Mother, Baby, God	Perception-knowledge tasks (varying action and question type)	When child knows content of box and is asked 'single barrel' question: 36–47 months attribute similar and high knowledge to God and Mother, older children attribute more knowledge to God than mother. ^a When child does not know content of box and is asked 'double barrel' question: 36–59 months attribute similar and low knowledge to God and Mother, older children attribute more knowledge to God than Mother
Shaman et al. (2016)	3;6 to 6;0	American Protestant, Catholic, Muslim, Religiously Non-Affiliated	Parents' and children's views on prayer	Mother, God	Visual perspective taking, ambiguous figures, appearance reality	Age correlated with attributing false belief to Mother but not to God; children less likely to attribute false belief to God than Mother; children who attribute false belief to Mother more likely to attribute false belief to God

Note. ^aKiessling & Permer (2014) data were able to be formatted/presented in the same way as other studies in this table.

children's concepts of God are strongly based in anthropomorphism, children may first incorporate human fallibility (i.e., holding false beliefs) into their concept of God's mind before revising that concept to incorporate God's infallibility, with cultural inputs supporting subsequent differentiation between humans and God's mind (Lane & Harris, 2014). This view has resulted in rather strong claims that young children conceive of God as an 'ignorant man in the sky' (Kiessling & Perner, 2014) and comes from research with primarily Catholic (Kiessling & Perner, 2014) or Protestant children (Lane *et al.*, 2012). However, arguments that all children have a strongly anthropomorphic basis to their concept of God are challenged by recent evidence that Muslim preschoolers do not attribute embodied characteristics to Allah (Richert *et al.*, 2016), suggesting the extent to which children's concepts of God are anthropomorphic can vary widely due to cultural input.

According to Vygotsky (1934/1986), preschoolers' concepts are pseudoconcepts, initially formed through an associative relationship between the word for the concept and concrete components associated with the concept. As such, the context in which children are first exposed to and refine a concept provides the preliminary structure of that concept (Gauvain, 2001). In regard to concepts of God's and human minds, cultural factors could support differentiation between conceptions of God's mind and human minds early in the preschool years, such that children never treat God's mind as if it is fallible in the same ways human minds are fallible. Certainly, numerous cultural factors support children's understanding of human minds, such as engaging in discourse about mental states (Ruffman, Slade, & Crowe, 2002; Turnbull, Carpendale, & Racine, 2009). Additionally, in the absence of cultural supports to the contrary, one might expect children's concepts of God to be anthropomorphic to the extent that their concepts of other agents is anthropomorphic (Heiphetz, Lane, Waytz, & Young, 2015; Lane & Harris, 2014). Thus, the current study examined how religious experiences impact when and to what degree preschoolers differentiate the capabilities of God's mind from human minds, utilizing analyses of religious context at both the group level and within a family system.

Sociocultural factors

Given that a concept of God develops with the aid of cultural learning (e.g., via testimony, engagement in religious practices), a sociocultural approach to the development of the God concept should explicitly consider the impact of parents' religious beliefs and practices on children's differentiation between God's and human minds (Vygotsky, 1934/1986). From this perspective, variations in children's differentiation of God's mind from human minds should be related to variations in the contexts in which children are exposed to the concept of God.

Group-level effects

Some influences on children's differentiation of God's mind from human minds may be best captured at the level of religious group affiliation (i.e., an indicator of membership to a subculture). Given that the degree of iconic imagery in Christian worship is related to adults' anthropomorphic conceptions of God (Barrett & VanOrman, 1996), a primary influence on children's God concepts is likely children's exposure (or lack thereof) to anthropomorphic depictions of God. Christian children (both Protestant and Catholic) explicitly learn about Jesus, who is God in human form. This representation of God as human influences the extent to which children associate life-cycle traits with God

(Burdett & Barrett, 2016). In contrast, children raised in Muslim homes that ban anthropomorphic depictions of God are much less anthropomorphic in their conceptions of God than their Protestant, Catholic, or Non-Affiliated counterparts (Richert *et al.*, 2016). Thus, one hypothesized group-level difference (between religious groups) is that Muslim children will differentiate between God's mind and human minds more so than Protestant, Catholic, or Non-Affiliated children, due to taboos on iconic representations of Allah.

Additionally, children raised in Non-Affiliated homes would be expected to have substantially less exposure to a concept of God at all and would be expected to have minimal participation in religious practices involving communication with or doctrinal learning about God. Thus, in the absence of religious inputs that promote differentiation between God's mind and human minds, a second hypothesized group-level difference is that Non-Affiliated children will demonstrate almost no differentiation between God's and human minds.

Family-level effects

As Bronfenbrenner (1988) outlined, macrosystem level effects (e.g., religious beliefs) are transmitted to a child through their parents' practices. Children learn about God's mental state directly through testimony from parents or other knowledgeable experts (Harris, 2012), as well as indirectly from listening to how their parents talk about God (Gelman, 2009), and through engagement in shared religious activities directed at God (e.g., prayer; Richert & Granqvist, 2013). We examine each of these family-level factors.

Religious exposure. In the process of formalized religious education or participation in formalized religious practices (rituals, prayer), children hear and experience the concept of God in unique and special circumstances that are unlike other kinds of day-to-day or cultural practices. Regularly practised, formalized ('doctrinal' per Whitehouse, 2004) religious practices build on cognitive mechanisms that promote memory and the transfer of concepts (Whitehouse, 2004) and utilize social-cognitive mechanisms for understanding human behaviour (Lawson & McCauley, 1993). Thus, we hypothesize that increased frequency in exposure to formalized religious practices (in which God is treated as special and must be communicated with and treated in special ways) will be related to greater differentiation between God's and human minds.

Prayer practices. One way in which children are initially exposed to the concept of God is watching their parents pray or jointly praying with their parents. A recent study has found that preschoolers across religious traditions have relatively inflexible views about how a person can pray, arguing that people cannot pray while doing activities such as the splits or standing on their head (Shaman, Saide, Lesage, & Richert, 2016). This inflexible view of prayer was held especially strongly by children who understood their mother could hold false beliefs, but was unrelated to children's beliefs about the infallibility of God's mind. In other words, children appeared to believe the actions of prayer communicated to other people, but not to God, the children's intention to be praying (Shaman *et al.*, 2016). As such, parents who communicate inflexibility about prayer actions may present their children with a prayer context that highlights the parents' own mental limitations while also highlighting the need to act in special ways when praying to

God. Thus, we hypothesized that parents who have greater inflexibility in their views of prayer actions will have children with more differentiation between human minds and God's mind.

Parent anthropomorphism of God. Additionally, many adults have anthropomorphic biases that structure their concepts of God (Heiphetz *et al.*, 2015; Lane & Harris, 2014), and these anthropomorphic biases likely emerge in the language parents use when talking about God with their children. Additionally, Lane *et al.* (2012) found that children who were tested using anthropomorphic depictions or language about God were more likely to attribute ignorance to God than children tested without such anthropomorphic depictions. Thus, as preschoolers' concepts reflect the words and actions in which those concepts were learned (Vygotsky, 1978), we also hypothesized that parents who have more anthropomorphic concepts of God will have children who differentiate less between human minds and God's mind.

Summary and hypotheses

In summary, the current study addressed two limitations in prior research that have interfered with the ability to draw meaningful inferences about the ways in which the God concept is structured by cultural practices and belief systems. First, past studies either lack diversity in participants' religious background (mostly from Christian backgrounds) or have missing information on participants' religious background (i.e., inferring religiousness from enrolment at a religious school). Second, the studies have not measured religious context factors that may contribute to the degree to which children's concepts of God's and human minds are differentiated.

The current study tested four hypotheses regarding the ways in which religious context factors impact children's differentiation between God's mind and human minds. Hypothesis 1 was that Muslim children would have the greatest differentiation, Protestant and Catholic children would have moderate differentiation, and Non-Affiliated children would have the smallest (or potentially no) differentiation. Hypothesis 2 was that there would be a positive relation between children's religious exposure and differentiation. Hypothesis 3 was that there would be a positive relation between how flexible parents are about prayer actions and differentiation. Hypothesis 4 was that there would be a negative relation between the extent to which parents' anthropomorphize God and differentiation. Finally, exploratory analyses examined if there is a remaining effect of religious group affiliation on differentiation unaccounted for by the other religious context factors.

Method

Participants

Participants were 272 children (3.310–6.982 years, $M = 4.669$, $SD = 0.809$; 58.1% female) and a parent (92.7% mothers; 20–59; $M = 33.460$, $SD = 6.398$). Participants were recruited from the community around a Southern California university through an existing database of participants from prior unrelated studies, attendance at community events for families, attendance at events hosted by religious organizations (e.g., churches), and through word-of-mouth recommendations from participants. Participants were recruited

to enrol in a longitudinal study on religious cognition; the data reported here are from the first wave of data collection.

In terms of ethnicity, 40.4% of children were Caucasian, 20.6% Hispanic/Latino, 11.4% Asian, 7.4% African American, 1.1% Native American, and 19.1% Other/Mixed Race/declined to answer. Families from various religious backgrounds were recruited to participate: Protestant ($n = 82$), Catholic ($n = 55$), Muslim ($n = 75$), Non-Affiliated ($n = 48$), Other ($n = 12$). (Note: Data on a subset of these participants were published in Richert *et al.*, 2016 and Shaman *et al.*, 2016.) Three exclusion criteria were applied for the analysis: 'Other' religion ($n = 12$), missing data ($n = 36$), or over age 6 ($n = 12$). Table 2 has the descriptive statistics of the remaining children ($n = 212$). Age and gender were not significantly different between the religious groups.

Measures

Knowledge differentiation

The outcome variable of interest was the extent to which children differentiated God's ability to know information from humans' ability to know information. A differentiation score was calculated based on children's performance on four tasks assessing children's beliefs about agents' knowledge: two unfamiliar human agents (a boy doll and a girl doll) and God (not physically represented). In the Occluded-Picture Level 1 task, children indicated if each agent would know the identity of an occluded picture. In the Occluded-Picture Level 2 task, children were asked the same question after they were shown the identity of the occluded picture (see Barrett *et al.*, 2003). In the Perspective-Taking Level 2 task, children indicated whether the agents would know what a small drawing on a piece of paper was from far away after the child knew the identity of the drawing (see Richert & Barrett, 2005). In the Appearance-Reality Level 2 task, children indicated whether the agents would think a piece of chalk shaped like a cupcake is actually a piece of chalk or is a cupcake (see Flavell, Flavell, & Green, 1983). For all Level 2 tasks, children first answered control questions regarding their memory for their initial belief about the objects and actual status of the objects before responding to the test questions. When children did not pass the control, they were reminded of the correct answers until they answered the control questions correctly.

After responding to the test question, children provided a certainty judgment (really sure, a little sure). Based on typical scoring of Theory-of-Mind tasks, responses ranged from -2 (has knowledge, really sure) to $+2$ (does not have knowledge, really sure). Variables were averages across all four tasks: *God Knowledge* (four items, $\alpha = .490$) and *Human Knowledge* (two agents, eight items, $\alpha = .740$). A *Knowledge Differentiation* score was derived by subtracting the God Knowledge score from the Human Knowledge score, with a higher score indicating God has more correct knowledge than humans.

Table 2. Child participants by religious background

	Overall ($n = 212$)	Protestant ($n = 65$)	Catholic ($n = 47$)	Muslim ($n = 60$)	Non-Affiliated ($n = 40$)
Age (SD)	4.617 (0.698)	4.627 (0.693)	4.596 (0.725)	4.723 (0.711)	4.465 (0.652)
% Female	58.02	61.54	57.45	51.67	62.50

Religious exposure

Parents rated how often their child (1) engaged in public religious practices (i.e., at a religious institution), (2) engaged in private religious practices (i.e., at home), (3) attended religious events, and (4) received formal religious instruction. Responses ranged from *never* (0) to *once a month* (3) to *multiple times a week* (6) to *multiple times a day* (8); the average was *Religious Exposure* (four items, $\alpha = .818$).

Parent anthropomorphism

Parents indicated their perceptions of God's abilities or needs: (1) to forget, (2) to get bored, (3) to get sick, (4) to eat food and drink water, (5) to have a heart to stay alive, (6) to get wet in the rain, (7) to open a door to go through it, and (8) to be touched by a hand (Shtulman, 2008). Responses ranged from *definitely no* (−2) to *definitely yes* (2); the average was *Parent Anthropomorphism* (eight items, $\alpha = .850$).

Parent prayer flexibility

Parents indicated if a person could pray standing on their head, doing the splits, and while shrugging (see Shaman *et al.*, 2016). Parents responded from *definitely no* (−2) to *definitely yes* (+2); the average was *Parent Prayer Flexibility* ($\alpha = .958$).

Procedure

Each child was interviewed in an on-campus laboratory or in the family's home in Southern California (approximately 45–75 min), during which the accompanying adult completed a questionnaire in an adjacent room. The parent/guardian received \$20 per child, and each child received a small toy (\$1 value).

Results

We first examined how children's age related to their Knowledge Differentiation ($M_{\text{Differentiation}} = 0.452$, $SD = 1.101$). Age was a significant predictor of Knowledge Differentiation, Adjusted $R^2 = .101$, $p < .001$, $B = .512$ ($SE = 0.103$), 95% CI: 0.309–0.715. As Figure 1 indicates, children's differentiation of God's and human minds began as early as 3.5 years and increased steadily with age. An Independent Samples t -test indicated no significant gender difference in Knowledge Differentiation.

Primary analyses began by testing Hypothesis 1 regarding religious group differences in children's Knowledge Differentiation scores. Analyses continued with correlations testing the hypothesized positive relation between Religious Exposure and Differentiation (Hypothesis 2), positive relation between Parent Prayer Flexibility and Differentiation (Hypothesis 3), and negative relation between Parent Anthropomorphism and Differentiation (Hypothesis 4). Finally, a series of hierarchical regression analyses examined all religious context variables in the same models and specifically explored the possible remaining effect of religious group affiliation once the effects of religious context variables were accounted for.

The mean Knowledge Differentiation scores by Religious Group are presented in Figure 2. A Univariate ANOVA with Knowledge Differentiation as the dependent variable and Religious Group (Protestant, Catholic, Muslim, Non-Affiliated) as the between-

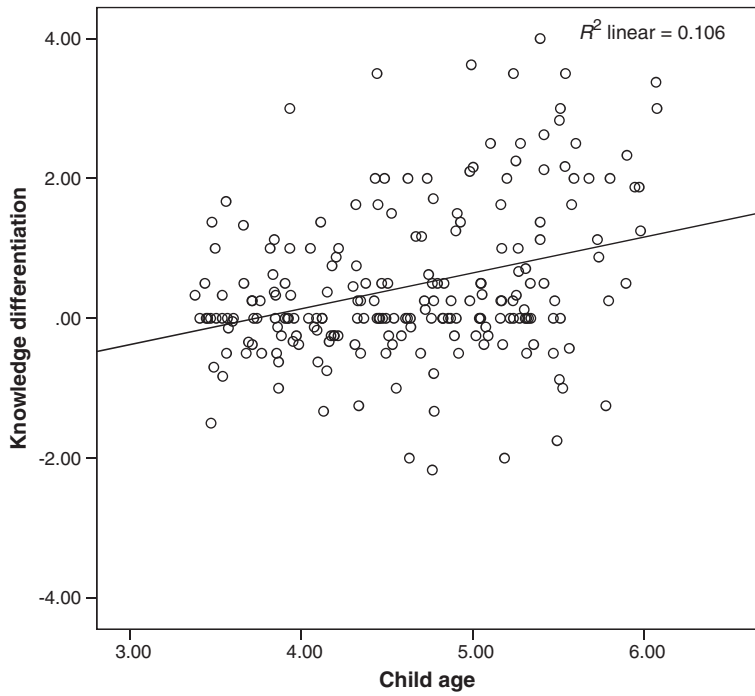


Figure 1. Linear relationship between age and knowledge differentiation.

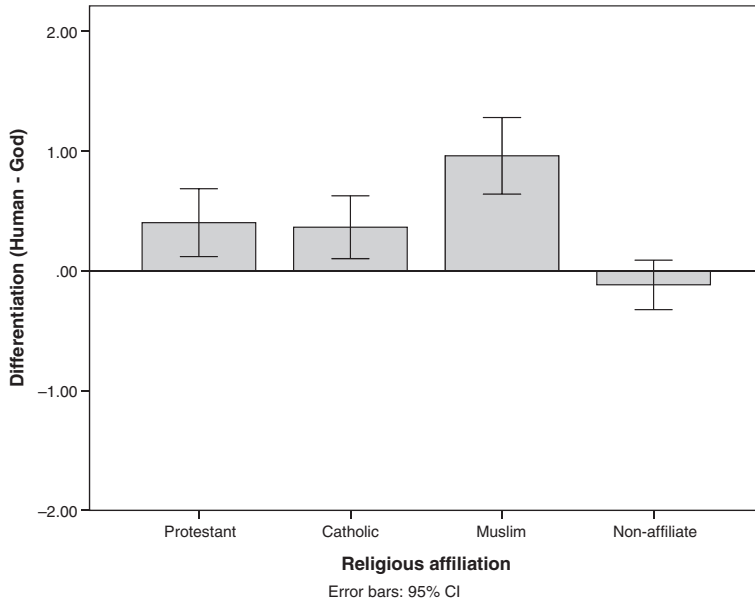


Figure 2. Knowledge differentiation by religious affiliation.

subjects factor indicated a significant effect of Religious Group, $F(3, 208) = 8.862$, $p < .001$, $\eta_p^2 = .113$. A Tukey's-*b* *post-hoc* test indicated support for Hypothesis 1: Muslim children had the greatest differentiation scores, with significantly lower differentiation by

Catholic children and Protestant children (who did not differ from each other), and almost no differentiation in Non-Affiliated children.

Univariate ANOVAs with Religious Group (Protestant, Catholic, Muslim, Non-Affiliated) as the between-subjects factor, incorporating Tukey's *b post-hoc* tests, examined if religious context variables varied by religious affiliation (see Table 3). For Religious Exposure, there was a large significant effect of religious group, such that the Muslim and Protestant families were similar to each other and had significantly higher religious exposure than the Catholic families, who had significantly higher exposure than the Non-Affiliated families. There was a moderate significant effect of religious group on Parent Anthropomorphism, and there was also a large significant effect of religious group on Parent Prayer Flexibility. Tukey's *b post-hoc* tests indicated Muslim parents were significantly less anthropomorphic and less flexible about prayer than other parents (who did not significantly differ from each other).

Next, we tested if religious context differences were related to the extent to which children differentiate God's knowledge from human knowledge. Bivariate correlations indicated all religious context variables were correlated with Knowledge Differentiation (see Table 4). In support of Hypotheses 2, 3, and 4, children who differentiated more between God's mind and human minds had greater religious exposure and had parents who had less anthropomorphic conceptions of God and were less flexible about how prayer had to be performed.

To examine the combined influence of the religious context variables, we ran a series of hierarchical regression analyses, testing the effects of age (Model 1), the added effects of religious context including: Religious Exposure, Parent Prayer Flexibility, and Parent Anthropomorphism (Model 2), and the additional added effects of religious group affiliation (Models 3–6). These models are presented in Table 5. Model 2 explained 18.7%

Table 3. Means (SD) of religious context variables by religious background

	Religious exposure	Parent anthropomorphism	Parent prayer flexibility
Overall	3.196 (2.093)	-1.228 (0.848)	0.668 (1.495)
Protestant	4.004 (1.822)	-1.152 (0.832)	1.454 (0.970)
Catholic	2.713 (2.034)	-0.937 (0.791)	1.206 (0.889)
Muslim	4.158 (1.585)	-1.773 (0.425)	-1.011 (1.391)
Non-Affiliated	1.006 (1.365)	-0.874 (1.025)	1.275 (0.773)
$F_{\text{ReligiousGroup}}$	33.432*** ($\eta_p^2 = .325$)	15.121*** ($\eta_p^2 = .179$)	70.390*** ($\eta_p^2 = .504$)

Note. *** $p < .001$.

Table 4. Correlation matrix

	KD	A	RE	PA	PPF
Knowledge differentiation (KD)	-				
Age (A)	.325***	-			
Religious exposure (RE)	.193**	.104	-		
Parent anthropomorphism (PA)	-.241***	.043	-.247***	-	
Parent prayer flexibility (PPF)	-.187**	-.130 [†]	-.092	.259***	-

Note. *** $p < .001$; ** $p < .01$; * $p < .05$; [†] $p < .10$.

Table 5. Regression models predicting differentiation

	B	B SE	β	95% CI for β		Adjusted R^2	F change
				Lower	Upper		
Model 1							
Age	.512	0.103	.325***	0.309	0.715	.101	24.797***
Model 2							
Age	.492	0.101	.313***	0.294	0.691	.187	6.893***
Religious participation	.054	0.034	.102	-0.014	0.121		
Parent prayer flexibility	-.061	0.048	-.083	-0.156	0.034		
Parent anthropomorphism	-.270	0.087	-.208**	-0.491	-0.098		
Model 3							
Age	.493	0.101	.313***	0.295	0.692	.168	0.117
Religious participation	.057	0.036	.109	-0.014	0.128		
Parent prayer flexibility	-.054	0.052	-.074	-0.157	0.048		
Parent anthropomorphism	-.269	0.087	-.207**	-0.441	-0.097		
Protestant Christian	-.057	0.168	-.024	-0.389	0.274		
Model 4							
Age	.492	0.101	.312***	0.293	0.691	.168	0.209
Religious participation	.055	0.034	.104	-0.013	0.123		
Prayer flexibility	-.064	0.049	-.087	-0.161	0.032		
Parent anthropomorphism	-.274	0.088	-.212**	-0.448	-0.101		
Roman Catholic	.078	0.171	.030	-0.260	0.416		
Model 5							
Age	.492	0.101	.313***	0.294	0.691	.186	4.791*
Religious participation	.033	0.035	.063	-0.036	0.103		
Prayer flexibility	.038	0.066	.052	-0.092	0.168		
Parent anthropomorphism	-.216	0.090	-.167*	-0.393	-0.040		
Muslim	.514	0.235	.211*	0.051	0.976		
Model 6							
Age	.483	0.100	.307***	0.286	0.680	.184	4.195*
Religious participation	.016	0.039	.030	-0.060	0.092		
Prayer flexibility	-.046	0.048	-.063	-0.142	0.049		
Parent anthropomorphism	-.260	0.086	-.200**	-0.430	-0.089		
Non-Affiliated	-.422	0.206	-.150*	-0.828	-0.016		

Note. Model fit statistics for Models 3–6 are all compared to Model 2.

* $p < .05$; ** $p < .01$; *** $p < .001$.

of the variance in Knowledge Differentiation, and age remained a significant predictor of differentiation once the religious context variables were included. However, Parent Anthropomorphism was the only religious context variable that significantly predicted differentiation.

In the four models testing the effects of religious affiliation, the models with the added effects of being Muslim (Model 5) and Non-Affiliated (Model 6) were significant, $\beta = .211$, $p < .05$; $\beta = -.150$, $p < .05$, respectively. More specifically, the added effect of Muslim Religious Group Affiliation was positive, indicating children in Muslim homes had greater differentiation between God and human minds that was not explained by the religious context factors. In contrast, the added effect of Non-Affiliated Group Affiliation was negative, such that children in Non-Affiliated homes had less differentiation between God and human minds that was not explained by religious context factors.

Discussion

The current study examined religious context factors that may support or hinder children's differentiation of God's mind from human minds: religious affiliation, overall religious exposure, parents' conception of prayer flexibility, and parents' anthropomorphic conception of God. Preschool-aged children from four religious backgrounds (Protestant Christian, Roman Catholic, Muslim, Non-Affiliated) indicated if they thought God and humans had knowledge/ignorance, and parents specified their own anthropomorphic views of God, their views on the flexibility of prayer actions, and the extent of their child's participation in religious practices and instruction.

As in past studies, children began to differentiate God's mind from human minds during the preschool years (e.g., Barrett *et al.*, 2001). However, in contrast to some recent studies (Giménez-Dasí *et al.*, 2005; Kiessling & Perner, 2014; Lane *et al.*, 2010, 2012), children rarely attributed mental state limitations to God even as their understanding of the limitations of human minds improved. Analyses confirmed the hypothesized religious group affiliation differences in differentiation. Muslim children had the greatest differentiation of God's mind from human minds, followed by Protestant and Catholic children, with Non-Affiliated children reporting almost no differentiation between their views on God's mind and human minds. The Non-Affiliated children in particular treated humans and God similarly during these preschool years, suggesting a strong anthropomorphism heuristic for God used by children in the absence of cultural supports to the contrary (Heiphetz *et al.*, 2015; Lane & Harris, 2014).

However, the findings with Muslim children, who rarely associated limitations to God's mind, suggest cultural inputs can mitigate anthropomorphic assumptions in children's developing conceptions of God's mind and can promote flexibility in children's theories of mind. Thus, in contrast to recent arguments that children cannot develop concepts of abstract, supernatural agents until they have a full grasp of human fallibility (Lane & Harris, 2014), these findings suggest that aspects of children's cultural environment can facilitate early differentiation between natural and supernatural concepts. As such, these findings support the growing body of scholarship calling for greater diversity in the participants with which researchers draw from, and on which conclusions about human cognition are drawn (e.g., Henrich, Heine, & Norenzayan, 2010).

The need for greater diversity in research into religious concept development is highlighted by the fact that differential patterns in children's differentiation between God and humans were associated with variations in the cultural context in which children are exposed to a concept of God. Differentiation was only weakly correlated with general measures of religious involvement, indicating more sensitive measures of the cultural context were crucial for understanding the differences in differentiation by religious background. In terms of these more direct measures of parent input about God, children had stronger differentiation between God and humans when parents had less flexibility in their views on whether a person could perform non-traditional actions while praying prayer and if parents reported more anthropomorphic views of God.

In regard to prayer flexibility, prior research has suggested children may view the actions of prayer as communicating to other people (rather than God) the intention to be praying (Shaman *et al.*, 2016). As such, we hypothesized an emphasis on using traditional prayer actions may present a context for children in which the limitations of human minds are contrasted with the specialness of God (if not specifically the specialness of God's mind). The findings support this hypothesis, as children's differentiation between the

special capabilities of God's mind and the limitations of human minds was related to less flexibility in parents' views of prayer actions.

In regression analyses, the strongest predictor of differentiation was parents' anthropomorphic views of God. Although examination of mean levels of anthropomorphism indicated parents did not tend to attribute anthropomorphic characteristics to God (similar to Shtulman, 2008), there was still variation in parents' anthropomorphism; and this variation predicted children's differentiation between God's mind and human minds even after controlling for age. Parents who were more anthropomorphic had children who differentiated between God and humans less.

As a whole, these findings suggest varying sources of input about God may present children with conflicting views of God's mind. Adults often hold implicit anthropomorphic views of God's mind that conflict with 'theologically correct', omniscient views of God's mind (Barrett & Keil, 1996). Thus, the explicit testimony about God's omniscience children receive may contrast with implicit messages about God's human-like fallibility that come through in the course of day-to-day interactions. The current findings suggest that general exposure to religious teaching and doctrine is not the primary way in which children come to differentiate God from humans in early childhood. In contrast, religious discourse and practices in the home are the primary influence on children's earliest concepts of God.

Together with the finding that the effect of being raised in a Muslim or Non-Affiliated home was significant beyond the effects of age and parent anthropomorphism, these findings also suggest children in Muslim and Non-Affiliated homes come to differentiate God's mind from human minds through different cultural mechanisms than those raised in Protestant and Catholic homes. This pattern supports a cultural systems-level approach to conceptual development such that cultures and concepts are viewed and researched as 'interacting elements of niche construction' (Ojalehto & Medin, 2015, p. 267). From this perspective, a concept that may on the surface appear to be similar for different cultural groups (like God) may be better understood as a concept that operates differently within different cultural contexts. To understand the development of this concept, and the way in which this concept influences belief and behaviour in the course of development, researchers should consider that concept within the cultural niche in which that concept has evolved and is transmitted to the child.

Limitations

As parent anthropomorphism was a strong predictor of children's differentiation, one limitation of this study is that this measure only indirectly indicates parents' communication about God with their child and could indicate the influence of either (or both) implicit or explicit messages about God. Thus, future research should examine how parents' anthropomorphic views of God contribute to children's differentiation between human and God concepts (e.g., how information is transmitted to the children, amount of time parents converse with children about God).

An additional limitation was the measure of prayer flexibility. Although this measure has been used in prior studies as an indicator of how flexibly children and parents view prayer actions (Shaman *et al.*, 2016), there are many other facets to prayer that may be expected to relate to children's concepts of God. Recent studies have suggested developments during the preschool years in children's understanding of prayer as a form

of extraordinary communication (Lane, Evans, Brink, & Wellman, 2016) as well as differences in how parents from different religious traditions view the function of prayer actions (Richert *et al.*, 2016). Thus, future research could examine how these aspects of prayer concepts relate to children's concepts of God.

A third limitation is related to the added effect of being Religiously Non-Affiliated. The current study was not able to examine differences within this group of participants; however, recent research has found that religious non-affiliates vary considerably in the religious beliefs they hold and the religious behaviours in which they engage (McCaffree, 2014, forthcoming). In particular, theists are more likely than agnostics or atheists to believe prayers will be fulfilled (Lane & Dolins, 2016). Thus, one limitation of this study is that we did not consider subgroups of religious non-affiliates; and future research may consider the effects on children's religious concepts of being raised in homes with parents from these different types of religious non-affiliation.

Finally, the current study did not examine individual difference aspects of children beyond age and gender. Past research indicates some potential factors that may relate to children's differentiation between minds, including individual differences in anthropomorphism generally (Severson & Lemm, 2016) and in children's fantasy orientation (Taylor, 2001; Wigger *et al.*, 2013). Thus, future studies could examine how these individual child factors support or hinder children's differentiation between human and God concepts.

Conclusion

These findings support the growing body of scholarship calling for greater diversity in the populations from which researchers draw (e.g., Henrich *et al.*, 2010) and consideration of cultural influences in religious concept development (Richert & Granqvist, 2013). The findings from the current study provide a framework for conceptualizing the development of religious cognition as a lens through which to examine the development of children's abstract concepts and point to the fundamental ways in which human cognition is shaped by the religious and cultural context in which it develops. In particular, in the absence of cultural supports, children's concepts of God are relatively anthropomorphic. However, parent factors, especially less anthropomorphism in parents and in religious contexts generally (e.g., through bans on iconic representations of God), can support children's differentiation of God from humans from the earliest inceptions of these concepts.

Acknowledgements

We thank Insia Dharsi, Tatiana Garcia, and Christina Stream for their assistance with this project and the parents and children who participated in this research. We also thank Paul Harris for his comments on a draft of this manuscript; and Hannah Puttre for her assistance with minor portions of this manuscript. The research in this study was conducted with the support of a grant from the Social Science Research Council's New Directions in the Study of Prayer initiative to Dr. Rebekah Richert and Nicholas Shaman, a grant from the John Templeton Foundation awarded to Dr. Rebekah Richert, as well as a Research and Travel grant from the UCR Academic Senate to Dr. Rebekah Richert and a UCR Chancellor's Research Fellowship to Insia Dharsi.

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Received 4 February 2016; revised version received 15 August 2016