Can God do the impossible? Anthropomorphism and children's certainty that God can make impossible things possible

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ABSTRACT

This study examined beliefs about the possibility of impossible events in early childhood. Protestant, Catholic, Muslim, and Non-Affiliate parent-child dyads ($N = 222$) first indicated if 4 impossible events could happen in real life; they then indicated their level of certainty that God could make the events happen. Children's judgments about whether or not God could make impossible events possible depended on their age and concepts of God. Specifically, 5- to 6-year-old children with non-humanlike views of God had greater certainty that God could make impossible events possible than children with a humanlike view of God. Children provided natural justifications for how God could or could not bring about an impossible event, though religious justifications increased with age. Additionally, analyses of parent beliefs and religious affiliation indicated different developmental trajectories for children. These findings highlight variations in how the religious context shapes young children's understanding of the physical world and belief in supernatural causality.

1. Introduction

Prior research has found that children are more likely to believe that events and characters in storybooks, even those with highly fantastical and impossible features, are real or possible if God is a character in those stories (Corriveau, Chen, & Harris, 2015; Vaden & Woolley, 2011; Woolley & Cox, 2007). These findings are intriguing in light of studies suggesting that by the age of 4, most children correctly indicate events that are impossible or fantastical cannot occur in the real world (Rosengren & Hickling, 2000; Shtulman & Carey, 2007; Woolley & Cox, 2007). Additionally, by age 5, most children differentiate events that are impossible from those that simply violate convention (Kalish, 1998); and by age 8, most children will differentiate events that are improbable from events that are impossible (Nolan-Reyes, Callanan, & Haigh, 2016; Shtulman & Carey, 2007; Shtulman, 2009; Woolley, Cornelius, & Lacy, 2011). However, prior research has not specifically examined children's belief or certainty that God can actually *do* impossible things. The current study extends prior research into children's understanding of possibility (Corriveau et al., 2015; Nolan-Reyes et al., 2016; Shtulman & Carey, 2007), their beliefs in supernatural causality (Legare, Evans, Rosengren, & Harris, 2012; Woolley et al., 2011), and their concepts of God's abilities and limitations (Barrett & Keil, 1996; Heiphetz, Lane, Waytz, & Young, 2016; Nyhof & Johnson, 2017; Richert, Saide, Lesage, & Shaman, 2017; Shtulman & Lindeman, 2016; Shtulman, 2008). Specifically, the current study examined factors related to children's certainty that God can effect supernatural change in the physical world.

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2. Developing understanding of improbable and impossible events

Understanding of what is and is not possible develops in early childhood through increases in experience with the natural world and the developing ability to think abstractly about mechanisms for how improbable events might be possible (Lane, Evans, Brink, & Wellman, 2016; Lane, Ronfard, Francioli, & Harris, 2016; Shtulman & Carey, 2007). For example, 4- to 6-year-old children who indicated improbable events could occur tended to give mechanistic justifications for how that event could occur (e.g., step-by-step, procedural justifications). In contrast, most children indicated impossible events could not occur and tended to justify their answers by giving conditional explanations for how those events could occur even though they are clearly impossible (e.g., "by creating an imaginary or silly scenario in which the event might be possible") (Nolan-Reyes et al., 2016, p. 392). In addition, when asked why difficult-to-explain events occur, 8- to 12-year-old children overwhelmingly focused on natural explanations (e.g., laws of nature) over supernatural justifications (Woolley et al., 2011).

These finding were replicated in younger children by Nancekivell and Friedman (2017) in a set of studies examining 6- and 7-year-olds' explanations for improbable (e.g., owning a peacock) and impossible events (e.g., owning a unicorn). Even when Nancekivell and Friedman (2017) included a magical being (e.g., a fairy or wizard) in the story, children *still* provided natural explanations for the phenomena. Woolley and Cornelius (2017) further found that children's belief about the possibility of supernatural events was related to their explanations for those events. Although 5- to 9-year-olds were most likely to give natural explanations for how three kinds of events could have happened [mundane (i.e., a boy bumps a vase and returns it to the shelf and the mom doesn't notice), improbable (i.e., the vase breaks, the boy fixes it and the mom doesn't notice), or extraordinary (i.e., the vase breaks and is fixed when the boy looks up from hiding behind the couch)], when children claimed the extraordinary event was possible, they also were more likely to give a supernatural explanation (e.g., God or magic) for that event. The nature of this increase, however, is critical for understanding how children process supernatural and extraordinary events. Specifically, only 5%–10% of explanations for extraordinary events were supernatural; but over 50 % of explanations for the extraordinary events were natural (Woolley & Cornelius, 2017).

In summary, prior research has suggested that young children differentiate possible from impossible events and tend to rely on natural explanations even when explaining how extraordinary events can occur. There is one category of naturally impossible events for which children may have increased belief in their possibility and also an increased use of supernatural explanations for how those events can occur. According to data collected in 2018 and 2019, 72 % of American adults indicate an affiliation with a religious belief system (Pew Research Center, 2019), suggesting the majority of children in the United States are raised in homes that profess belief in God and in God's interaction in the world. As such, studies have examined children's specific belief in the possibility of the impossible events presented in religious stories.

3. Religious stories

Children are more likely to indicate a fantastical story is real if God is a character in that story (Corriveau et al., 2015; Vaden & Woolley, 2011; Woolley & Cox, 2007). For example, Woolley and Cox (2007) found that by the age of 5, children were more likely to claim impossible events in religious stories than impossible events in fantastical stories could happen in real life. Extending this research, Vaden and Woolley (2011) found that 6-year-old children were more likely than 4- and 5-year-olds to report religious stories as possible in real life and the story protagonists as real, indicating belief in the possibility of supernatural religious events may increase with age. In addition, children who were told the religious stories gave more religious justifications; and children who were told non-religious stories gave more natural (i.e., scientific) and magical explanations (Vaden & Woolley, 2011). Furthermore, Lane (2020) found that children did not differentiate between wishing versus praying to God for an impossible event to occur and that children were less likely after the age of 6 than before to claim that wishing or praying to God would result in an impossible effect on the world.

Given the cultural specificity of religious stories, researchers have hypothesized and found that religious exposure and education are related to children's belief that extraordinary events in religious stories can happen in real life. Regarding the possibility of events themselves, Vaden and Woolley (2011) found that children who had received formal religious education (i.e., either through attending a religiously affiliated school or a religious place of worship more than once a week) were more likely to claim impossible religious events and characters occurred in real life than children with low religious exposure. In the case of characters in stories with impossible events, Corriveau et al. (2015) found that 5- to 6-year-old children with exposure to religion (defined as attending church and/or a parochial school) judged religious and fantastical characters to be real whereas children with no exposure to religion (defined as not attending church or a parochial school) judged the characters to be pretend (Corriveau et al., 2015). Additionally, Lane (2020) found that children's general religious participation and their participation specifically in prayer predicted an increase in belief that praying to God could have an extraordinary result; but this relation did not hold for wishing to God.

The authors of these prior studies interpreted their findings to reach somewhat conflicting conclusions about the influence of religious exposure on cognitive development. Corriveau et al. (2015) argued that the effect of religious exposure on children's reasoning is domain-general, such that children raised in religious homes are more likely to believe in the possibility of impossible events in general, regardless of whether the events are presented as religious or otherwise. In contrast, Vaden and Woolley (2011) contended that religious children's higher belief in the possibility of religious than fantastical events represents a domain-specific cognitive process whereby cultural learning influences children's reasoning specifically when processing religious content but does not otherwise affect children's reasoning about event possibility. Lane (2020) similarly interpreted the differential relations of religious participation with beliefs about wishing and prayer to indicate domain-specific cultural influence.

The current study adds to this discussion by examining children's certainty about God's general supernatural agency as well as supernatural agency in the context of familiar religious stories. Research on children's concepts of God suggests children's belief that God can do the impossible is not a foregone conclusion. In one study, for example, 4.5- to 6-year-old children were more likely to report

that God would know about a person's desires if the person asked or prayed for those desires aloud rather than hoping or praying for them silently (Lane, Evans et al., 2016; Lane, Ronfard et al., 2016). In other words, children did not seem to think that God can violate the natural laws of physics, biology, and psychology to just know what someone wants.

4. Concepts of God

Despite religious doctrines that include teachings that God can do anything, it remains unclear if, when, and under what conditions children believe that God can make extraordinary things happen in the world. One interpretation of Lane's (2020) finding that children did not differentiate between wishing to God or praying to God is that children's responses indicated how they conceive of God, not wishing or prayer specifically. However, the wording of the questions in Lane (2020) leave that conclusion open for further study, as children were not directly asked if God could do the impossible. Instead, children were asked if the desired outcome would occur (i.e., "If Jon [wishes/prays to God] for the building to stay up and not fall over, will the building stay up or will it fall over?" Lane, 2020, p. 260). Thus, it is not immediately apparent that children were thinking about God, as opposed to the acts of wishing or praying, when responding. When asked about what miracles are, only 7% of children specifically cited God as the cause of a miracle (Woolley & Dunham, 2017), suggesting that it is unclear in prior studies if children were thinking specifically about God's role in making impossible things possible in religious stories. Research into anthropomorphism in children's God concepts and children's certainty about God's existence suggests potential constraints on children's attribution of supernatural abilities to God.

Anthropomorphism in children's God concepts takes a variety of forms, which vary across development and across socio-cultural contexts. Some studies have specifically assessed anthropomorphism of God by mapping children's developing theory of God's mind in contrast to their developing theory of human minds. Using this method, some prior studies have found that children maintain a belief that God knows everything even while children are solidifying their understanding that human minds are fallible (Barrett, Richert, & Driesenga, 2001; Barrett, Newman, & Richert, 2003; Knight, Sousa, Barrett, & Atran, 2004; Richert & Barrett, 2005; Shaman, Saide, Lesage, & Richert, 2016; Wigger, Paxon, & Ryan, 2013). Other studies using this method have found that children go through a transition phase in their beliefs about God's mind, associating limitations such as ignorance to God as they are learning about the limitations of human minds (Giménez-Dasí, Guerrero, & Harris, 2005; Kiessling & Perner, 2014; Lane, Wellman, & Evans, 2010; Lane, Wellman, & Evans, 2012; Makris & Pnevmatikos, 2007). Richert et al. (2017) found that these different patterns of findings are related to children's religious backgrounds. Specifically, 4- to 7-year-old Muslim children were more likely than Protestant, Catholic, and Non-Affiliated children to continue to associate omniscience to God's mind as they were learning about the limitations of human minds. In addition, for children raised in Muslim, Protestant, Catholic, and Non-Affiliated homes, greater differentiation between God's mind and human minds was predicted by variation in the degree of anthropomorphism in parents' concepts of God (Richert et al., 2017).

The current study operationalizes anthropomorphism of God using a somewhat different, attributional approach. In the attributional approach, children are asked if God has a variety of characteristics or concept features. For example, 5-year-old children are more likely than their parents to attribute biological (e.g., sneezes), physical (e.g., jumps), and psychological (e.g., thinks) human-like properties to God (Shtulman, 2008). In addition, Muslim children and adults are less likely than other children and adults to associate biological and physical attributes to God (Richert, Shaman, Saide, & Lesage, 2016; Shaman, Saide, & Richert, 2018). Finally, although general religious exposure is not related to children's association of biological, psychological, and physical properties to God, the human-like attributions in children's concepts of God were more similar to their parents' non-human-like concepts of God after children passed theory of mind tasks (Saide & Richert, 2020).

In summary, prior studies suggest variation in the degree to which children anthropomorphize God. These variations in anthropomorphism suggest a potential developmental mechanism related to children's certainty in the possibility that God can do the impossible. More specifically, children who associate less human-like attributions to God may also be less likely to believe that God can do the impossible. Since children's association of human-like properties to God decreases with age, we may in turn hypothesize their belief in supernatural causality increases with age as a result of cultural refinement of the God concept (Saide & Richert, 2020). This pattern would lend support to theories about the co-existence of natural and supernatural explanatory frameworks (Astuti & Harris, 2008). However, this developmental pattern would be in contrast to Lane (2020), which found that belief in the efficacy of wishing and praying decreased with age. The current study aims to shed light on how children's concept of God relate to their certainty about what God can do.

5. Additional social and cognitive influences

5.1. Parent support

In addition to general cognitive developmental shifts, parents also play a critical role in children's developing beliefs about possibility. Children's belief in fantastical beings is related to the support that parents explicitly provide to encourage that belief (Woolley, Boerger, & Markman, 2004, 2011). Parents are more likely than their children to report skepticism about truly impossible events, focusing on how those events would not be possible in the real world (Nolan-Reyes et al., 2016). However, adults also are more likely to give supernatural explanations for unexpected events than 8- to 12-year-old children (Woolley et al., 2011). Moreover, 12-year-old children and adults who report high religiosity are more likely to reference God as an explanation for unexpected events than children and adults who are low in religiosity (Woolley et al., 2011).

These findings indicate the need to examine how parent input influences children's developing beliefs about what is and is not possible. Some studies have indicated that the religiosity of the home environment plays a key role (Woolley & Cox, 2007), whereas other studies have suggested that parents' beliefs more than general religious participation are related to concepts of God in early

childhood (Richert et al., 2017). The current study examines the relationship between religious beliefs and religious exposure and certainty that God can make impossible things possible in both parents and children.

5.2. Experience envisioning alternatives

An additional factor that may be hypothesized to influence children's ability to imagine causes for impossible events is children's experience envisioning alternatives to reality. Prompting children to engage their imagination has been found to promote deductive reasoning in early childhood (Richards & Sanderson, 1999), and children are more likely to judge impossible events to be possible if asked to imagine those events happening in a distant country (Bowen-Smith, Shtulman, & Friedman, 2018). Thus, in the current study, we also examined if children's belief that impossible events might be possible may be related to their general engagement in pretense or fantasy in which they envision alternatives to reality.

6. The current study

The current study tested four primary hypotheses. The first hypothesis, supported by prior research on children's beliefs about religious stories, was that children will be more certain that an impossible event is possible if that event is done by God. An exploratory question related to this hypothesis is whether children's certainty varies based on whether the stories are familiar religious stories (e.g., domain-specific) or more general, non-religious stories (e.g., domain-general). The second hypothesis was in regard to anthropomorphism of God as a developmental mechanism; specifically, the hypothesis is that greater certainty about God's supernatural abilities would be related to decreases in children's attribution of anthropomorphic properties to God. The third hypothesis was that specific sociocultural experiences (i.e., parents' beliefs that God can make impossible things possible, children's religious affiliation, children's education and participation in formalized religious activities and doctrine) would positively relate to certainty that God can make impossible events possible. The fourth hypothesis was that children's certainty in God's supernatural abilities would be positively related to their beliefs about God's reality status and their engagement in imagining alternatives to reality (as measured by engagement in pretense), such that stronger certainty that God is real and more engagement in pretense would relate to children judging the impossible events as more possible. However, we also hypothesized that the effect of anthropomorphism of God would remain even after accounting for the effects of age, pretense engagement, and God's reality status. In summary, the current study examines the global hypothesis that variations in children's anthropomorphism of God will be the primary predictor of their certainty in God's supernatural abilities, with anthropomorphisms operating as a developmental mechanism for differences that co-occur with age and religious socialization.

7. Method

7.1. Participants

A total of 296 children between the ages of 3;1 and 6;11 ($M = 4;7$, $SD = 9$-months) and a parent/guardian (92.8 % mothers) participated in this study between March 2013 and June 2016. Families were recruited from community events in the United States from Southern California to participate as part of a larger longitudinal study on children's developing understanding of religious concepts (e.g., God, prayer, and supernatural causality). The data for this analysis were drawn from the first time-point of data collection. Some data on these participants has been reported previously (Richert, Saide, Lesage, & Shaman, 2017; Richert, Shaman, Saide, & Lesage, 2016; Saide & Richert, 2020; Shaman, Saide, Lesage, & Richert, 2016); however, the specific analyses reported in the current study are unique research questions and hypotheses posed regarding children's beliefs in supernatural causality. All parents self-identified with one of the following groups: Protestant Christian ($n = 89$), Roman Catholic ($n = 61$), Muslim ($n = 75$), Religiously Non-Affiliated ($n = 61$), and Other ($n = 10$). Of note, the Religiously Non-Affiliate group included families who self-identified as Non-Affiliate and were not engaging their children with any formal religious training, but parents might still have reported believing in God or being spiritual. For this study, specific affiliation (or non-affiliation) with a religious community or belief system complimented other measures assessing parents' beliefs in God's existence and the nature of God. All families reported English as the primary language spoken in the home.

Parent-child dyads were excluded from data analysis if the parents self-identified as Other for religious affiliation ($n = 10$), the child did not consent to participating in the study ($n = 3$), the child did not understand the questions included in this paper ($n = 25$), the child and/or parent did not complete the measures examined in the current study ($n = 34$), there were distractions in the environment ($n = 2$), or there was an experimenter error ($n = 1$). The gender breakdown and age groups of children for the remaining participants ($N = 222$) can be found in Table 1.

Table 1
Demographic Breakdown for Children by Religious Affiliation.

	Overall (N = 222)	Protestant (n = 60)	Catholic (n = 49)	Muslim (n = 65)	Non-Affiliated (n = 48)
% female	56.8 %	53.3 %	59.2 %	56.9 %	58.3 %
Mean Age (SD)	4.699 (.794)	4.701 (.786)	4.644 (.697)	4.935 (.897)	4.434 (.667)

Parents ranged in age from 20- to 59-years-old ($M = 33;5$, $SD = 6;5$, 93.2 % female). The majority of parents (94.6 %) provided information on their child's racial/ethnic background: Other (25.7 %), White (21.6 %), Hispanic/Latino (28.4 %), Asian (14.0 %), Black (4.1 %), and Native American (.9%). Additional demographic information such as parent education, family income, and parental ethnic background, including a breakdown by religious affiliation, can be found in Table 1 in the Supplemental Materials.

7.2. Materials

Children were interviewed by a researcher while the accompanying adult filled out a similar questionnaire (see Supplemental Materials for all survey questions). The child interview consisted of questions assessing children's understanding of supernatural causality, God, and the functions of and behaviors used with prayer. Questions about children's pretense engagement were also included, as were cognitive tasks such as theory of mind and executive functioning.

7.2.1. Possibility judgments with supernatural causality

Parents and children indicated if four physically impossible events could happen in real life. Two of the impossible events were chosen because they were from stories that occur in the Old Testament of the Christian Bible and the Muslim Qur'an: holding up a stick and moving water apart and being swallowed by a whale and staying alive (Corriveau et al., 2015; Vaden & Woolley, 2011). These events represent domain-specific impossible events. The other two impossible events were non-Bible/Qur'an based, but have been used by previous researchers examining children's understanding of impossibility: walking through walls and becoming invisible (Shtulman, 2009). These events represent domain-general impossible events. Parents were asked if a person could fly instead of if a person could become invisible, though both events were still physical, impossible events and highly correlated (see Supplemental Materials, Part 4 for further analyses).

After indicating if each event could happen in real life, children then were asked if each event could happen by asking God (i.e., the supernatural causal mechanism) for it to happen. Protestant, Catholic, and Non-Affiliated participants were asked about God whereas Muslim participants were asked about Allah. Children were first asked all questions as a "*Yes*"/ "*No*" response, and then asked how certain they were of the "*Yes*" or "*No*" response (*a little sure* or *really sure*). Hand motions were also used to emphasize the difference between "*A little sure*" (Hands close together) or "*Really sure*" (Hands wide apart). If a child responded with "*Don't Know*", they were not asked the certainty questions. Thus, children responded to each question on 5-point Likert scale (*No, Really Sure* [-2] to *Yes, Really Sure* [+2]), and this procedure was used throughout the child interview. Parents responded to each question on 5-point Likert scale (*Definitely No* [-2] to *Definitely Yes* [+2]). Positive scores indicate that the event could happen in real life; negative scores indicated the event could not happen in real life. Responses were averaged for Domain-General events without supernatural causality (child $r = .668$, $p < .001$; parent $r = .602$, $p < .001$), Domain-General events with supernatural causality (child $r = .533$, $p < .001$; parent $r = .882$, $p < .001$), Domain-Specific events without supernatural causality (child $r = .315$, $p < .001$; parent $r = .619$, $p < .001$), and Domain-Specific events with supernatural causality (child $r = .564$, $p < .001$; parent $r = .859$, $p < .001$).

7.2.2. Supernatural causality justifications

For each item, after children were asked whether or not God/Allah could make the event happen, children were then asked a follow-up, open-ended, justification question about how God/Allah could make the impossible event happen in real life (if the child judged the event as possible), or why God/Allah could not make the impossible event happen in real life (if the child judged the event as not possible). Parents were not asked these open-ended questions. All responses were coded into 1 of 5 categories: (1) natural explanations (e.g., using science or describing a law of nature such as gravity), (2) religious supernatural explanations (e.g., using God or prayer), (3) non-religious supernatural explanations (e.g., using magic or sorcery), (4) irrelevant (e.g., redundant or nonsensical explanations), and (5) absent (e.g., child was not asked to provide a response) (Woolley et al., 2011). Two independent coders coded children's responses (natural: 90.54 % agreement, Cohen's kappa = .841; religious supernatural: 95.50 % agreement, Cohen's kappa = .888; non-religious supernatural: 99.55 % agreement, Cohen's kappa = .976; irrelevant: 92.79 % agreement, Cohen's kappa = .892). Any disagreements were discussed and settled by a third independent rater for the final analyses.

The number of response types were summed for each child and could range from [0] *never used that type of justification to* [4] *used that type of justification for every question.* Nine children gave more than 1 type of explanation in any given response (see Supplemental Materials for description of these 9 co-existing explanations). The remaining 214 children gave mutually exclusive responses belonging to only one category (Table 2).

Table 2
Examples of responses coded from children's justifications of possibility judgments.

CODE:	EXAMPLE:
Natural	*Because they will hit their head.*
Religious Supernatural	*Because God made it.*
Non-Religious Supernatural	*Because [the person] is not magic.*
Irrelevant	*They moo.*
Natural + Religious Supernatural	*Because if [the whale] didn't have teeth, God can.*
Natural + Non-Religious Supernatural	*Because that couldn't happen. And they would be a ghosts, and [ghosts] aren't real.*
Religious + Non-Religious Supernatural	*Because God is a ghost.*
Don't Know + Irrelevant	*I don't know. Can I tell you something about my bike?*

7.2.3. Anthropomorphism of God

Children and parents were asked about eight humanlike abilities or needs of God/Allah: (1) to forget, (2) to get bored, (3) to eat and drink water, (4) to have a heart to stay alive, (5) to get sick, (6) to get wet in the rain, (7) to have to open up a door to go through it, and (8) to be touched (see Richert et al., 2016). Children responded on a 5-point Likert scale (*No, Really Sure* [-2] to *Yes, Really Sure* [+2]). Parents responded on a 5-point Likert scale (*Definitely No* [-2] to *Definitely Yes* [+2]). Positive scores indicated that God is humanlike; negative scores indicated God is non-humanlike. Responses were averaged for an overall anthropomorphism score (child Cronbach's α = .804; parent Cronbach's α = .861).

7.2.4. God reality status

In line with other studies indicating children were more likely to believe story characters and events were real if God was present in those stories, we included a measure of children's belief that God is real to explore how this measure might relate to children's possibility judgments. Children were asked a single question asking if God/Allah was real or pretend, and how certain they were, on a 5-point Likert scale (*God is Pretend, Really Sure* [-2] to *God is Real, Really Sure* [+2]). A score of 0 corresponded with *I Don't Know if God is Real or Pretend*. Parents were also asked a single question asking if God/Allah was real or pretend on a 5-point Likert scale (*Definitely Pretend* [-2] to *Definitely Real* [+2]). A score of 0 corresponded with *Don't Know*.

7.2.5. Religious participation

For children, the measure of religious participation was an average of how often ([0] *Never* to [8] *Multiple Times a Day*) parents reported their child engaged in public and private religious practices, attended religious events, and received formal religious instruction (child Cronbach's α = .844). An average religious participation variable was also created for parents, as they also indicated how frequently they themselves engaged in public and private religious practices and attended religious events ([0] *Never* to [8] *Multiple Times a Day*) (parent Cronbach's α = .568).

7.2.6. Pretense engagement

The measure of children's engagement in pretense was based on previously published measures (Richert & Smith, 2011). Children were asked if they participated in five pretense activities: (1) if they liked to pretend, (2) if they talked to themselves when they were lying in bed before they went to sleep, (3) if they liked to make up songs or plays, (4) if they sang songs or acted out plays for their friends and family, and (5) if they had a pretend friend. Responses were scored as the following and averaged: *No* [-1], *Don't Know* [0], *Yes* [+1] (Cronbach's α = .695).

7.2.7. Demographic information

Parents (or guardians) also provided demographic information about the child, themselves, and the child's family. Questions about the child included the child's date of birth, age, gender, ethnic/racial background, and primary language.

7.3. Procedure

Each child and his or her parent/guardian were interviewed in an on-campus laboratory or in the family's home. Child interviews took about 45−75 min each. The accompanying adult filled out a questionnaire in a nearby room while the child was interviewed. Participants were compensated $20 per child, and each child also received a small toy worth approximately $1. All parents provided written informed consent and all children provided verbal informed consent. All children received the same questions, and four different versions of the survey were administered to children, counterbalanced by child age and gender within each of the four religious affiliations (see Part 1 of Supplemental Materials for specific version orders).

7.4. Model building strategy

We used multilevel models (MLM) and the lme4 package in R to estimate the within- and between-person variance components in intercepts and slopes for possibility judgments using Story-Characteristics (Level 1) and Participant-Characteristics (Level 2) as predictors. Three separate models were built: (1) Parent Model – using parental data, (2) Child Model – using child data, and (3) Parent-Child Discrepancy Model – comparing parent-child scores. Non-significant predictors that did not improve model fit were trimmed for model parsimony, so that the final three models reported each only includes the significant predictors (see Supplemental Materials for a detailed description of the variables within each model as well as the model building strategy).

8. Results

8.1. Model 1: parent model

8.1.1. Preliminary analyses

To assess if and how the variables chosen for the Parent Model were related, Pearson Product Moment Bivariate correlations were conducted prior to building the Parent Multilevel Model (see Table 3). Belief in the existence of God and religious participation were positively related to the parents' possibility judgments overall whereas anthropomorphism of God was negatively (although not significantly) related to parents' possibility judgments overall.

Table 3

Correlation Matrix, Means, and Standard Deviations for Parents – Collapsed Across Religious Groups.

	1	2	3	M (SD)
1. Belief in God's Reality Status	—			1.137 (1.083)
2. Anthropomorphism of God	.014	—		−1.250 (.844)
3. Religious Participation	.396***	−.204**	—	3.225 (2.033)
4. Causal Mechanism – Events with no cause provided	.133*	.102	.203**	−1.193 (.949)
5. Causal Mechanism – Events with God	.199**	−.198**	.345***	−.198 (1.466)
6. Event Type – Domain-General	.123†	−.099	.265***	−.995 (.991)
7. Event Type – Domain-Specific	.231**	−.099	.374***	−.419 (1.151)
8. Possibility Judgments – Overall	.206**	−.108	.360***	−.704 (.970)

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$; two-tailed.

In order to assess if Multilevel Models (MLM) were needed to analyze the data, Intraclass Correlations (ICC) were conducted for each step in the following Parent Model. The ICC indicates the proportion of variance in parent's possibility judgments accounted for by between-group variation, specifically, religious affiliation. Obtaining an ICC above .5 indicates a moderate level of clustering within groups and the need for using multilevel models to account for this clustering (Finch, Bolin, & Kelley, 2014; Snijders & Bosker, 2012). For the Parent Model, the ICC for Steps 1–10 ranged from .306 to .525, justifying the use for MLM (see Table 4 for ICC at each step). Steps 1–6 of the Parent Model are discussed below (see Supplemental Materials for Steps 7–10).

8.1.2. Results for parent multilevel model: model 1

The final Parent Multilevel Model was a Random Intercepts and Random Slopes Model and included four predictors across Story-Characteristics (Level 1) and Participant-Characteristics (Level 2):

(1) Causal Mechanism (events presented with no causal mechanism vs. events presented with God as a causal mechanism)
(2) Event Type (Domain-Specific vs. Domain-General)
(3) Family Religious Affiliation (Muslim, Protestant Christian, Roman Catholic, Non-Affiliated)
(4) Parent Belief in God's Reality Status (Real, Pretend)

Parents' possibility judgments were the outcome (see Table 4, Steps 3–6). This type of model allowed us to test variability in both intercepts and slopes for all three predictors.

In examining model fit, when compared to Step 2, Steps 3–6 each showed a decrease in AIC and a significant change in the likelihood ratio test. Regarding how much variance was explained in the parent model, Steps 2–10 showed 65 % of the variance was explained with Story-Characteristics (Level 1) with the two parameters: Causal Mechanism and Event Type; 13–16 % of the variance was explained with Participant-Characteristics (Level 2), Family Religious Affiliation.

Regarding the Story Characteristic (Level 1) Variables of the Parent Model – Step 2, Causal Mechanism, had a significant, positive slope (Step 2 $\gamma_{10} = 1.107$, $SE = .108$), meaning participants were significantly more certain that the events with God were possible than the events without God. Similarly, for Event Type, the Domain-Specific events were judged as significantly more likely to be possible than the Domain-General events (Step 2 $\gamma_{20} = .689$, $SE = .070$; see Table 3 for each M and SD). Also, there was a significant interaction between Causal Mechanism and Event Type, with participants being most certain of the possibility of Domain-Specific events with God, followed by Domain-General events with God, Domain-Specific events without God, and finally, Domain-General events without God (see Fig. 1).

Finally, there was significant variability between the two conditions in both Causal Mechanism (Step 2 $u_{1j} = 1.965$) and Event Type (Step 2 $u_{2j} = .498$), meaning the effect of Causal Mechanism and the effect of Event Type was not the same for each parent.

Adding in Family Religious Group (Level 2 variable) also showed main effects. Specifically, Muslim parents were significantly more certain the events were possible when compared to the other three religious groups at the same time (see Table 4, Step 3; $\gamma_{01} = 0.692$, $SE = .117$), whereas Catholic and Non-Affiliate parents were significantly less certain the events were possible when compared to the other three religious groups at the same time (see Table 4, Step 5: $\gamma_{01} = -0.454$, $SE = 0.130$; see Table 4, Step 6: $\gamma_{01} = -0.349$, $SE = .169$ – respectively). The effect of being Protestant compared to all other religious affiliations at once was not significant (see Table 4, Step 4: $\gamma_{01} = -0.008$, $SE = .125$).

Finally, parental belief in the reality status of God (ranging from *Definitely Pretend* to *Definitely Real*; Level 2 Variable) also showed a significant main effect. Across all four religious groups, parents who believed in God being real were significantly more certain the events were possible (see γ_{02} at Steps 3–6).

In summary, Muslim adults were fairly certain that Allah was able to make the impossible happen – more so than Protestant, Catholic, and Non-Affiliate adults. Moreover, adults who believe God is maybe real or definitely real were more certain the impossible events were possible. Finally, parent certainty also varied by Event Type (Domain-Specific vs. Domain-General) and Causal Mechanism (no cause provided vs. God as a cause). Specifically, parents were most certain about the possibility of Domain-Specific events with God and least certain about the possibility of Domain-General events with no cause.

Table 4

Coefficients (and standard errors) of multilevel regression models predicting parents' possibility judgments.

Model Parameter	Unconditional Model (Step 1)	Level 1 Model (Step 2)	Full Parent Model – **Muslims** vs All (Step 3)[b]	Full Parent Model – **Protestants** vs All (Step 4)[b]	Full Parent Model – **Catholics** vs All (Step 5)[b]	Full Parent Model – **Non-Affiliates** vs All (Step 6)[b]
Fixed Effects [a]						
Intercept (γ_{00})	−0.703 (0.065)***	−1.533 (0.064)***	−1.970 (0.096)***	−1.834 (0.099)***	−1.782 (0.097)***	−1.645 (0.135)***
Level 1 Intercepts						
Causal Mechanism (γ_{10})	–	1.107 (0.108)***	1.102 (0.108)***	1.107 (0.108)***	1.105 (0.108)***	1.106 (0.108)***
Event Type (γ_{20})	–	0.689 (0.070)***	0.689 (0.070)***	0.689 (0.070)***	0.689 (0.070)***	0.690 (0.070)***
Causal Mechanism * Event Type (γ_{30})		−0.262 (0.073)***	−0.260 (0.073)***	−0.261 (0.073)***	−0.261 (0.073)***	−0.261 (0.073)***
Level 2 Intercepts						
Family Religious Affiliation (γ_{01})			0.692 (0.117)***	−0.008 (0.125)	−0.454 (0.130)***	−0.349 (0.169)*
Parent Belief in God's Reality Status (γ_{02})			0.161 (0.048)***	0.206 (0.050)***	0.238 (0.049)***	0.128 (0.063)*
Random Effects/Variance Components						
Level 1 – (r_{ij}) = σ^2	1.637	0.570	0.569	0.570	0.570	0.570
Causal Mechanism (u_{1j})	–	1.965	1.976	1.969	1.970	1.968
Event Type (u_{2j})	–	0.498	0.502	0.498	0.498	0.501
Level 2 – (u_{0j}) = τ_{00}	0.721	0.606	0.645	0.616	0.608	0.615
Proportion of the variance in r_{ij} explained by the model	–	65.18%	65.24%	65.18%	65.18%	65.18%
Proportion of the variance in u_{0j} explained by the model	–	15.95%	10.54%	14.56%	15.67%	14.70%
Intraclass Correlation (ICC)	.3058	.5153	.5313	.5194	.5161	.5190
Model Fit						
AIC	6139.1	5157.3	5119.3	5146.4	5135.0	5142.2
Number of Parameters	3	11	13	13	13	13
Likelihood Ratio Test	–	$\Delta\chi^2(8) = 997.88$***	$\Delta\chi^2(2) = 42.001$***	$\Delta\chi^2(2) = 14.903$***	$\Delta\chi^2(2) = 26.308$***	$\Delta\chi^2(2) = 19.049$***

$N = 1742$ observations nested within 222 parents.

[a] For the Fixed Effects, Standard Error is shown in parentheses.

[b] Steps 3–6 are each compared to Step 2 for Model Fit.

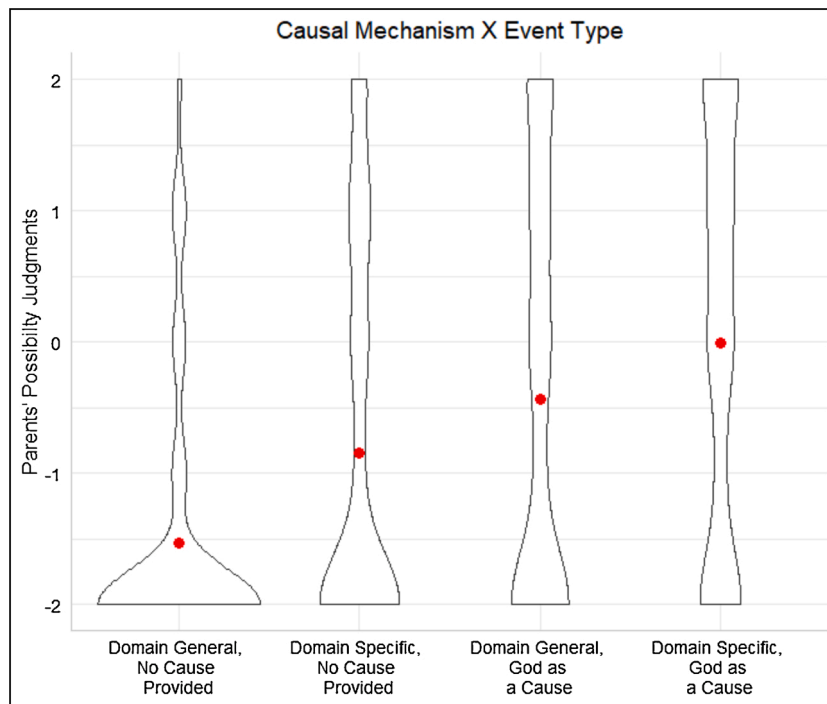* $p < .05$. ** $p < .01$. *** $p < .001$; two-tailed.

Fig. 1. Violin Plot Showing the Interaction between Causal Mechanism (No Cause Provided, God as a Cause) X Event Type (Domain-General, Domain-Specific) for Parents Across Religious Groups.
Note: The red dots in the violin plot are the means.

8.2. Model 2: child model

8.2.1. Preliminary analyses

To assess if and how the variables chosen for the Child Model were related, Pearson Product Moment Bivariate correlations were conducted prior to building the Child Multilevel Model (see Table 5). Unlike parents, anthropomorphism of God and pretense engagement were positively related to children's possibility judgments; whereas God reality status and religious participation were negatively related to children's possibility judgments, although the relation with religious participation was not statistically significant. Child's age was negatively related to possibility judgments, indicating older children were less likely to say the events could happen in real life. For the Child Model, the ICC for Steps 1–11 ranged from .340 to .468, justifying the use for MLM (see Table 6 for ICC

Table 5
Correlation Matrix, Means, and Standard Deviations for Children – Collapsed Across Religious Groups.

	1	2	3	4	5	*M (SD)*
1. Age (linear)	—					4.699 (.794)
2. God Reality Status	.404***	—				.838 (1.592)
3. Anthropomorphism of God	−.375***	−.231**	—			.026 (1.060)
4. Pretense Engagement	−.274***	−.136*	.291***	—		.452 (.572)
5. Religious Participation	.158*	.184**	−.209**	.017	—	3.350 (2.146)
6. Causal Mechanism – Events with no cause provided	−.460***	−.316***	.400***	.266***	−.083	−.434 (1.235)
7. Causal Mechanism – Events with God	−.110	−.174**	.168*	.093	.048	−.174 (1.344)
8. Event Type – Domain-General	−.310***	−.246***	.329***	.216**	−.053	−.407 (1.266)
9. Event Type – Domain-Specific	−.257***	−.254***	.253***	.158*	.017	−.214 (1.225)
10. Possibility Judgments – Overall	−.311**	−.280***	.316***	.210**	−.026	−.281 (1.147)

[†] $p < .10.$ * $p < .05.$ ** $p < .01.$ *** $p < .001$; two-tailed.

Table 6
Coefficients (and standard errors) of multilevel regression models predicting children's possibility judgments.

Model Parameter	Unconditional Model (Step 1)	Level 1 Model (Step 2)	Cross-Level Interaction Model (Step 3)	Full Child Model – **Muslims** vs All (Step 4) [b]	Full Child Model – **Protestants** vs All (Step 5) [b]	Full Child Model – **Catholics** vs All (Step 6) [b]	Full Child Model – **Non-Affiliates** vs All (Step 7) [b]
Fixed Effects [a]							
Intercept (γ_{00})	−0.303 (0.076)***	−0.531 (0.088)***	−0.620 (0.094)***	−0.636 (0.109)***	−0.612 (0.113)***	−0.530 (0.114)***	−0.487 (0.116)***
Level 1 Intercepts							
Causal Mechanism (γ_{10})	–	0.275 (0.082)***	0.198 (0.081)*	0.198 (0.081)*	0.198 (0.081)*	0.198 (0.081)*	0.198 (0.081)*
Event Type (γ_{20})	–	0.178 (0.057)**	0.096 (0.070)	0.093 (0.070)	0.096 (0.070)	0.095 (0.070)	0.095 (0.070)
Level 2 Intercepts							
Child Age – Linear (γ_{01})	–	–	−0.656 (0.099)***	−0.571 (0.106)***	−0.585 (0.106)***	−0.582 (0.106)***	−0.578 (0.106)***
Child Age – Quadratic (γ_{02})	–	–	0.033 (0.100)	0.032 (0.100)	0.041 (0.101)	0.037 (0.100)	0.040 (0.100)
Child Belief in God's Reality Status (γ_{03})	–	–	–	−0.083 (0.047)†	−0.062 (0.046)	−0.062 (0.046)	−0.083 (0.047)†
Child Anthropomorphism of God (γ_{04})	–	–	0.308 (0.714)***	0.401 (0.080)***	0.361 (0.079)***	0.363 (0.079)***	0.390 (0.079)***
Child Age – Linear * Child Anthropomorphism of God (γ_{05})	–	–	−0.214 (0.097)*	−0.103 (0.103)	−0.119 (0.103)	−0.115 (0.103)	−0.109 (0.103)
Child Belief in God's Reality Status * Child Anthropomorphism of God (γ_{06})	–	–	–	−0.069 (0.041)†	−0.089 (0.041)*	−0.081 (0.040)*	−0.087 (0.040)*
Family Religious Affiliation (γ_{07})	–	–	–	0.329 (0.161)*	0.129 (0.149)	−0.183 (0.157)	−0.308 (0.167)†
Level 1 Slopes							
Child Age – Linear * Causal Mechanism (γ_{11})	–	–	0.415 (0.107)***	0.415 (0.107)***	0.414 (0.107)***	0.414 (0.107)***	0.414 (0.107)***
Child Age – Quadratic * Event Type (γ_{12})	–	–	0.135 (0.065)*	0.133 (0.065)*	0.134 (0.066)*	0.133 (0.066)*	0.133 (0.065)*
Causal Mechanism * Child Anthropomorphism of God (γ_{13})	–	–	−0.113 (0.078)	−0.113 (0.078)	−0.112 (0.078)	−0.112 (0.078)	−0.112 (0.078)
Child Age – Linear * Causal Mechanism * Child Anthropomorphism of God (γ_{14})	–	–	−0.237 (0.094)*	−0.238 (0.094)*	−0.239 (0.094)*	−0.238 (0.094)*	−0.238 (0.094)*
Variance Components							
Level 1 – (r_{ij}) = σ^2	1.592	1.330	1.324	1.324	1.324	1.324	1.324
Causal Mechanism (u_{1j})	–	0.791	0.565	0.564	0.564	0.564	0.564
Level 2 – (u_{0j}) = τ_{00}	1.072	1.172	0.721	0.694	0.701	0.702	0.692
Proportion of the variance in r_{ij} explained by the model	–	16.46%	16.83%	16.83%	16.83%	16.83%	16.83%
Proportion of the variance in u_{0j} explained by the model	–	0%	32.74%	35.26%	34.61%	34.51%	35.45%
Intraclass Correlation (ICC)	.402	.468	.353	.3800	.3823	.3827	.3793
Model Fit							
AIC	5943.9	5853.9	5763.5	5758.4	5761.8	5761.2	5759.1
Number of Parameters	3	7	15	18	18	18	18
Likelihood Ratio Test	–	$\Delta\chi^2(4) = 97.976$***	$\Delta\chi^2(8) = 106.4$***	$\Delta\chi^2(3) = 11.096$*	$\Delta\chi^2(3) = 7.7165$†	$\Delta\chi^2(3) = 8.305$*	$\Delta\chi^2(3) = 10.36$*

Note: Child's age was grand mean centered before being added to the model ($M = 4.699$) – for both the Linear and Quadratic terms.

$N = 1677$ observations nested within 222 children.

[a] For the Fixed Effects, Standard Error is shown in parentheses.

[b] Steps 4–7 are each compared to Step 3 for Model Fit.

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$; two-tailed.

at each step). Steps 1–7 of the Child Model are discussed below (see Supplemental Materials for Steps 8–11).

8.2.2. Results for child multilevel model: model 2

The final Child Multilevel Model was a Random Intercepts and Random Slopes Model and included 12 predictors across Story-Characteristics (Level 1) and Participant-Characteristics (Level 2):

(1) Causal Mechanism (events presented with no causal mechanism vs. events presented with God as a causal mechanism)
(2) Event Type (Domain-General vs. Domain-Specific)
(3) Child Age – Linear (Grand Mean Centered at 4.699-years)
(4) Child Age – Quadratic (Grand Mean Centered at 4.699-years before making the quadratic term)
(5) Child Anthropomorphism of God
(6) Child Belief in God's Reality Status
(7) Family Religious Affiliation (Muslim, Protestant Christian, Roman Catholic, Non-Affiliated)
(8) 2-way interaction between Child Age – Linear X Child Anthropomorphism of God
(9) 2-way interaction between Child Age – Linear X Causal Mechanism
(10) 3-way interaction between Child Age – Linear X Child Anthropomorphism of God X Causal Mechanism
(11) 2-way interaction between Child Age – Quadratic X Event Type
(12) 2-way interaction between Child Anthropomorphism of God X Child Belief in God's Reality Status

Children's possibility judgments were the outcome for each step (see Table 6, Steps 4–11).

In examining model fit, when compared to Step 2, Step 3 showed a decrease in AIC and a significant change in the likelihood ratio test, meaning that adding in these Participant-Characteristic Variables improved model fit. Similar to parents, adding in Family Religious Affiliation improved the overall model fit at most steps (other than Step 5, the effect of being Protestant). Additionally, when compared to Step 3, Steps 4–7 showed a decrease in AIC. Finally, concerning how much variance was explained in the Child Model, Steps 2–7 showed 16 % of the variance was explained with Story-Characteristics (Level 1) with the two parameters: Causal Mechanism and Event Type; 32–35 % of the variance was explained with Participant-Characteristics (Level 2), specifically, Child Age, Child Anthropomorphism of God, Child Belief in God's Reality Status, and Family Religious Affiliation (and their interactions).

In examining the Story-Characteristic (Level 1) Variables of the Child Model – Step 2, Causal Mechanism had a significant, positive slope (Step 2 $\gamma_{10} = .275$, $SE = .082$), meaning the events with God were judged as significantly more possible than the events without. There was also significant variability in Causal Mechanism (Step 2 $u_{1j} = .791$). That is, the effect of Causal Mechanism was not the same for each child. Finally, for Event Type, the Domain-Specific events were judged as significantly more possible than the Domain-General events (Step 2 $\gamma_{20} = .178$, $SE = .057$; see Table 5 for each M and SD). However, unlike parents, there was not a significant interaction between Causal Mechanism and Event Type for children (see Fig. 2).
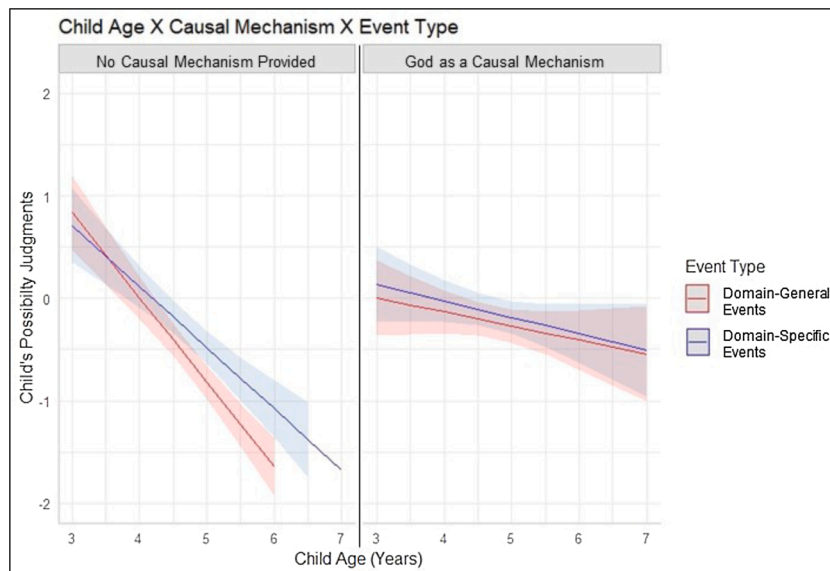

Fig. 2. Interaction between Child Age X Causal Mechanism (No Cause Provided, God as a Cause) X Event Type (Domain-General, Domain-Specific) for Children Across Religious Groups.
Note: Shaded areas represent 95 % CI.

Adding in the Participant-Characteristics Variables (Level 2), specifically child age (both linear and quadratic) and anthropomorphism of God, at Step 3 showed both significant main effects and cross-level interactions with the Story-Characteristic (Level 1) Variables. In particular, results showed a significant negative slope for age (linear) (Step 3 $\gamma_{01} = -.656$, $SE = .099$), meaning older children were more certain the events were not possible. There also was an interaction between age (linear) and Causal Mechanism (Step 3 $\gamma_{11} = .415$, $SE = .107$), meaning the difference between the two Causal Mechanism categories (events without a cause, events with God as a cause) becomes greater as children get older. This was also demonstrated when examining the correlation between age (linear) and children's possibility judgments for type of causal mechanism (see Table 5). Specifically, for the events in which no cause was provided, as children got older, they were more certain the events were not possible ($r(220) = -.460$, $p < .001$). However, for the events in which God was provided as a cause, there was not a significant correlation between child age (linear) and whether children judged the events as possible or not possible ($r(219) = -.110$, $p = .104$). The findings of this specific interaction are discussed further below. Lastly, the significant interaction between quadratic age and Event Type implies the rate of change for the Domain-Specific events was faster for children than the rate of change for the Domain-General events (Table 6, Step 3 $\gamma_{12} = .135$, $SE = .065$).

For child anthropomorphism of God, there was a significant, positive slope (Step 3 $\gamma_{03} = .308$, $SE = .714$), meaning children with more humanlike views of God were more certain the events were possible. However, in assessing child's anthropomorphism of God in light of the interaction with child age (linear), there was a significant, negative slope (Step 3 $\gamma_{04} = -.214$, $SE = .097$). This means as child's age increased, their anthropomorphism of God decreased. This can be further examined in the significant 3-way interaction between anthropomorphism of God X child age (linear) X Causal Mechanism (Step 3 $\gamma_{14} = -.237$, $SE = .094$; see Fig. 3).

For events without a cause given, younger children who had higher anthropomorphic views of God (i.e., viewed God as more humanlike), were more certain the events were possible, whereas older children with higher anthropomorphic views of God were a little certain the events were not possible. For these events, across all ages, children who had lower anthropomorphic views of God (i.e., judged God as less-humanlike) were a little certain the events were not possible.

A slightly different pattern emerges when examining children's possibility judgments in which God is provided as a causal mechanism. Younger children who viewed God as humanlike (i.e., anthropomorphic) and older children with who viewed God as different from humans (i.e., non-anthropomorphic) tended to indicate they were a little certain God could make impossible events possible (see Fig. 3). Conversely, older children who viewed God as humanlike and younger children who viewed God as different from humans were a little certain God could not make the events possible.

Next, Family Religious Group and Child Belief in God's Reality Status (Level 2 Variables) were added into the Child Model; the Family Religious Group variable allowed us to test the effect of being in that religious group compared to not being in that religious group (i.e., the "effect" of being Muslim, or the "effect" of being Protestant etc.). The results of Step 4 showed Muslim children were significantly more certain the events were possible than children in the other three religious affiliations ($\gamma_{07} = .329$, $SE = .161$; see Table 6), but there was no significant effect for the other religious groups in Steps 5–7. That is, overall, there is specifically an effect of being raised in a Muslim home on children's possibility judgments.

8.2.3. Further examination of child age X causal mechanism X Religious affiliation

In order to further examine the ages at which children judge the events as possible with God within each religious affiliation, the Johnson-Neyman Interval technique was employed (see Table 7 and Fig. 4a–d). This allowed us to test the ages at which children
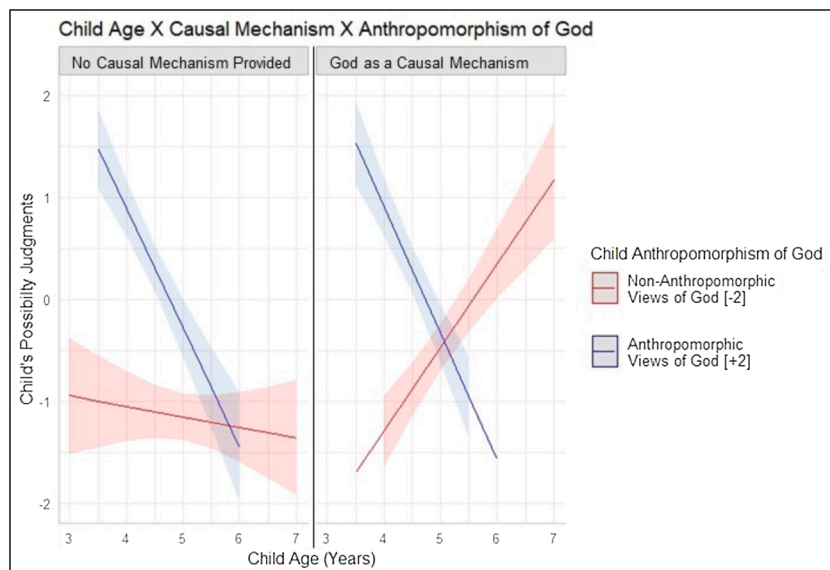

Fig. 3. Interaction between Child Age X Causal Mechanism (No Cause Provided, God as a Cause) X Anthropomorphism of God for Children Across Religious Groups.
Note: Shaded areas represent 95 % CI.

Table 7

Johnson-Neyman Intervals for Children's Judgments for God Making Impossible Events possible – by Religious Group.

Johnson-Neyman Interval	Muslim	Protestant	Catholic	Non-Affiliate
Age Range (M)	3.439- to 6.979-years (M = 4.935)	3.452- to 6.856-years (M = 4.701)	3.379- to 5.947-years (M = 4.644)	3.496- to 5.506-years (M = 4.434)
Ages when Significantly below 0 [a] Estimated Associated Slopes (SE)	3.439- to 3.640-years −.72 (.30) & -.54 (.27)	– –	– –	– –
Age when Estimated Slope = 0 [b] (SE of Estimated Slope)	4.226-years (.19)	3.821-years (.23)	4.601-years (.15)	4.298-years (.15)
Ages when Significantly above 0 [c] Estimated Associated Slopes (SE)	4.586- to 6.979-years .32 (.16) & 2.50 (.36)	4.879- to 6.856-years .30 (.15) & .88 (.43)	– –	– –
Age when Slope = 1 [d] (SE of Estimated Slope)	5.325-years (.16)	–	–	–
Age when Slope = 2 [e] (SE of Estimated Slope)	6.424-years (.28)	–	–	–

*Note*: A dash indicates that group never reached that specific criteria.

[a]*Ages when Significantly below 0* = Judging that the Event with God is not Possible.

[b]*Ages when Significantly above 0* = Judging that the Event with God is Possible.

[c]*Age when Estimated Slope = 0* = Age when child is not sure if event with God is possible.

[d]*Age when Estimated Slope = 1* = Age when child judges the events with God as possible – and are a little sure.

[e]*Age when Estimated Slope = 2* = Age when child judges the events with God as possible – and are really sure.
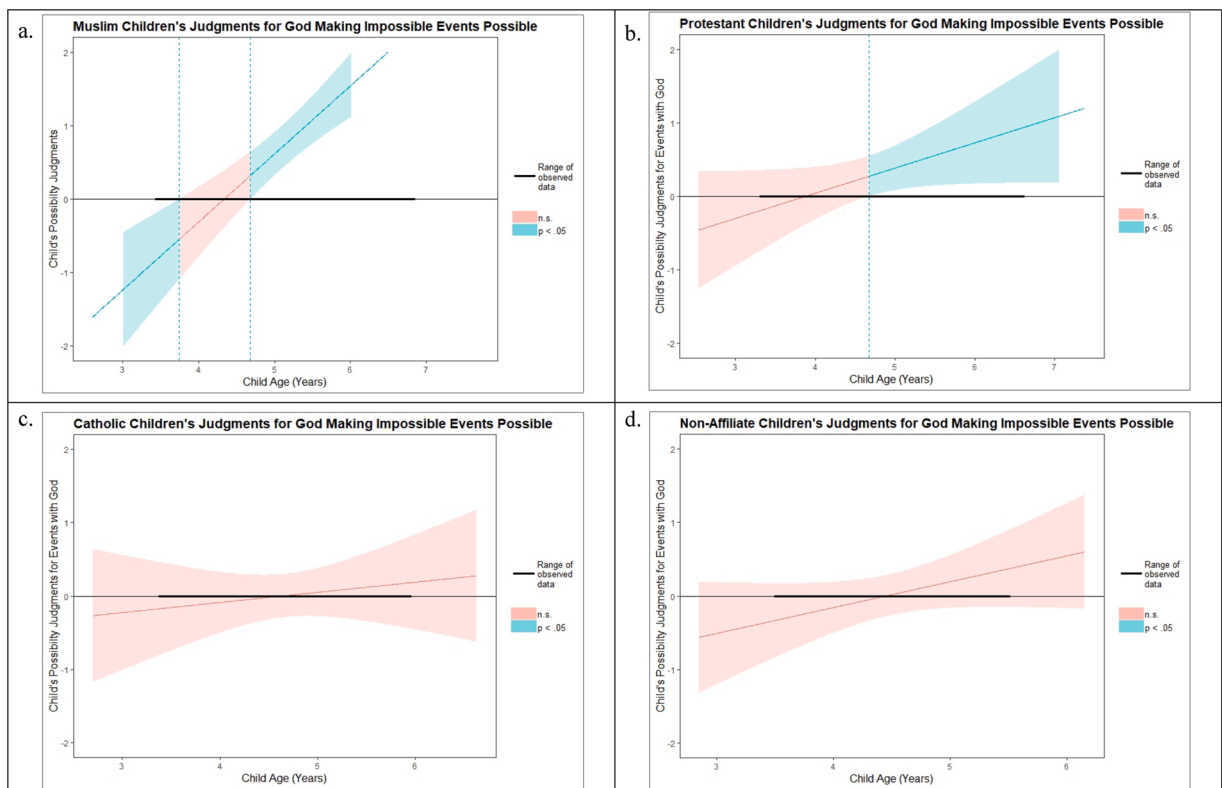
Fig. 4. Johnson-Neyman Plots for Children's Judgments for God Making Impossible Events possible – by Religious Group and Child Age. *Note*: Shaded areas represent 95 % CI. Red values indicate scores was not significant from 0 at that age. Blue values indicate scores were significantly above or below 0 at that age.

judged the events as possible or not possible, and how this varied depending on religious affiliation. We describe the analyses by child religious affiliation.

Muslim children between the ages of 3.439- to 3.640-years judged God as not able to make the events possible. Between 3.641- to 4.585-years, they were not sure if God was able to make the events possible or not. That is, their estimated slope was not significant from 0, or "*don't know.*" However, by 4.586- to 6.979-years, Muslim children began to judge God as able to make the events possible.

For Protestants, children below the age of 4.878-years were not sure if God could or could not make the events possible, as their estimated slope was not significant from 0, or "*don't know.*" Children aged 4.879- to 6.856-year-olds judged God as able to make the events possible. However, the highest estimated slope for Protestants at any age was .88, which is below a score of +1 (*a little sure God can do it*). In contrast, by the age of 5.325, Muslim children were "*a little sure*" God could bring about impossible events; and by 6.424-years, they were "*really sure*" God could do so. Specifically, at the age of 5.193-years, Muslim children were at the same point as their Protestant counterparts at 6.856-years, suggesting that the shift in reasoning about supernatural causality occurs earlier in Muslim children.

For Catholics and Non-Affiliates, the estimated scores were never significantly above or below 0, meaning they remained uncertain whether God could bring about the events across all ages.

8.2.4. Children's justifications

Qualitative data on children's explanations for why God could or could not make an event possible were also examined. Independent Samples T-Tests indicated there were no significant gender differences for types of justifications children provided, so gender was not considered in subsequent analyses. In each of the four religious groups, p-values for examining gender differences ranged from .119 to .937. A Repeated Measures ANOVA found differences in how frequently children gave each type of explanation overall, $F(4, 884) = 16.663$, $p < .001$, $\eta_p^2 = .070$. Specifically, children gave irrelevant justifications most frequently ($M = .950$, $SD = 1.197$), followed by natural ($M = .698$, $SD = .990$), don't know ($M = .622$, $SD = 1.122$), religious supernatural ($M = .541$, $SD = 1.099$), and finally non-religious supernatural ($M = .140$, $SD = .469$). Post-hoc Paired Samples T-Tests with Bonferroni Corrections revealed the following pairs of explanations were significantly different from each other: (1) natural justifications were given significantly more frequently than non-religious supernatural justifications, (2) religious supernatural justifications were given significantly more frequently than non-religious supernatural justifications, (3) irrelevant justifications were given more frequently than both religious supernatural justifications and (4) non-religious supernatural justifications, and (5) don't know justifications were given more frequently than non-religious supernatural justifications. The other five pairs showed no significant differences (i.e., no significant difference in frequency between (1) natural and religious supernatural, (2) natural and don't know, (3) natural and irrelevant, (4) religious supernatural and don't know, and (5) don't know and irrelevant).

In order to test if there were differences by religious group and to take child's age into consideration, a Repeated Measures ANCOVA with Family Religious Affiliation (Protestant, Catholic, Muslim, Non-Affiliate) as a between-subject factor X Child Age as a covariate X Justification Type (Natural, Religious Supernatural, Non-Religious Supernatural, Don't Know, Irrelevant) was done (see Fig. 5). Once again, there was a main effect of justification type, as described above, $F(4, 868) = 5.721$, $p < .001$, $\eta_p^2 = .026$. There was also a significant main effect of child age, and a significant interaction between justification type and child age, $F(4, 868) = 4.619$, $p = .001$, $\eta_p^2 = .021$. Specifically, older children provided more natural justifications ($r(220) = .175$, $p = .009$) and more religious supernatural justifications ($r(220) = .340$, $p < .001$). However, age was not significantly correlated to the number of non-religious justifications, how often children said they did not know, or the frequency of irrelevant justifications.
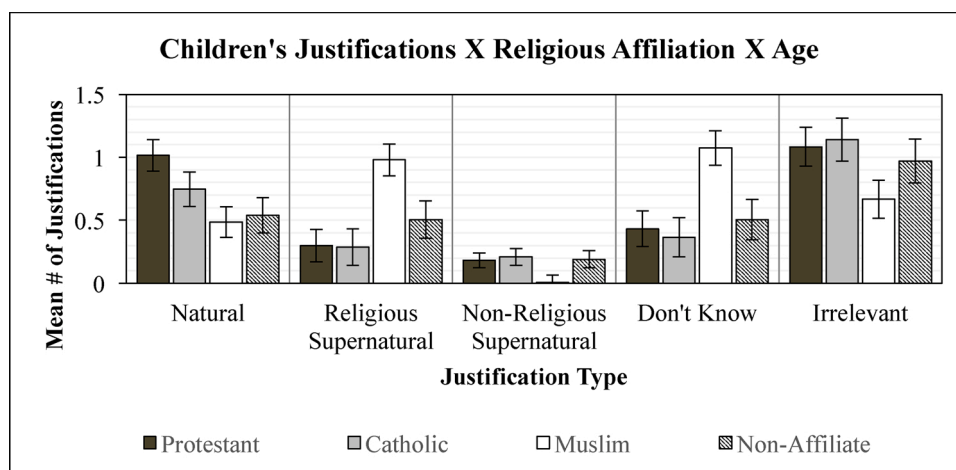

Fig. 5. Types of Justifications Provided by Children by Religious Affiliation and Child Age.
Note: Error Bars represent Standard Error. Means shown in figure and reported below also include child age as a covariate.

Finally, although there was not a significant main effect of religious affiliation, there was a significant a 3-way interaction between justification type X religious affiliation X child age, $F(12, 868) = 4.242$, $p < .001$, $\eta_p^2 = .055$ (see Fig. 5). Protestant children provided irrelevant explanations the most often ($M = 1.083$, $SE = .154$), followed by natural ($M = 1.016$, $SE = .124$), don't know ($M = .433$, $SE = .141$), religious supernatural ($M = .299$, $SE = .129$), and non-religious supernatural ($M = .183$, $SE = .060$). Additionally, age was only positively correlated with providing more religious supernatural justifications ($r(58) = .312$, $p = .015$). That is, as Protestant children get older, they are more likely to provide religious explanations for why God can or cannot make impossible events possible.

Similarly, Catholic children provided irrelevant explanations most frequently ($M = 1.141$, $SE = .170$), followed by natural ($M = .747$, $SE = .137$), don't know ($M = .364$, $SE = .156$), religious supernatural ($M = .288$, $SE = .143$), and non-religious supernatural ($M = .209$, $SE = .066$). Furthermore, for Catholic children, age was positively correlated with providing more religious supernatural justifications ($r(47) = .307$, $p = .032$) and more non-religious supernatural justifications ($r(47) = .354$, $p = .013$).

For Non-Affiliate children, irrelevant explanations were also provided most often ($M = .971$, $SE = .174$), followed by natural ($M = .540$, $SE = .140$), don't know ($M = .507$, $SE = .160$), religious supernatural ($M = .506$, $SE = .146$), and finally non-religious supernatural ($M = .192$, SE $= .068$). Age was positively correlated with providing more natural justifications ($r(46) = .339$, $p = .019$) and religious supernatural justifications ($r(46) = .417$, $p = .003$).

Finally, Muslim children showed a different pattern of responses. They provided don't know explanations the most frequently ($M = 1.074$, $SE = .137$), followed by religious supernatural ($M = .979$, $SE = .126$), irrelevant ($M = .669$, $SE = .150$), natural ($M = .485$, $SE = .121$), and finally, hardly any non-religious supernatural justifications ($M = .009$, $SE = .058$). Age was only positively correlated with Muslim children providing more religious supernatural justifications ($r(63) = .283$, $p = .022$). Post-hoc analyses using Tukey's HSD found that Muslim children's justifications differed significantly from Non-Affiliates. There were no other significant differences by religious affiliation.

Exploratory analyses examined if children's justifications varied depending on if the child initially judged the event as possible or not possible. A 2 (Judgment Stance: Possible, Not Possible) X 5 (Explanation Type: Natural, Religious Supernatural, Non-Religious Supernatural, Don't Know, Irrelevant) X 4 (Religious Group: Protestant, Catholic, Muslim, Non-Affiliate) Repeated Measures ANCOVA with child age as a covariate was conducted. The dependent variable was a sum score was created for each type of explanation type by judgment stance (see Supplemental Materials Part 1 for statistics and figure).

These exploratory findings suggest that children do change some of the types of justification they provide, depending on whether they initially judged the event as possible or not possible. When the event is judged as not possible, children tend to provide more natural explanations. That is, instead of giving religious explanations for why God *cannot* do the impossible (and possibly focusing in on the limitations of what God can/cannot do in the physical world), children provide natural explanations (e.g., the laws of nature) in this context. However, when children are asked to explain how/why God *can* do the impossible, they talk about it in terms of the religious component in particular – especially Muslim children. Children also generally provide a lot of irrelevant justifications and are unsure of how to explain it regardless of the initial judgment stance.

8.3. Model 3: parent-child discrepancy model

A Multilevel Model was also conducted to examine how closely related children's responses were to their parents. The outcome variable for each step (possibility judgments) was a discrepancy score calculated by subtracting children's scores from their parents. Given that the possible range for the DV was -2 [*No, Really Sure*] to +2 [*Yes, Really Sure*] – with 0 indicating *Don't Know* – a negative discrepancy score indicated the parent was more certain than their child that the event could *not* happen. A positive score, on the other hand, indicated the parent was more certain than their child that the event *could* happen. Finally, a score of 0 indicated the parent and child had the same possibility judgments (see Table 8). For the Parent-Child Discrepancy Model, the ICC for Steps 1–12 ranged from .363 to .443, justifying the use for MLM (see Table 8 for ICC at each step). Steps 1–8 of the Parent-Child Discrepancy Model are discussed below (see Supplemental Materials for Steps 9–12).

The final Parent-Child Discrepancy Multilevel Model was a Random Intercepts and Random Slopes Model and included eight predictors across Story-Characteristics (Level 1) and Participant-Characteristics (Level 2):

(1) Causal Mechanism (events presented with no causal mechanism vs. events presented with God as a causal mechanism)
(2) Event Type (Domain-General vs. Domain-Specific)
(3) Child Age – Linear (Grand Mean Centered at 4.699-years)
(4) Child God Reality Status
(5) Child Anthropomorphism of God
(6) Child Religious Participation
(7) Family Religious Affiliation (Muslim, Protestant Christian, Roman Catholic, Non-Affiliated)
(8) 2-way interaction between Child Age – Linear X Causal Mechanism

In examining model fit, Step 4 showed a decrease in AIC and a significant change in the likelihood ratio test, suggesting adding in these Participant-Characteristics (Level 2) Variables improved the overall model fit. However, adding in Family Religious Affiliation (Steps 5–8) did not improve the overall model fit; Family Religious Affiliation was still kept in this model to demonstrate the range in intercepts across the different religious affiliation. Finally, concerning how much variance was explained in the Parent-Child Discrepancy Model, Steps 2–8 showed 36 % of the variance was explained at the Story-Characteristic Level (Level 1) with the two parameters: Causal Mechanism and Event Type; for Participant-Characteristics Variables (Level 2), 4–43 % of the variance was

Table 8

Coefficients (and standard errors) of multilevel regression models predicting the difference between parents' and children's possibility judgments.

Model Parameter	Unconditional Model (Step 1)	Level 1 Model (Step 2) [c]	Cross-Level Interaction Model (Step 3) [c]	Full Parent-Child Model (Step 4) [c]	Full Model – **Muslims** vs All (Step 5) [d]	Full Model – **Protestants** vs All (Step 6) [d]	Full Model – **Catholics** vs All (Step 7) [d]	Full Model – **Non-Affiliates** vs All (Step 8) [d]
Fixed Effects [a]								
Intercept (γ_{00})	−0.411 (0.096)***	−0.935 (0.112)***	−0.941 (0.103)***	−1.444 (0.167)***	−1.470 (0.168)***	−1.435 (0.167)***	−1.424 (0.173)***	−1.516 (0.231)***
Level 1 Intercepts								
Causal Mechanism (γ_{10})	–	0.709 (0.120)***	0.710 (0.119)***	0.707 (0.119)***	0.706 (0.120)***	0.707 (0.119)***	0.707 (0.119)***	0.708 (0.119)***
Event Type (γ_{20})	–	0.364 (0.094)**	0.364 (0.094)***	0.365 (0.094)***	0.363 (0.094)***	0.364 (0.094)***	0.365 (0.094)***	0.365 (0.094)***
Level 2 Intercepts								
Child Age – Linear (γ_{01})	–	–	0.801 (0.121)***	0.513 (0.131)***	0.513 (0.132)***	0.517 (0.132)***	0.510 (0.131)***	0.512 (0.131)***
Child God Reality Status (γ_{02})			–	0.136 (0.056)*	0.128 (0.057)*	0.137 (0.054)*	0.137 (0.056)*	0.142 (0.058)*
Child Anthropomorphism of God (γ_{03})	–	–	–	−0.257 (0.084)**	−0.229 (0.088)**	−0.238 (0.087)**	−0.258 (0.084)**	−0.260 (0.085)**
Child Religious Participation (γ_{04})	–	–	–	0.119 (0.039)**	0.110 (0.040)**	0.131 (0.041)**	0.119 (0.039)**	0.131 (0.048)**
Family Religious Affiliation (γ_{05})	–	–	–	–	0.225 (0.202)	−0.177 (0.194)	−0.091 (0.196)	0.118 (0.258)
Level 1 Slopes								
Child Age * Causal Mechanism (γ_{11})	–	–	−0.300 (0.150)*	−0.302 (0.150)*	−0.302 (0.150)*	−0.301 (0.150)*	−0.302 (0.150)*	−0.301 (0.150)*
Variance Components								
Level 1 – (r_{ij}) = σ^2	2.879	1.832	1.832	1.831	1.830	1.830	1.831	1.831
Causal Mechanism (u_{1j})	–	2.123	2.079	2.093	2.095	2.094	2.094	2.093
Event Type (u_{2j})	–	0.934	0.935	0.935	0.938	0.936	0.935	0.934
Level 2 – (u_{0j}) = τ_{00}	1.641	1.200	1.562	1.438	1.458	1.445	1.438	1.432
Proportion of the variance in r_{ij} explained by the model	–	36.37%	36.37%	36.40%	36.44%	36.44%	36.40%	36.40%
Proportion of the variance in u_{0j} explained by the model	–	26.87%	4.81%	12.37%	42.84%	42.96%	43.02%	43.08%
Inter-Class Correlation (ICC)	.363	.396	.460	.440	.443	.441	.440	.439
Model Fit								
AIC	6742.4	6499.7	6463.4	6440.1	6441.0	6441.3	6441.9	6441.9
Number of Parameters	3	10	12	15	16	16	16	16
Likelihood Ratio Test	–	$\Delta\chi^2(7) = 256.730$***	$\Delta\chi^2(2) = 40.313$***	$\Delta\chi^2(3) = 29.231$***	$\Delta\chi^2(1) = 1.172$	$\Delta\chi^2(1) = 0.817$	$\Delta\chi^2(1) = 0.213$	$\Delta\chi^2(1) = 0.208$

N = 1636 observations nested within 222 parent-child dyads.

[a] For the Fixed Effects, Standard Error is shown in parentheses.

[b] Child's age was grand mean centered before being added to the model (M = 4.699) – for both the Linear and Quadratic terms.

[c] Each Step is compared to the previous Step for Model Fit.

[d] Steps 5–8 Models are each compared to the Step 4 Model for Model Fit.

[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$; two-tailed.

explained with the five child variables added into the model.

Across all Steps of Parent-Child Discrepancy Model, the intercept was negative, meaning the parents were more certain than children that the events could *not* happen.

Regarding the Story-Characteristic (Level 1) Variables of the Parent-Child Discrepancy Model – Step 4, Causal Mechanism had a significant, positive slope (Step 4 $\gamma_{10} = .707$, *SE* $= .119$), meaning there was a greater difference between parents and children for the events with God than events in which no causal mechanism was provided. Likewise, for Event Type, there was a greater difference between parents and children for the Domain-Specific events than the Domain-General events (Step 4 $\gamma_{20} = .365$, *SE* $= .094$). However, there was not a significant interaction between Causal Mechanism and Event Type.

There was also significant variability in both Causal Mechanism (no cause provided vs. God as a cause; Step 4 $u_{1j} = 2.093$) and Event Type (Domain-General vs. Domain-Specific; Step 4 $u_{2j} = .935$), meaning the effect of Causal Mechanism and the effect of Event Type was not the same for each parent-child comparison.

Adding in Participant-Characteristics (Level 2) Variables to the Parent-Child Discrepancy Model at Step 4 showed both significant main effects and cross-level interactions with the Story-Characteristic (Level 1) Variables. Specifically, there was a significant positive slope for child age (linear) (Step 4 $\gamma_{01} = .513$, *SE* $= .131$), meaning older children were more similar to their parents in their possibility judgments than younger children. There was also a negative interaction between child age (linear) X Causal Mechanism (Step 4 $\gamma_{11} = -.302$ *SE* $= .150$), meaning the difference in parent-child judgments between the two Causal Mechanism categories (events without a cause, events with God as a cause) becomes smaller as children get older (see Fig. 6).

Children's religious participation showed a significant, positive slope (Step 4 $\gamma_{04} = .119$, *SE* $= .039$), suggesting that greater religious exposure was related to increased differences between children and parents, such that children were less certain than their parent that the events were possible. Along these lines, children's God reality status (judging God as real or pretend) also showed a significant, positive slope (Step 4 $\gamma_{02} = .136$, *SE* $= .056$). This means if children were more certain that God was real, they were then less certain than their parent that the events were possible. On the other hand, for child anthropomorphism of God, there was a significant, negative slope (Step 4 $\gamma_{03} = -.257$, *SE* $= .084$), meaning if the child had more humanlike views of God, they were more certain than their parent that the events were *not* possible.
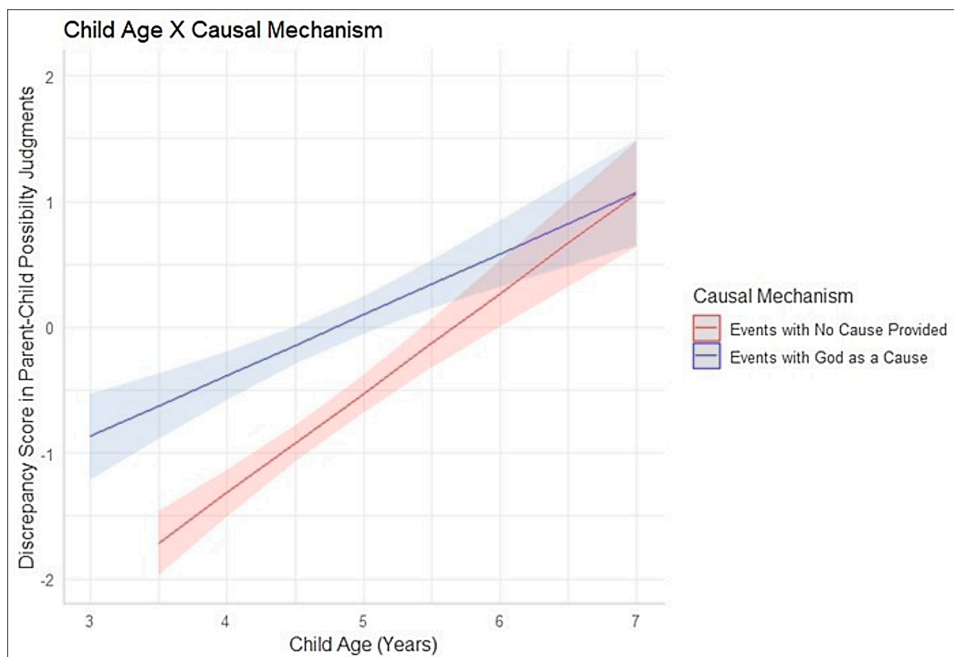

Fig. 6. Interaction between Causal Mechanism (No Cause Provided, God as a Cause) X Child Age for Parent-Child Discrepancy Scores Across Religious Groups.
Note: Shaded areas represent 95 % CI.

Finally, although there was no significant effect of Family Religious Affiliations (Steps 5–8), there was a range of intercepts and slopes across the different religious affiliations, indicating the effect of being raised in each religious affiliation might be slightly different. For example, Muslims had the highest positive slope (Step 5: $\gamma_{05} = .225$, $SE = .202$), suggesting that compared to the other religious affiliations, Muslim parents were much more certain than their child that the events can happen. This was followed by Non-Affiliate parents and children, with Non-Affiliate parents also being more certain than their child that the events can happen (Step 8: $\gamma_{05} = .118$, $SE = .258$). Catholic parents and children were close to 0 (Step 7: $\gamma_{05} = -.091$, $SE = .196$), suggesting Catholic children and parents judged the events in a similar fashion. Finally, Protestant parents and children had a negative slope (Step 6: $\gamma_{05} = -.177$, $SE = .194$), meaning Protestant parents were more confident than their children that the events could not happen.

9. Discussion

In the present study, children and parents from four religious groups indicated their certainty about the possibility that physically impossible events could occur. Specifically, we examined how variation in children's concepts of God relate to their certainty that God can make impossible things possible. We further examined how religious socialization, belief in God, and engagement in pretense may influence children's beliefs in supernatural causality. Finally, we considered how parental beliefs in supernatural causality related to their child's emerging belief systems. The findings indicate differences in certainty of about the possibility of impossible events by religious group, concepts of God, and child age. We unpack each primary finding and what the pattern as a whole tells us about children's developing belief in supernatural causality before considering the domain-general or domain-specific effects of religious socialization on children's cognitive development.

The first primary finding is related to children's general certainty that God can (or cannot) do the impossible. Consistent with prior research, the child participants acknowledged that impossible events were impossible (Nolan-Reyes et al., 2016; Shtulman & Carey, 2007; Shtulman, 2009). The novel finding presented here is that in general, children did not believe God could make impossible events possible; in contrast, children's responses indicated they were either unsure or somewhat sure that God could *not* do impossible things. On the surface, these findings may seem to contradict previous research indicating that children are more likely to believe stories with impossible events are real if God is in those stories (Corriveau et al., 2015; Vaden & Woolley, 2011; Woolley & Cox, 2007). Within the context of these prior studies, there are two key extensions provided by the current study. First, we asked children directly *if* God could make impossible things possible, rather than assessing if an event in which they were told God had done something impossible was *real*. Second, we examined if belief in God, the nature of the God concept, or the combination of the two were most predictive of children's certainty that God can do the impossible.

Regarding the question wording, when directly asked if God can make impossible things happen, young children do not appear to be certain that God can actually do the impossible. However, children did demonstrate more uncertainty in their judgments about God performing impossible feats than their judgments that those events could occur without God's intervention. Thus, the first hypothesis was partially supported: children were more likely to judge impossible events as able to happen in real life when they were asked to consider a specific supernatural causal mechanism (i.e., God) through which that event could happen. The mechanisms through which responding while thinking about God change children's belief about impossible events are further delineated by unpacking patterns of responses by age and variations in concepts of God.

The shift in children's reasoning about possibility and whether a supernatural being can have a causal effect on physical events was related to children's age and individual differences in children's view of God as more or less real and more or less human-like; and these factors interacted with each other. More specifically, younger children who viewed God as more human-like judged the impossible events as possible, whereas older children with less human-like views of God judged the events possible. Thus, there is a developmental shift over early childhood in children's understanding of supernatural causality and in how concepts of God relate to beliefs about supernatural causality.

The findings with younger children, in particular, deserve some consideration as they were both not hypothesized as well as surprising. In particular, younger children who endorsed human-like properties for God also said God could do very non-human, supernatural things. One possibility is that this pattern is a methodological artifact. Within the method of the current study, if younger children said 'yes' to all of the questions, then God has all the same attributes as a person and God is able to do all things. However, exploration of the data cast doubt on this interpretation: for the possibility and anthropomorphism questions, only 11 of the 222 participants said 'yes' to all questions.

Thus, a second possibility is that the interaction between concepts of God and age represents an increasing coherence in the God concept. Theoretical models of children's concept development (Vygotsky, 1934/1986) would suggest that the disconnect between saying God has human-like properties but also superhuman powers indicates these younger children have not connected these two domains of reasoning (e.g., what God is like vs. what God can do) into a coherent concept of God. However, as children get older, the properties they attribute to God become both more coherent and more differentiated from other concepts. In the current study, if older children viewed God as a non-human-like entity, they also were more certain to claim that God could bring about the impossible. In contrast, the older children who viewed God as a human-like entity, had less certainty that God could do the impossible. Finally, the nature of the God concept interacted with children's certainty that God is real, such that older children who both believed God is real and who believed God is not like a human were most certain that God could do the impossible.

Prior studies have indicated substantial variation in whether or not children view God as human-like or not. For example, Muslim children are more likely than their Protestant, Catholic, and Non-Affiliated peers to differentiate God's mind from the mind of humans (Richert et al., 2017). Thus, further analyses explored variation by religious affiliation for developmental trajectories in the relation between anthropomorphizing of God and belief that God can do the impossible. These analyses indicated that Muslim children were

younger than their peers when first indicating that they were somewhat certain that God could do the impossible (around age 5); and by age 6.5, on average, they were 'very sure' that God could do the impossible. In contrast, around the age of 7, Protestant children on average were somewhat certain that God could do the impossible; and most Protestant children did not indicate they were 'very sure' that God could do the impossible. Finally, Catholic and Non-Affiliated children demonstrated no clear age-related differences, maintaining on average a general view that God probably cannot do the impossible. These differences by religious affiliation suggest it may be the type of religious exposure within religious affiliations that influence how children come to understand God's abilities, and not just general religious participation alone. In other words, how Muslim parents talk to their children about Allah and Allah's supernatural powers might be different than how Protestant or Catholic parents talk to their children about God. Indeed, teachings banning anthropomorphic depictions of and references to Allah suggest profound qualitative differences in children's religious exposure.

Children provided justifications for why the supernatural causal mechanism (i.e., God) would or would not be able to bring about the impossible event. Coding of these justifications revealed that children across all religious groups rarely spontaneously mentioned non-religious supernatural explanations. Supporting previous research that children focus on naturalistic explanations for physically-impossible events (Nancekivell & Friedman, 2017; Nolan-Reyes et al., 2016; Woolley et al., 2011), Protestant, Catholic, and Non-Affiliate children mostly relied on natural explanations, followed by religious supernatural explanations. In contrast, Muslim children tended to provide religious supernatural explanations more frequently than natural explanations. In concert with the findings related to religious participation discussed above, the patterns in children's justifications suggest that frequency of religious participation alone may not be what shapes children's supernatural causal reasoning – but instead, children's understanding of what God can/cannot do is dependent on the specific messages they receive from their parents and religious institutions. That said, it should be noted that children rarely provided any co-existing explanations, in line with prior working suggesting that co-existing explanations (in particular, natural + supernatural) might be less salient in early childhood but increase with age (c.f., Legare et al., 2012).

Thus, a third set of analyses specifically focused on the relation between parents' and children's possibility judgments. As hypothesized, parents' possibility judgments were related to children's possibility judgments, but the degree to which children's judgments matched their parents depended on child-specific variables: the child's age, the child's views of God as real or pretend (i.e., child God reality status), the child's anthropomorphism of God, and the child's religious participation. Older children's possibility judgments were more similar to their parents' possibility judgments than younger children.

Although family religious affiliation was not a significant predictor in differences between parent-child possibility judgments, there was variation in how similar parents and children's views were across the religious groups. Catholic parents and children were the most similar in their views, followed by Non-Affiliates, Protestants, and Muslims. Protestant parents were more certain than their children that the events *could not* happen in real life. However, for Muslims and Non-affiliates, parents were more certain than their children that the events *could* happen in real life. This calls for a further exploration as to why there might be these differences across these religious groups.

Finally, in line with previous research there was a small positive correlation between pretense engagement and possibility judgments (events with no cause provided, Domain-General events, Domain-Specific events, and Overall; see Table 5; e.g., Bowen-Smith et al., 2018). However, for the events in which God was provided as a cause, pretense engagement was not significantly related. This suggests children with greater participation in fantastical thinking and pretense were perhaps more practiced in imagining conditions under which impossible events could be possible if they had to provide their own explanation (per Nolan-Reyes et al., 2016). Yet when adding pretense engagement to the child model with all of the predictors, it was no longer significant and did not improve model fit. Therefore, engagement in fantastical thinking in general may not be the most influential mechanism in the development of belief in supernatural causality.

The current findings also speak to debates about the domain-general or domain-specific effects of religious socialization on cognitive development (Corriveau et al., 2015; Lane, 2020; Vaden & Woolley, 2011). As described in the Introduction, researchers have reached conflicting conclusions about whether religious exposure influences children's general belief about the possibility of impossible events (Corriveau et al., 2015) or is specifically related to children's beliefs about events that fall withing the domain of 'religion' (Lane, 2020; Vaden & Woolley, 2011). The findings offer qualified support for a domain-specific account, but that support comes with a critical caveat outlined below. Two main findings suggest domain-specific mechanisms: children had increased certainty that impossible events were possible if those events were part of religious stories (i.e., in the Bible/Quran) or were done by God. Indeed, the effect of including God as a causal mechanism was stronger than the effect of whether the stories were traditionally religious or not. It could be that including God as the supernatural cause made all events with God equally domain-specific, as opposed to the original design of dividing domain-general and domain-specific based on whether or not the events had occurred in religious stories. Findings indicating differences in children's certainty ratings about impossible events with and without God do suggest domain-specific effects of including God on children's beliefs about possibility. These domain-specific effects are further delineated when considering that children's anthropomorphism of God was specifically related to age-related differences in certainty about God's abilities to enact supernatural effects on the world (but not to the general possibility that impossible events could occur). From this perspective, the current findings could be interpreted as both supporting a domain-specific account of how concepts of the supernatural relate to children's beliefs about what is possible in the world and the increasing coherence of the concept of God with age. What these findings do not clarify is what factors or mechanisms contribute to when and whether effects of religious socialization are domain-general or domain-specific.

As such, the current study also further delineates how different aspects of religious exposure may differentially relate to developing beliefs about the world in general and religious concepts and practices specifically. In the current study, children's religious participation was measured by parents' reports of the frequency with which they involved their children in public and private religious practices, in religious events, and in formal religious instruction. Religious participation was not related to children's certainty that

God could do the impossible or that impossible events could happen at all, regardless of whether those events were domain-specific (i. e., occurred in the Bible/Quran) or domain-general (general impossible events). If religious exposure and participation had a domain-general effect on children's reasoning, there should have been a significant, positive correlation between religious participation and possibility judgments – by both causal mechanism type and event type. Whereas if the effect of religious exposure was domain-specific, there should have been significant, positive correlations between religious participation and the events with God provided as a cause as well as the Domain-Specific events, but no significant correlations between religious exposure and events with no cause provided or Domain-General events. However, in the current study, for all four religious affiliations, children's average religious participation was not significantly related to any of their possibility judgments (see Part 10 of Supplemental Materials). As such, religious participation demonstrated neither uniquely domain-general nor domain-specific effects on children's concepts of possibility.

Differences between the current findings and prior studies can in some ways be accounted for by differences in how religious socialization has been measured. In several prior studies, religious exposure was operationalized by whether or not children were recruited from or attended a religious or non-religious school (Corriveau et al., 2015; Lane, 2020; Vaden & Woolley, 2011). Religious exposure has also been characterized by how frequently children attend religious houses of worship (Lane, 2020; Richert et al., 2016, 2017; Saide & Richert, 2020; Vaden & Woolley, 2011), participate in specific religious activities, such as prayer (Lane, 2020; Richert et al., 2016, 2017; Saide & Richert, 2020; Woolley & Cox, 2007), or discuss religious beliefs with their parents (Woolley & Cox, 2007).

In these prior studies, Corriveau et al. (2015) found that attendance at a religious school was related to increased belief in the reality status of both fantastical and realistic characters in books, concluding there are domain-general effects of religious education on children's beliefs about possibility. Other studies have concluded domain-specific effects. Lane (2020) found that attendance at a religious school, visits to houses of worship, and participation in prayer related to increased belief in the efficacy of prayer but not wishing. Vaden and Woolley (2011) found that attendance at a religious school and visits to houses of worship were related to increased belief in the possibility of religious events and characters but not fantastical; and Woolley and Cox (2007) found that how frequently parents reported talking about and engaging their children in religious activities was related to increased belief in the reality status of religious stories and events specifically. As the current study did not specifically focus on comparisons between children in religious and non-religious schools, there may be unique and specific effects of attending a religious school that was not captured the current study. Thus, the current study could not test the direct influence of schooling on beliefs about supernatural causality. However, the findings, and the fact that they conflict with prior studies, indicate the need for research delineating the specific mechanisms through which formal religious instruction influences cognitive development.

Interestingly, religious participation was positively related to the discrepancy in parents' and children's certainty about impossible events. Specifically, greater religious exposure was related to increased differences between children and parents such that children were *less* likely than their parents to judge impossible events as possible. These findings were unexpected, and therefore interpretation is speculative. However, given the relations between anthropomorphism of God and certainty in God's supernatural abilities, one possibility is that the practices that encompass religious socialization reinforce anthropomorphism in children's concepts of God. Indeed, prior studies have suggested that significant relations between formal religious instruction and anthropomorphism of God in children disappear when parents' own beliefs are included (Richert et al., 2017; Saide & Richert, 2020). Thus, future research should continue to examine the qualitative nature of religious socialization in children's lives, and what types of specific messages children are receiving about supernatural causality from their parents and in their formalized religious education or religious institutions. For instance, are children explicitly being taught that with God all things are possible already in the preschool years or is this type of message not introduced until later childhood?

9.1. Conclusion

In conclusion, the findings highlight how children's developing concepts of God interact with parental and religious factors to influence children's belief that God can do the impossible. Consistent with hypotheses that children's supernatural concepts emerge from the foundation of natural concepts (e.g., Lane & Harris, 2014), young children did not universally believe that God can do the impossible. However, the findings are also consistent with hypotheses indicating the cultural context has early and long-lasting influences on children's developing supernatural concepts (e.g., ojalehto & Medin, 2015; Richert et al., 2017). In particular, the different developmental trajectories for children and the stronger relation between the beliefs of Muslim parents and their children than between parents and children from other religious groups highlight the crucial role of cultural processes on children's concept development.

Acknowledgements

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.cogdev.2021.101034.

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