

Probabilistic Reasoning in Context: Socio-cultural Differences in Children's and Adults'

Predictions about the Fulfillment of Prayers and Wishes

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### Abstract

Children and adults appreciate that physical action is typically the conduit between individuals' desires and the fulfillment of those desires. However, certain forms of petitionary thought—e.g., wishing and praying—are believed by many people to influence the external world and fulfill desires without direct physical action. We examine whether children's and adults' predictions about the occurrence of desired events differs based on: (1) the ways in which desires are expressed (wishing vs. praying), (2) whether desired events are plausible vs. impossible, and (3) participants' religious backgrounds. Children ages 3- to 11-years ( $n = 144$ ) and young adults ( $n = 85$ ) were read scenarios in which a protagonist either wished or prayed for a desired event to occur. Some of the desired events could plausibly happen with ordinary human intervention and others were impossible, even with human intervention. Preschoolers often predicted that desired events would obtain; with increasing age, participants judged that fewer events would obtain. Participants' predictions varied by the probability of the desired event—across the entire age-range participants predicted that impossible events would obtain less often than plausible events. Thus, participants' everyday probabilistic reasoning was imported into their reasoning about the fulfillment of supernatural petitions. Children's and adults' religious experiences predicted their judgments that events would obtain if they had been prayed for, but not if they had been wished for. Thus, the effects of socio-cultural experience did not globally pervade children's and adults' probabilistic reasoning, but were specific to certain contexts about which they reasoned.

Keywords: belief; socio-cultural context; theory of mind

**Probabilistic Reasoning in Context: Socio-cultural Differences in Children's and Adults'  
Predictions about the Fulfillment of Prayers and Wishes**

A fundamental intuition that children and adults hold about minds is that they are “productive”—mental states (e.g., desires) can affect our behavior, and our behavior can in-turn affect the external world (e.g., Gray et al., 2007; Wellman, 1990). Concepts of a productive mind emerge early in life. By 2-years, children can typically articulate that people behave in ways to fulfill underlying desires; they might explain that someone retrieved a snack from a cupboard because that person “wanted” the snack (Bartsch & Wellman, 1995). By 4- or 5-years, most children can also articulate how people's behavior is influenced by their beliefs, whether those beliefs are accurate or false—for example, they may explain that someone opened a drawer to look for an object that they “believed” to be there (Wellman, Cross, & Watson, 2001). Thus, young children appreciate how mental states can induce change in the external world. Importantly, in the cases just described, children appreciate that physical action is the conduit between mental states and external outcomes. Indeed, preschoolers typically reason that physical action is *necessary* to link thoughts to external events. For example, they judge that *physically* moving a marble from one location to another would be ordinary, whereas moving a marble simply by *thinking* about it would be unusual and “magical” (Johnson & Harris, 1994).

However, certain forms of thought—such as wishing and praying—are believed by many people to influence the external world *without* direct physical action. Many children, especially those in Western societies, engage in wishing and observe others wish (Woolley et al., 1999); common examples are wishing upon a star or wishing before blowing out birthday candles. As well, children and adults across many cultures engage in prayer (Pew Research Center, 2010, 2014). In religious communities, children often witness prayer and may engage in prayer as early

as the preschool years (e.g., Lane, Evans, Brink, & Wellman, 2016; Woolley & Phelps, 2001). Some of these prayers make requests of divine beings—*petitionary* prayers—to accomplish things that may not be achievable even with direct physical action (Capps, 1982; Stump, 1979). Conceptually, wishing and petitionary prayer are fascinating as both require that individuals suspend their intuition that human physical intervention is the sole conduit between desires and the fulfillment of desires. Thus, both wishing and praying may be considered forms of *supernatural petition*. Studying the development of these concepts can shed light on the development of folk intuitions about relations between the mental and physical worlds, beliefs about what is possible, and the socio-cultural origins of such concepts and beliefs.

Predictions about whether supernatural petitions will be fulfilled may vary depending on what is requested, how requests are made, and individuals' personal experiences with supernatural petition. Thus, the current study addresses three primary research questions: (1) Do children's and adults' predictions about the occurrence of desired events differ based on whether events are ordinarily plausible vs. impossible? (2) Do children's and adults' predictions about the occurrence of desired events differ based on whether events are requested via wishing or praying? (3) Do such predictions differ based on participants' socio-cultural backgrounds and experiences? The following sections briefly review prior work on developing concepts of supernatural petition, predictions that petitions will be fulfilled, and the roles that socio-cultural factors might play in this development.

### **Concepts of Supernatural Petition**

In many Western countries (e.g., the U.S.), concepts of praying and wishing develop substantially during early- and middle-childhood (e.g., Bamford & Lagattuta, 2010; Lane et al., 2016; Vikan & Clausen, 1993; Woolley et al., 1999; Woolley, 2000; Woolley & Phelps, 2001).

Recent studies have examined children's concepts of the nature of these petitionary activities. For example, children have been asked whether a character must "close his eyes" to wish, or if he must "think about something" to wish (e.g., Woolley et al., 1999; Woolley & Phelps, 2001). Such work has revealed that 3-4 years-olds conceptualize praying *and* wishing mainly in terms of physical actions (e.g., closing eyes). By 5-7 years, children typically understand that *mental activity* is central to praying and wishing—they report that thinking is *required* for both activities (Woolley et al., 1999; Woolley & Phelps, 2001), and that physical actions during prayer are performed to help the pray-er *think* about God (Richert et al., 2016). Given that young children (as well as older children and adults) believe that mental activity is central to wishing and praying, when they predict that someone's wishes or prayers will be fulfilled they are entertaining the idea that mental activity can yield external events without that person's direct physical intervention.

Although existing work on the *efficacy* of wishing and praying is more limited, studies have revealed seemingly contradictory developmental trends in U.S. children's reasoning about their own wishes and prayers. Woolley and colleagues (1999) found an age-graded decrease, between 4-8 years, in children's judgments that their own wishes have been or will be fulfilled. As part of their studies, Woolley et al. (1999) also investigated whether children conceptualized wishing as a 'normal' force or a 'magical' force, and concluded that children understand wishing as involving a magical force. Thus, the age-related decrease that they found may partly reflect age-related decreases in beliefs about magic (see also Johnson & Harris, 1994; Subbotsky, 2004). However, Woolley and Phelps (2001) found an age-graded *increase* in children's judgments that their *prayers* have been or will be fulfilled. These results suggest that there might be different developmental trajectories in children's judgments about the power of wishing vs. praying.

However, in both of these studies, children were first asked to specify what they had wished or prayed for before reporting whether those specific wishes and prayers came true. Individuals may use wishes and prayers to request different things, and thus discrepant findings across these studies may reflect differences in the *content* of participants' specific prayers and wishes. The current study employs a within-subjects design to directly compare developmental trends in judgments about the efficacy of others' prayers and wishes, while equating the content (or goals) of those petitions. With this method, we expected to find similar developmental trends across judgments of wishes and prayers—age-graded decreases in predictions that desired outcomes will obtain.

A primary goal of this study is to examine how qualities of desired outcomes influence children's and adults' predictions that outcomes will obtain. Prior work establishes that children account for some qualities of outcomes in their predictions, namely the *valence* of outcomes. For example, Woolley and Phelps (2001) found that children from 'highly religious' and 'less religious' backgrounds judged that prayers for positive outcomes (e.g., getting candy) would be granted more often than prayers for negative outcomes (e.g., someone getting hurt). This distinction was evident among preschoolers, but was more pronounced among older children. Other work has revealed that adults' predictions about prayer and wish fulfillment depend on the *probability* of the desired events. In one study, U.S. adults judged that others' prayers and wishes for events that are plausible with modest physical intervention (e.g., preventing a fish bowl from toppling from a table during an earthquake) would be fulfilled much more often than prayers and wishes for events that would typically be impossible even with physical intervention (e.g., preventing a crumbling, leaning building from toppling during an earthquake; Lane & Dolins, 2016). Thus far, it is unknown whether or when children also make this distinction. We theorize

that children's predictions about what can be accomplished via praying or wishing will be colored by their everyday probabilistic reasoning. By at least 5-6-years of age, children typically report that improbable events are more likely to occur than impossible events (e.g., Bowman-Smith, Shtulman, & Friedman, 2019; Shtulman, 2009). Thus, we anticipated that, from 5-6 years onward children (and adults) will predict that desires for ordinarily plausible (vs. impossible) events will more often obtain, regardless of whether events have been prayed-for or wished-for. To investigate the development of these concepts, the current study included children ranging in age from 3- to 11-years, and adults.

Contextual factors might influence children's and adults' expectations about the outcomes of supernatural petition. For example, exposure to common notions of extraordinary deities (Heiphetz et al., 2016) might influence individuals' judgments about the success of supernatural petitions, like prayer, that call upon deities. Indeed, as discussed next, exposure to religious notions and practices might influence children's and adults' predictions about supernatural petition in several ways.

### **Social-cultural Factors**

By at least 4-years of age, children from highly religious (particularly Christian) households in the U.S. are more familiar with concepts of prayer relative to children from less religious households (Woolley & Phelps, 2001). Religiously-raised preschoolers in the U.S. also attribute greater knowledge to God, relative to their more secular peers (e.g., Lane et al., 2012; Richert, Saide, Lesage, & Shaman, 2017), including knowledge of people's prayers (Lane et al., 2016). Thus, religious exposure may influence concepts of what supernatural petition can accomplish by influencing children's concepts of what is possible with God's intervention. Vaden and Woolley (2011) presented 4- to 6-year-olds with scenarios about extraordinary

events, couched either in religious or non-religious contexts. For example, one *religious* story told of Moses parting the Red Sea to help God's people, the Israelites, escape the king of Egypt; the *nonreligious* version of this story told of Matthew parting the Green Sea to help the people of Ison escape the king of Ison. Children more often judged that the religious scenarios were real, and this was especially true for children from highly religious backgrounds (gauged by parent questionnaires). In contrast, judgments about nonreligious scenarios were *unrelated* to participants' religious backgrounds. Vaden and Woolley (2011) thus concluded that, "credulity in children is domain specific and does not reflect a more general mode of information processing" (p. 1130).

Other researchers have made contrary claims: that religious exposure more generally influences children's judgments about what is possible. Across two studies, Corriveau, Chen, and Harris (2015) presented 5- and 6-year-olds with extraordinary scenarios that were either *religious* (e.g., a story of Moses asking God for help, waving his staff, and parting a sea to help his people escape), or "*nonreligious*" (e.g., a story of Moses using his magic staff to part a sea and help his people escape; or a story of John using a stick to part a mountain and help his people escape). Note that even these "non-religious" stories included protagonists named after familiar biblical figures or were reminiscent of extraordinary biblical occurrences. Relative to their secular peers, children from religious backgrounds (those who attended church and/or religious schools) more often reported that the religious stories were real, *and* more often reported that the *nonreligious* stories were real (for approximately 30-50% of such stories). Contrary to Vaden and Woolley's (2011) conclusions, these researchers made broader claims: "exposure to religious ideas has a powerful impact on children's differentiation between reality and fiction, not just for religious stories but also for fantastical stories (Corriveau et al., 2015, p. 353), and "religious children



have a broader conception of what can happen” (Corriveau et al., 2015, p. 374).

Thus, religious exposure may foster beliefs that certain types of extraordinary events (particularly those that involve a religious context and/or God) can occur, in which case participants’ religious exposure would predict their judgments about the efficacy of praying to God, but not the efficacy of wishing. Alternatively, religious exposure may have a more general influence on individuals’ beliefs that extraordinary events can occur, in which case it would predict participants’ judgments about the efficacy of prayers *and wishes*. To test these competing hypotheses among adults, Lane and Dolins (2016) conducted an internet-based study. Participants read scenarios in which a protagonist desired to assist another person and either prayed to God or wished for their desires to be fulfilled. These scenarios dealt with contemporary predicaments (a character being bullied or getting sick; an earthquake causing a building to crumble) and protagonists had common, contemporary names (e.g., Jen, Mark). Participants’ self-reported engagement in religious activities (e.g., praying before bed) correlated positively with their belief that prayers would be fulfilled, but their religious engagement was *unrelated* to their belief that wishes would be fulfilled. Thus, adults’ religious experiences might influence their judgments that some extraordinary events (in this case, events caused by supernatural petitions) can occur in religious contexts, but *not* in all contexts. The current study addresses remaining developmental questions concerning associations between children’s religious experience and their predictions about whether wished-for and prayed-for outcomes will obtain.

We recruited participants from religious and secular contexts. Participants (or their parents) also provided detailed reports of their religious background, exposure to prayer, and engagement in prayer. Relations between participants’ religious experience and their predictions of petition fulfillment are evaluated by considering religious experience both categorically (i.e.,

comparing the judgments of ‘less religious’ and ‘highly religious’ participants) and continuously (i.e., evaluating linear relations between scaled measures of religious experience and predictions of petition fulfillment). Given that children with greater exposure to Judeo-Christian teaching and practices have more precocious understandings of prayer and of God (relative to their less religious age-mates), participants with greater exposure to religious doctrine and practices were expected to judge that prayer to God would be more effective. These highly religious participants were also expected to judge prayer as more effective than wishing. Given prior findings (Lane & Dolins, 2016; Vaden & Woolley, 2011), socio-cultural differences in judgments about the fulfillment of supernatural petition were expected to be context-specific for adults and for children: we expected to find such differences in participants’ predictions about the fulfillment of prayers, but not wishes.

## **Method**

### **Participants**

Participants included children (ages 3- to 11-years) and adults from Southeast Michigan. The religious population of Michigan is comparable to that of the United States as a whole (Pew Research Center, 2014). Most adults (70%) identify as Christian, 70% pray at least once a week, and 68% attend a place of worship at least once a month. Participants typically resided in communities that were middle-class to upper-middle class, and most participants were Caucasian. Child participants were interviewed individually, either in a university laboratory (where children were recruited through State birth records), or were interviewed at (and recruited through) local schools and a local natural history museum. Adult participants were undergraduate students who were interviewed individually in the laboratory.

A primary aim of this study is to examine how predictions about the fulfillment of

supernatural petition might vary between individuals from different socio-cultural backgrounds; specifically, between people who vary in their experiences with and exposure to Judeo-Christian religious practices. Thus, specific grouping criteria were required. Grouping child participants based on school attendance—e.g., religious vs. secular—is commonly done to explore social-cultural differences in conceptual development (e.g., Bering, Blasi, & Bjorklund, 2005; Evans, 2001; Lane et al., 2012, 2016). Thus, children were initially categorized as “highly religious” if they were recruited through and tested at one of three Christian schools (all of which mentioned “God”, “Christ”, or “Jesus” in their mission statements), and children were categorized as “less religious” if they were recruited through and tested in the laboratory or a local natural history museum. As reported later, complementary data further validate these groupings. One additional child was recruited through word-of-mouth; her parents identified as “Agnostic” on a questionnaire (described later) and thus the child was categorized as “less religious.”

All adult participants attended the same public universities, and thus different grouping criteria were required. Following prior work (e.g., Lane et al., 2016), adults were categorized as “highly religious” if (on a questionnaire completed after the main interview) they identified as Christian, identified with that belief system “strongly” or “very strongly” (on a 4-point scale ranging from “very little” to “very strongly”), and reported that religion was “important” or “very important” in their family’s life (on a 4-point scale ranging from “not at all important” to “very important”);  $n = 32$ . Adult participants were categorized as ‘less religious’ if they identified as either Atheist ( $n = 11$ ), Agnostic ( $n = 17$ ), Other ( $n = 1$ ), or if they identified as Christian but identified with that belief system only “very little” or “somewhat” and felt that religion was “not at all” or only “somewhat” important in their family’s life ( $n = 24$ ). Adults who did not meet these criteria (e.g., those who identified with a non-theistic religion; those who

identified with a theistic religion strongly but reported that religion was not very important in their life; those who did not respond to these three questionnaire items;  $n = 24$ ) were not included in analyses. Sixteen additional adults who identified as Muslim were not included in the current study to more thoroughly examine their responses in aggregate with a large ongoing study focused specifically on Muslim children and adults.

The final sample included 94 ‘highly religious’ participants (44 males, 49 females, 1 unreported gender) and 135 ‘less religious’ participants (61 males, 74 females), divided into four age-groups. An additional 8 children (4 ‘highly religious’ and 4 ‘less religious’) did not complete the study or were notably distracted during the study and were thus not included in the analyses. Age-groupings were based on findings from studies that have identified socio-cultural and age-related differences in concepts of supernatural agents’ awareness of people’s thoughts and prayers (Lane et al., 2014, 2016). The two youngest age-groups also parallel those studied in work that has identified age-related differences in concepts of wishing and praying (Vikan & Clausen, 1993; Woolley & Phelps, 2001; Woolley et al., 1999). ‘Highly religious’ participants included 19 3-4.5 year-olds ( $M_{age} = 3.76$ ;  $SD = .41$ ; 9 girls), 17 4.5-6 year-olds ( $M_{age} = 5.31$ ;  $SD = .52$ ; 11 girls), 26 6-11 year-olds ( $M_{age} = 9.22$ ;  $SD = 1.63$ ; 10 girls), and 32 adults ( $M_{age} = 20.01$ ;  $SD = 4.39$ ; 19 women). ‘Less religious’ participants included 25 3-4.5 year-olds ( $M_{age} = 4.00$ ;  $SD = .33$ ; 11 girls), 32 4.5-6 year-olds ( $M_{age} = 5.28$ ;  $SD = .39$ ; 20 girls), 25 6-11 year-olds ( $M_{age} = 8.60$ ;  $SD = 1.73$ ; 12 girls), and 53 adults ( $M_{age} = 20.29$ ;  $SD = 4.53$ ; 31 women).

The total sample size of 229 participants provided sufficient statistical power (power > .80;  $\alpha = .05$ ) to detect medium-to-large sized effects (e.g.,  $f_s \geq .25$  in ANOVAs) for each of the within-subjects variables, between-subjects variables, and any 2-way or 3-way interactions among these variables (Cohen, 1992). Power analyses were conducted using the software

G\*Power 3 (Faul, Erdfelder, Lang, & Buchner, 2007). Methods for participant recruitment and the study procedures were approved by the University of Michigan Institutional Review Board (HUM00081090).

## **Procedure**

### ***Predictions about the Fulfillment of Prayers and Wishes***

Participants were asked to predict whether 12 events would occur after a person wished for each event (across a block of six scenarios) or prayed for each event (across a block of six different scenarios). The order in which petition mode (wishing vs. praying) was presented was counterbalanced across participants within each age group. Both blocks included warm-up questions, an introduction to the scenarios, and the six scenarios. Warm-up questions included: (1) Do you know what it means to pray/wish? (2) What is praying/wishing? (3) Have you ever prayed/wished for something? And if “Yes”, Did your prayer/wish come true? (4) When prayers/wishes come true, is it because somebody makes them come true or because it just happens? and (5) Who makes prayers/wishes come true? These questions were worded similarly to questions asked by Woolley and colleagues in their studies of children’s concepts of praying and wishing (Woolley, 2000; Woolley & Phelps, 2001). Participants were free to answer these questions however they liked; no corrective feedback was provided and no participants were excluded from analyses based on their responses. Following the warm-up questions, participants were introduced to the related *supernatural petition* scenarios as follows: “Now I’ll tell you short stories about [protagonist’s name] and his/her friends. [*Experimenter shows drawing of protagonist*] In these stories [protagonist’s name] [prays to God/ makes wishes] for [his/her] friends, and I’ll ask you: Will [protagonist’s name]’s [prayers/wishes] come true? I’d like you to tell me what you *really* think.”

After the warm-up questions and introduction, participants were read a corresponding set of six scenarios (with accompanying drawings) in which a protagonist (gender-matched to the participant; e.g., Mark or Mary), held desires regarding friends in need and either prayed to God for each desire to be fulfilled or wished for each desire to be fulfilled. Scenarios were focused on requests for others' needs because children in previous work have reported that it is more appropriate to make such requests as opposed to requests for harm or for personal gain (Woolley & Phelps, 2001). After each scenario, participants were asked whether the desired outcome would obtain. An example *prayer* scenario is as follows: "One of Mark's friends lives in this big building. One day, there was an earthquake, making the whole building shake. It's shaking so much that the building is starting to crumble, tilt to the side, and fall over. Mark wants to help his friend and save the building. If Mark prays to God for the building to stay up and not fall over, will the building stay up or will it fall over?"

The second block was then presented, for which participants were asked warm-up questions about the other petition mode (either wishing or praying). Then, they were presented six new scenarios in which a new protagonist (e.g., Jon or Jen) held desires to assist friends in need and petitioned (i.e., wished or prayed) for each of those desires to be fulfilled. After each scenario, participants were asked whether the desired outcome would obtain.

The twelve scenarios were presented in one of two orders (counterbalanced across participants within each age group); one order is presented in the Appendix, and the second order is described in the Appendix note. The gender of the potential beneficiary of each request (i.e., boy vs. girl) was counterbalanced across conditions. For each block of scenarios, half of the requests were for outcomes that were *plausible* with modest human intervention (e.g., preventing a fish bowl from falling off of a table during an earthquake); and the other requests were for

outcomes that are *impossible* even with direct human intervention (e.g., preventing a crumbling building from toppling during an earthquake).

**Scoring.** For each of the 12 scenarios, participants' predictions that requests *would* be fulfilled were coded 1 and predictions that requests would *not* be fulfilled were coded 0. On occasion, a participant responded by saying "Both" or "I don't know"; so the participant was reminded that there are no wrong answers and the question was repeated. Very rarely (for 29 of 2760 judgments across the 12 scenarios) a participant would maintain their answer of "Both" or "I don't know." Such indefinite answers were coded .5. Four composites were computed for each participant—*plausible wishes, plausible prayers, impossible wishes, and impossible prayers*—by averaging across the three respective items. Resulting scores for each composite—ranging from 0% to 100%—indicate the percentage of plausible and impossible events that participants predicted would be obtain following wishes and prayers.

### ***Religious Background***

As described earlier, adult participants and the parents of child participants were given a questionnaire that gathered detailed information about participants' religious backgrounds and practices. Parents whose children participated in the lab, at the museum, or via word-of-mouth were given this questionnaire to complete at the time of testing. Parents whose children participated at school were mailed the questionnaire with a self-addressed stamped envelope. Most of the children's parents—127 of 144 (88%)—completed the questionnaire. All adult participants completed a similar questionnaire following their interview in the lab. The questionnaire asked how frequently participants engaged in 17 activities, eleven filler items about unrelated topics (engagement in activities involving music, science, animals, and magic) and six items directly relate to the current study—three items about participants' *general*

engagement in religious activities (reading religious stories or texts, watching religious TV shows or movies, attending a place of religious worship or religious classes) and three items about engagement in activities specifically involving *prayer* (praying before going to bed, praying before a meal, talking about prayer with others). Parents reported whether their child (or, for adult participants, they themselves) engaged in each activity, “Very rarely or never”, “At least twice a year”, “Every month or two”, “Every week”, or “Daily (or almost every day).” Responses were scored ranging from 1 (for “Very rarely or never”) to 5 (for “Daily (or almost every day)”). The three items about general participation in religious activities were highly interrelated for child participants ( $\alpha = .88$ ) and for adult participants ( $\alpha = .83$ ), as were the three items about activities specifically involving prayer (children:  $\alpha = .92$ ; adults:  $\alpha = .84$ ). *General religious participation* and *prayer participation* composites were created by averaging across those respective three items; the resulting scores ranged from 1 to 5 for each composite.

As noted earlier, this questionnaire also asked parents (or adult participants) to identify their belief system and *how much* they identified with that belief system, using a scale ranging from (1) “Very little”, to (4) “Very strongly”. Finally, the questionnaire asked participants how *important* religion is in their life, using a scale ranging from (1) “Not at all important”, to (4) “Very important.”

## Results

Initial analyses provide a general overview of whether participants predicted that requested events would occur (values above 50%) or would not occur (values below 50%). As seen in Figure 1, participants were generally conservative in their predictions. Indeed, only for *plausible* events did the three groups of children judge that significantly more than half of the requests would be fulfilled (*t*-tests against chance; *t*s = 6.16, 8.22, 2.84, respectively; all *p*s  $\leq .006$ , all *d*s  $> .39$ ). Moreover, the oldest children (6-11 years) judged that significantly *less* than



half of the requests for impossible events would be fulfilled ( $t(51) = -5.13, p < .001, d = -.72$ ), and adults judged that significantly less than half of the requests for plausible and impossible events would be fulfilled (plausible:  $t(84) = -6.93, p < .001, d = -.75$ ; impossible:  $t(84) = -27.81, p < .001, d = -3.03$ ).

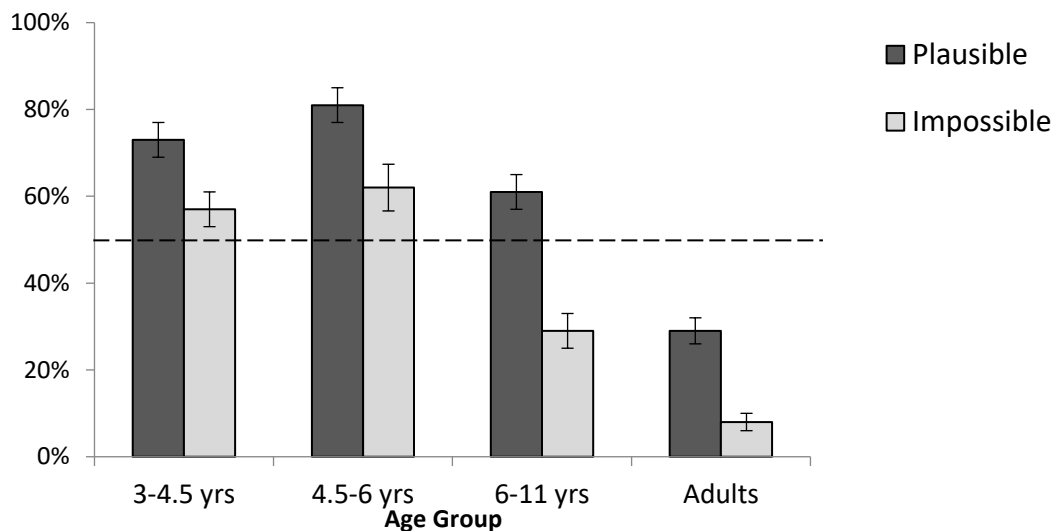


Figure 1. Predictions that requests for plausible and impossible events would obtain. (Error bars: +/- 1 standard error of the mean). Hashed line represents chance (50%).

To address our focal research questions, direct comparisons between the four age-groups, comparisons across event plausibility, petition modes, religious background, and interactions among these variables were examined with a mixed-effects ANOVA including Age (4: 3-4.5, 4.5-6, 6-11, adults) and Religious Background (2: highly religious, less religious) as between-subjects factors, and Petition Mode (2: praying vs. wishing) and Event Plausibility (2: plausible, impossible) as within-subjects factors. All between-subjects comparisons were subjected to Levene's tests for equality of variances between groups. This analysis revealed significant effects of Age ( $F(3, 221) = 58.19, p < .001, \eta_p^2 = .44$ ), Religious Background ( $F(1, 221) = 5.18, p = .024, \eta_p^2 = .02$ ), Event Plausibility ( $F(1, 221) = 189.86, p < .001, \eta_p^2 = .46$ ), and Petition Mode ( $F(1, 221) = 20.61, p < .001, \eta_p^2 = .09$ ), as well as significant interactions of Age X Event Plausibility ( $F(3, 221) = 4.18, p < .01, \eta_p^2 = .05$ ), Age X Petition Mode ( $F(3, 221) = 3.95, p <$

.01,  $\eta_p^2 = .05$ ), Religious Background X Petition Mode ( $F(1, 221) = 5.34, p = .022, \eta_p^2 = .02$ ), and Age X Religious Background X Petition Mode ( $F(3, 221) = 3.20, p = .024, \eta_p^2 = .04$ ). We unpack these results by first exploring the main effect of age, then exploring main effects and interactions involving event plausibility, and finally exploring main effects and interactions involving petition mode and religious background.

The main effect of age reflects an age-graded decrease in predictions that requested events would obtain. Collapsing across plausible and impossible events, the predictions of children 3-4.5 years ( $M = 65\%, SE = 4\%$ ) and children 4.5-6 years ( $M = 73\%, SE = 4\%$ ) did not significantly differ; but children 6-11 years predicted that requested events would obtain ( $M = 45\%, SE = 3\%$ ) less often than both younger groups ( $ps < .001$ , with Tukey HSD correction). Moreover, adults predicted that requested events would obtain ( $M = 20\%, SE = 3\%$ ) less often than *all three* child age-groups ( $ps < .001$ , with Tukey HSD correction). (Age-related decreases are also found when considering age as a continuous variable among the child participants, as depicted in Table 2). Consistent with our hypotheses, on average participants predicted that requests for plausible events ( $M = 62\%, SE = 2\%$ ) would obtain more often than requests for impossible events ( $M = 39\%, SE = 2\%$ ). This difference was also significant within each of the four age-groups (all  $ps < .001$ ), as seen in Fig. 1.

However—as indicated by the significant interaction of Age X Event Plausibility—the magnitude of this difference varied between age-groups. As depicted in Fig. 1, predictions that requests for plausible events (vs. impossible events) would obtain were most discrepant among children 6-11 years in age, relative to participants in the other age-groups. Another way to interpret this interaction is in terms of the developmental sequence between 4.5 and 11 years: Children 6-11 years predicted that fewer plausible events would obtain than did children 4.5-6

years ( $M_{\text{difference}} = 22\%$ ,  $SE = 5\%$ ,  $p < .001$ ) but their predictions differed more so for impossible events ( $M_{\text{difference}} = 34\%$ ,  $SE = 6\%$ ,  $p < .001$ ). Thus, during middle childhood, there was a steeper age-graded decline in predictions that requests for impossible events (vs. requests for plausible events) would obtain.

As noted earlier, the omnibus ANOVA also revealed significant main effects and interactions involving petition mode (praying vs. wishing) and participants' religious background (highly religious vs. less religious). The main effects of Petition Mode and Religious Background were subsumed under a significant interaction of Petition Mode X Religious Background. If desired outcomes had been wished for, 'Highly religious' participants ( $M = 49\%$ ,  $SE = 3\%$ ) and 'less religious' participants ( $M = 45\%$ ,  $SE = 2\%$ ) were equivalent in predicting that those outcomes would occur,  $p = .29$ . However, if desired outcomes had been prayed for, 'highly religious' participants ( $M = 60\%$ ,  $SE = 3\%$ ) were more likely than 'less religious' participants ( $M = 49\%$ ,  $SE = 3\%$ ) to predict that those outcomes would occur,  $p = .003$ . The magnitude of this difference varied with age, as indicated by the Petition Mode X Religious Background X Age interaction (depicted in Fig. 2).

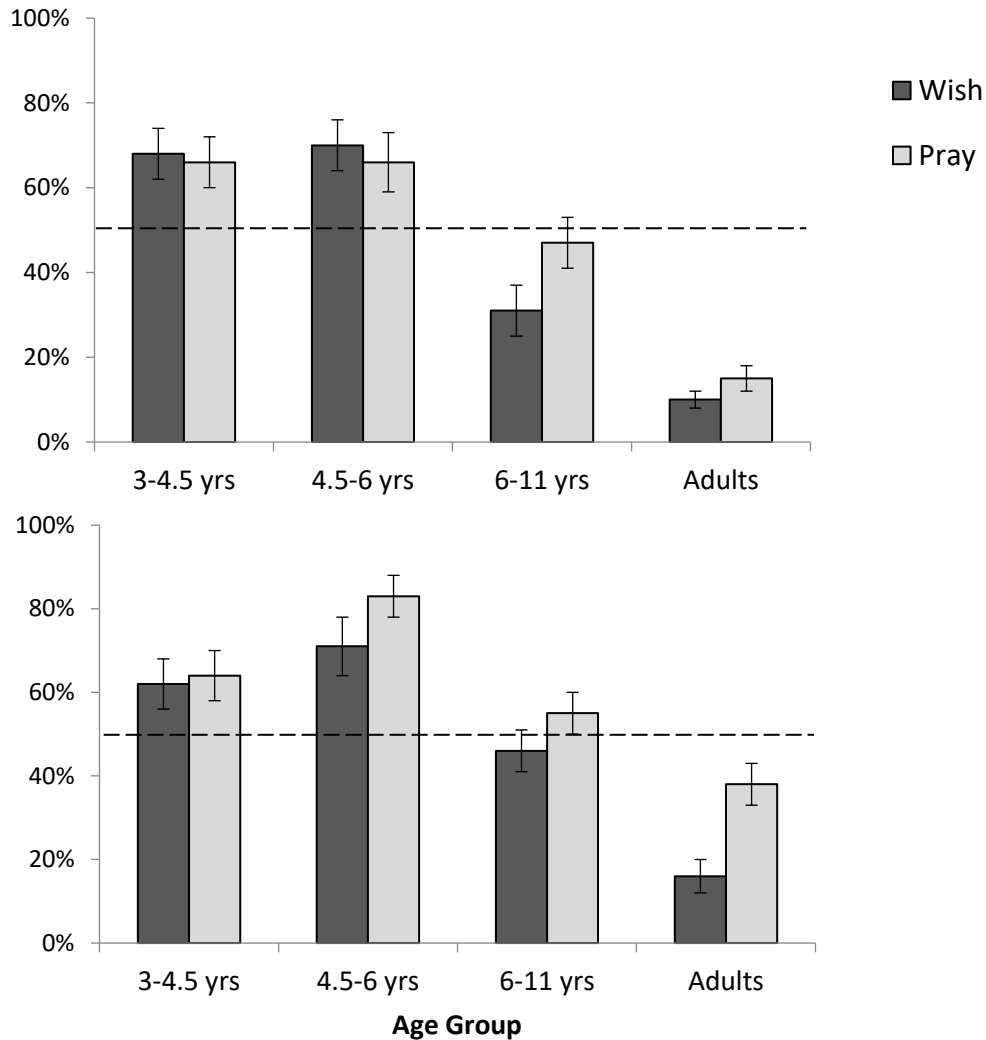


Figure 2. Predictions that requested events would obtain, by petition mode (wish vs. pray) and age group. Top: 'Less religious' participants. Bottom: 'Highly religious' participants. (Error bars: +/- 1 standard error of the mean). Hashed lines represent chance (50%).

Among 3-4.5 years-olds, 'highly religious' and 'less religious' children predicted that events would occur equally often following prayers and wishes. Among slightly older children (4.5-6 years), differences based on religious background and petition mode emerged: 'highly religious' children predicted that desired events would more often occur following prayers than wishes ( $p = .028$ ), whereas 'less religious' children's predictions were similar for prayers and wishes ( $p = .32$ ). Among the oldest children (6-11 years), 'highly religious' participants predicted that desired events would more often occur following prayers than wishes ( $p = .04$ );

and (surprisingly) this distinction was even greater among ‘less religious’ participants ( $p < .001$ ). Lastly, ‘highly religious’ adults predicted that desired events would more often occur following prayers than wishes ( $p < .001$ ), but ‘less religious’ adults did not make this distinction ( $p = .16$ ). In sum, by 4-5 years of age, participants from highly religious (vs. less religious) backgrounds more often predicted that desired events would obtain following prayer, and they predicted that events would more often obtain following prayers than following wishes. However, for all ages, participants from highly religious and less religious backgrounds were *equivalent* in their predictions that desired outcomes would obtain following wishes.

### ***Religious Participation and Predictions about Supernatural Petition Fulfillment***

Thus far, these data have revealed general socio-cultural differences in children’s and adults’ predictions that desired outcomes will obtain after they are prayed for; differences that begin to emerge in early childhood. The initial categorization of participants as *highly religious* or *less religious* in previous analyses is admittedly imperfect—such categorization is based on *proxies* for participants’ exposure to religion and prayer (e.g., school attendance and religious affiliation). Participants’ (or their parents’) responses on questionnaires provide more detailed information about participants’ frequency of *general religious participation* (e.g., reading religious texts) and, more specifically, their *prayer participation* (e.g., praying before bed). Average scores for these two composites (*general religious participation* and *prayer participation*) for each of the four age-groups are presented in Table 1. We use these composites to further investigate how participants’ predictions about the fulfillment of supernatural petitions vary based on their socio-cultural experiences. For each age group, participants who had been grouped as ‘highly religious’ and ‘less religious’ differed considerably in their religious participation generally and in their prayer participation specifically. These differences help to

validate the earlier dichotomous grouping of participants. Yet, as indicated by the standard deviations in Table 1, there is also considerable variability in these measures among ‘very religious’ participants and among ‘less religious’ participants. To take full advantage of this variability, the next analyses examine relations between these two composites and participants’ predictions about the fulfillment of prayers and wishes.

Table 1

Average prayer participation and general religious participation, by religious background and age-group

Age-group	Prayer participation		<i>t</i> ( <i>df</i> ) = <i>F</i>	General religious participation		<i>t</i> ( <i>df</i> ) = <i>F</i>
	Less Religious <i>M</i> ( <i>SD</i> )	Highly Religious <i>M</i> ( <i>SD</i> )		Less Religious <i>M</i> ( <i>SD</i> )	Highly Religious <i>M</i> ( <i>SD</i> )	
3-4.5 years	2.10 (1.27)	3.71 (1.50)	<i>t</i> (38) = 3.65***	1.98 (.91)	2.67 (1.09)	<i>t</i> (38) = 2.14*
4.5-6 years	2.69 (1.39)	4.53 (.87)	<i>t</i> (31.71) = 5.25***	2.45 (1.10)	4.00 (.57)	<i>t</i> (36.97) = 6.10***
6-11 years	2.77 (1.46)	4.13 (1.37)	<i>t</i> (41) = 3.14**	2.51 (1.15)	3.43 (1.11)	<i>t</i> (41) = 2.68*
Adults	1.55 (.73)	3.55 (.92)	<i>t</i> (83) = 11.08***	1.48 (.59)	2.78 (.68)	<i>t</i> (83) = 9.31***

*Note.* Scores are based on responses to questionnaires completed by children’s parents and adult participants. Some parents did not complete questionnaires; resulting sample sizes are 24, 32, 23 for the ‘less religious’ child age-groups, and 16, 12, 20 for the ‘highly religious’ child age-groups. *T*-test values reflect comparisons between ‘less religious’ and ‘highly religious’ participants, per age-group. *T*-tests for children 4.5-6 years were corrected for unequal variances, determined by Levene’s tests. For prayer participation comparisons, all *ds* > .96. For general religious participation comparisons, all *ds* > .68.

\**p* < .05. \*\**p* < .01. \*\*\**p* < .001.

Pearson correlations among age (in years), general religious participation, prayer participation, and predictions that desired events would occur after prayers (averaged across the 6 prayer scenarios), and wishes (averaged across the 6 wish scenarios) are presented in Table 2, separately for children (coefficients above the diagonal) and adults (coefficients below the diagonal). These correlations again reveal significant age-related decreases between 3 and 11 years for predictions that desired outcomes will obtain. [Analyses in Supplementary Materials reveal that this is also the case separately for physical, biological, and psychological outcomes].

Analysis of data within just the oldest group of children (6-11 years) reveals correlations between age and predictions about the fulfillment of wishes ( $r(51) = -.34, p = .01$ ) and prayers ( $r(51) = -.31, p = .03$ ) that are similar in magnitude to correlations for the entire age-range (these findings, in addition to those depicted in Figures 1 and 2, suggest that this age-related decrease took place *throughout* early and middle childhood).

Of central interest is whether participants' experiences with religion and prayer relate to their predictions that desired outcomes will obtain following supernatural petition. Among children, both general religious participation and prayer participation positively correlate with predictions that prayed-for events will obtain. [Analyses in Supplementary Materials reveal similar patterns across domain of outcome--physical, biological, and psychological]. However, neither of these factors correlate with predictions that wished-for events will obtain. Relations among adults were similar—greater general religious participation and prayer participation positively correlate with predictions that prayed-for events will obtain [analyses in Supplementary Materials reveal similar patterns across domain of outcome], but these factors are *unrelated* to judgments that wished-for events will obtain.

To examine the *relative* predictive value of engagement in prayer activities vs. more general exposure to religious activities on predictions that prayers will be fulfilled, we included both questionnaire measures (religious participation and prayer participation) in the same regression analysis ( $F(2, 209) = 23.12, R = .43, p < .001$ ). General religious participation remained significantly related to predictions that prayers will be fulfilled (Standardized  $\beta = .45, t = 3.32, p = .001$ ), over-and-above the effect of engagement in prayer. Engagement in prayer no longer significantly related to predictions about the fulfillment of prayers (Standardized  $\beta = -.03, t = -.22, p = .828$ ). So, it seems that participants' more general exposure to religion may be a

stronger predictor (vs. engagement in prayer alone) of participants' judgments that prayers will be fulfilled.

Table 2

*Correlations among measures of age, socio-cultural background, and predictions about the occurrence of requested events, for child and adult participants*

	Age	Religious Participation	Prayer Participation	Prayer Judgments	Wish Judgments
Age	--	<b>.16</b>	<b>.14</b>	<b>-.26**</b>	<b>-.42***</b>
Religious Participation	.04	--	<b>.90***</b>	<b>.28**</b>	<b>.13</b>
Prayer Participation	-.01	.83***	--	<b>.19*</b>	<b>.06</b>
Prayer Judgments	-.02	.41***	.46***	--	<b>.70***</b>
Wish Judgments	-.01	.04	.02	.46***	--

Note. These analyses include data only from participants with completed questionnaires. Pearson correlations for child participants ( $n = 127$ ) are bolded and above the diagonal. Pearson correlations for adult participants ( $n = 85$ ) are below the diagonal.

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

A further way to examine relations between engagement in prayer and predictions about the fulfillment of prayers and wishes is to utilize participants' answers to the question "Have you ever prayed for something?" during the warm-up questions for the prayer scenarios. Not only does this provide a personal account of each participants' exposure to prayer, but an additional advantage of this variable is that it provides self-report data for *all* child participants (whereas not all parents completed questionnaires about their children's religious background). Table 3 summarizes participants' responses to this question, per age-group.



Table 3

*Personal Reports of Engagement in Prayer*

Age-group	Less Religious	Highly Religious	
3-4.5 years	32%	74%	**
4.5-6 years	44%	82%	**
6-11 years	52%	89%	**
Adults	81%	100%	**

*Note.* Asterisks reflect significant Mann-Whitney Tests between ‘less religious’ and ‘highly religious’ participants, per age-group.  
\*\* $p \leq .01$ .

Within each of the four age-groups, participants who had been categorized as ‘highly religious’ (in earlier analyses) more often reported praying than did participants categorized as ‘less religious’, further validating the earlier groupings (two children in the youngest age-group responded “I don’t know”, and were excluded from analyses). Children who had reportedly prayed predicted that more desired outcomes would obtain following prayer (across the six prayer scenarios;  $M = 68\%$ ,  $SE = 3\%$ ), relative to children who reported having never prayed ( $M = 54\%$ ,  $SE = 4\%$ ),  $t(140) = 2.61$ ,  $p = .01$ ,  $d = .44$ . In contrast, for predictions of whether desired outcomes would obtain following *wishes* (across the six wish scenarios), children who reportedly prayed ( $M = 59\%$ ,  $SE = 4\%$ ) were similar to their peers who had reportedly never prayed ( $M = 57\%$ ,  $SE = 4\%$ ),  $t(126.33) = .38$ ,  $p = .71$ ,  $d = .06$ , correcting for unequal variances between groups.

Most adults (75 of 85; 88%) reported having prayed. However, consistent with earlier analyses, adults who reported never praying were less likely to predict that desired outcomes would obtain following prayers ( $M = 6\%$ ,  $SE = 4\%$ ) compared to adults who *did* report praying ( $M = 26\%$ ,  $SE = 3\%$ ),  $t(20.77) = 3.72$ ,  $p = .001$ ,  $d = .92$ , correcting for unequal variances

between groups. Again consistent with earlier analyses, adults did not differ in their predictions that outcomes would obtain following wishes, whether they had reportedly prayed ( $M = 13\%$ ,  $SE = 2\%$ ) or not ( $M = 12\%$ ,  $SE = 4\%$ ),  $t(83) = .14$ ,  $p = .89$ ,  $d = .06$ .

### Discussion

A fundamental lay assumption about minds is that they are “productive”—mental states can affect behavior and, in turn, affect the external world (e.g., Gray et al., 2007; Wellman, 1990). The current study was designed to explore concepts of mental states, specifically desires, that can spur change in the external world *without* direct human physical intervention. Activities such as wishing and petitionary prayer are widely-practiced in Western contexts, suggesting that many individuals indeed believe that, under certain circumstances, desires can influence the external world without direct physical intervention. We investigated how predictions about the fulfillment of desires differ based on how desires are expressed (wishing vs. praying), the everyday probability of the desired outcomes, and socio-cultural experiences; and we explored how these associations vary across development.

When children and adults were asked whether events would occur after others prayed or wished for the events, preschoolers often predicted that the events would indeed occur. As evident in Fig. 1 and in Table 2, across the sample, there were age-graded decreases in judgments that prayed-for and wished-for events would occur—these age-related declines persisted throughout middle childhood, and into adulthood. This developmental pattern is consistent with prior work on children’s developing judgments about the efficacy of wishing (Woolley et al., 1999), but may initially seem to conflict with work demonstrating an age-graded *increase* in judgments about the efficacy of *praying* (Woolley & Phelps, 2001). This apparent conflict can be reconciled in light of methodological differences between the current work and

prior work. Specifically, in prior work children were asked to judge whether their own particular past and future requests have been or would be fulfilled. The particular requests that participants pondered might have varied by participants' age and might have varied by the mode of petition (praying vs. wishing). For example, one participant might have reasoned about the effectiveness of their wish for a gift, and another might have reasoned about the effectiveness of their prayer for their family's health (Woolley, 2000; Woolley & Phelps, 2001). To directly examine how children's and adults' probabilistic reasoning varies based on the petition mode alone (praying or wishing) in the current study, we had participants judge whether prayers and wishes would be effective in requests for the *same* outcomes (counterbalanced across participants). Equating the content of the requests, the current study revealed similar age-graded decreases in judgments about the effectiveness of praying and the effectiveness of wishing. Thus, discrepant age-related patterns found in studies on children's predictions about prayers vs. wishes (e.g., Woolley, 2000; Woolley & Phelps, 2001) likely reflect discrepancies in the *content* of children's prayers vs. wishes (and age-related differences in that content) more so than age-related differences in the presumed effectiveness of praying vs. wishing *per se*.

The finding that the youngest children were most likely to predict that requested outcomes will obtain should not be taken as evidence that young children simply believe that supernatural petitions can fulfill *any* request. To the contrary, participants across the age range (even 3- to 4-year-olds) predicted that petitioned-for events that were humanly impossible (e.g., someone stopping a crumbling building from toppling over) were significantly less likely to occur than petitioned-for events that could plausibly occur with modest human intervention (e.g., someone stopping a fish bowl from falling off a table). Thus, the assumed probability of events occurring in everyday life influences children's and adults' reasoning about what events

supernatural petition can help to yield, and this is true even for preschoolers. Moreover, as evident in Fig. 1, even when they reasoned about the occurrence of plausible events, preschoolers' judgments were not near ceiling.

Multiple indices of participants' socio-cultural experiences—religious school attendance, parent-reported (or self-reported) engagement in religious activities, and self-reported engagement in prayer—were all associated with their predictions that prayers would more often be fulfilled; this was true for children and for adults. As well, more religious participants (or participants raised in more religious contexts) in particular tended to predict that prayers would be fulfilled more often than wishes. These relations between religious exposure and predictions about supernatural petition began to emerge in the late preschool years and were also found among older children and adults. Intriguingly, as depicted in Fig. 2, children 6-11 years from religious *and less religious* backgrounds tended to report that prayers would be fulfilled more often than wishes. These results join other developmental evidence that even within less religious communities in the U.S., middle childhood appears to be a period during which children are especially likely to entertain 'supernatural' concepts that are prominent in the broader culture, including concepts of creationism (e.g., Evans, 2001) and concepts of life-after-death (Lane, Liqi, Evans, & Wellman, 2016). The increased appeal of certain widely-endorsed supernatural ideas might be influenced by a variety of factors, including increased exposure to religious ideas from peers in school, children beginning to face (and attempting to answer) their own existential questions, and children's developing ability to cognitively represent certain supernatural concepts (e.g., Lane & Harris, 2014). However, exposure to religious ideas and practices do not seem to spur belief that prayer can achieve *anything*. Indeed, whether participants were from 'highly religious' or 'less religious' backgrounds, older children (6-11 years) were at chance in

their predictions that prayers would obtain (predicting that approximately half of prayed-for outcomes would occur), and adults often predicted that prayed-for events would *not* obtain (i.e., predicting that prayers would occur below chance levels).

Critically, none of the indices of socio-cultural experiences predicted children's or adults' judgments that (otherwise identical) wished-for outcomes would obtain. These findings are inconsistent with Corriveau et al.'s (2015) broad conclusions that, "exposure to religious ideas has a powerful impact on children's differentiation between reality and fiction" (p. 353), or that "religious children have a broader conception of what can happen" (p. 374). Rather, the current findings support a more tempered theory, consistent with a growing body of research demonstrating that individuals may hold co-existing conceptions of the same phenomena, and that different contexts elicit those different conceptions (for a review, see Legare, Evans, Rosengren, & Harris, 2012). The extent to which cultural experiences influence children's and adults' beliefs about what can happen (in the current case, what can happen following supernatural petition) depends heavily on the context. The key distinction between wishes and prayers—both conceptually and in terms of how questions were posed to our participants—is the involvement of an additional agent (God) who helps to obtain the desired outcomes. When individuals reason about events occurring with the assistance of powerful deities (whom they believe to exist), when contexts include familiar extraordinary protagonists whom they believe to have existed (as in Corriveau et al., 2015), or when extraordinary occurrences are reminiscent of events that they believe to have occurred (as in Corriveau et al., 2015), individuals are more likely to believe that such events did occur or could occur. Without these contextual cues, these same individuals may be no more likely than their less religious peers to predict that such events have occurred or could occur. This more tempered theory (consistent with the conclusions of

Vaden and Woolley, 2011) accounts for the current finding that religious experience was associated with increased predictions that requested events would occur following prayer to God but *not* following more secular supernatural petition--wishing.

One may question whether differences in the predictions of ‘highly religious’ and ‘less religious’ children were a function of different testing environments—children categorized as ‘highly religious’ were tested in religious schools, and children categorized as ‘less religious’ were tested in secular contexts. However, it is unlikely that the testing environment accounted for these group differences. Consider that ‘highly religious’ and ‘less religious’ adults were tested in the *same* (secular) contexts and there were still substantial differences in their predictions about the fulfillment of prayers (see also Lane & Dolins, 2016, whose adult participants were all tested online). It is more likely the case that the contexts in which individuals *lived* (rather than the contexts in which they were tested) influenced their judgments. Importantly, on either account of the differences between ‘less religious’ and ‘highly religious’ participants’ predictions, the results point to the same conclusions—the effects of context do not pervade all of children’s and adults’ probabilistic reasoning, but are constrained; in this case, constrained to their reasoning about what outcomes can obtain via praying and not via wishing.

The current findings suggest that developing predictions about the fulfillment of supernatural petitions have much to do with personal experiences engaging in or observing these petitionary activities. It is likely that the general age-graded decline in participants’ predictions that desired events would obtain is a function of their personal experiences—having their own supernatural petitions go unfulfilled and observing others’ supernatural petitions go unfulfilled. As well, these age-related patterns could reflect changes in beliefs about one mechanism by which prayers and wishes may be fulfilled: magic. Indeed, with increasing age, children are less

likely to report that events are possible with magic (Johnson & Harris, 1994; Subbotsky, 2004; Woolley et al., 1999).

Most of our core findings were robust and replicated across multiple analyses, yet there are several ways in which future research may improve and expand upon the current methods. For some impossible scenarios there were plausible scenarios with corresponding themes and content; e.g., there were two falling-object scenarios, one about preventing a building from falling (Impossible), and one about preventing a fish bowl from falling (Plausible); and there were two rain-water scenarios, one about clearing flood waters immediately (Impossible), and one about clearing small puddles within a day (Plausible). The content of other scenarios did not match as neatly. It is unlikely that this influenced the very strong differences found in children's and adults' predictions about the occurrence of impossible vs. plausible outcomes (especially since improbable and impossible composites averaged across *many* types of phenomena; other work on probabilistic reasoning has taken a similar methodological approach; e.g., Shtulman & Carey, 2007). Still, in future work on this topic, researchers may endeavor to create more parallel sets of scenarios with either plausible or impossible outcomes.

The current study was focused on children's and adults' predictions about the potential occurrence of explicitly prayed-for and wished-for events. In everyday life, sometimes apparently miraculous things occur without an obvious explanation--e.g., a country is spared from a hurricane that was predicted to make landfall, someone recovers from a terminal illness, a sports team makes an unprecedented run at a championship. It would be valuable to investigate how children and adults reason about the mechanisms behind these everyday 'miracles'. For example, participants could be told stories in which unlikely outcomes have *already* occurred and then asked *how* the outcomes were achieved. This would invite participants to express their

beliefs about prayers, wishes, and other mechanisms (e.g., magic, manual human intervention) that might achieve these outcomes.

Children's engagement in supernatural petition, observations of others engaging in these petitions, and what other people teach children about the power of such petitions likely varies in both quantity and quality across cultural contexts. The present study included children and adults from the U.S. This population, on the whole, has substantial experience observing and engaging in supernatural petition; for example, participating in group prayer during church services. Indeed, it is possible that some children in the 'less religious' group had attended religious schools, and (as seen in Tables 1 and 3) this group had some (modest) exposure to religious practices. Additional data are needed from children and adults in other cultural contexts. These studies may include individuals from more secular societies, as well as individuals for whom supernatural petition is an even more consistent and integral part of their lives; for example, devout Muslims who engage in prayer (salah) several times daily. As well, future work in other contexts can examine children's probabilistic reasoning about the occurrence of events following other forms of supernatural petition, such as appeals to witchcraft (Lillard, 1998; Lührman, 1989). Such work will shed further light on how context—both the contexts in which individuals live and the contexts that they are asked to reason about—shape probabilistic reasoning across development.



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## Appendix

*Scenarios (versions for male participants)*

	Impossible		Plausible
1	<i>[show drawing]</i> One of Jon's friends lives in this big building. <i>[show drawing]</i> One day, there was an earthquake, making the whole building shake <i>[shake drawing]</i> . It's shaking so much that the building is starting to crumble, tilt to the side, and fall over. Jon wants to help his friend and save the building. If Jon <i>[wishes/prays to God]</i> for the building to stay up and <i>not</i> fall over, will the building stay up or will it fall over?	2	<i>[show drawing]</i> One of Jon's friends lives in this town. <i>[show drawing]</i> One day, it started to rain in the town, so there was a little water on the ground. If the water stays there too long, his friend might slip and hurt himself. Jon wants to help his friend get rid of the water. If Jon <i>[wishes/prays to God]</i> for all of that water to go away by tomorrow, will the water stay or will it go away?
3	<i>[show drawing]</i> This is one of Jon's friends. <i>[show drawing]</i> One day, a bully started chasing Jon's friend, so the friend ran away. Then Jon's friend came to a very high, strong wall, and the bully was catching up. Jon wants to help his friend escape. If Jon <i>[wishes/prays to God]</i> for his friend to run right through the wall to get to the other side <i>[point at other side of wall]</i> , will his friend run right through <i>[slide finger across wall]</i> or be stuck here <i>[point to side with bully]</i> ?	4	<i>[show drawing]</i> This is one of Jon's friends. <i>[show drawing]</i> One day, Jon's friend was playing in her yard, when she got bitten by some ants. The bites made her hand get red and hurt. Jon wants to help his friend feel better. If Jon <i>[wishes/prays to God]</i> for his friend's hand to heal, will her hand stay red and hurt or will it heal?
5	<i>[show drawing]</i> This is one of Jon's friends. <i>[show picture]</i> Jon's friend doesn't know where his pet hamster is; it ran away. It could be under his bed <i>[point to drawing of bed]</i> , it could be anywhere <i>[wave hand over picture]</i> . Jon's friend wants to find his hamster right now, without looking around. And Jon wants to help him. If Jon <i>[wishes/prays to God]</i> for his friend to know where the hamster is right now without looking, will his friend know where it is or not know?	6	<i>[show drawing]</i> This is one of Jon's friends. <i>[show drawing]</i> One day, a big dog started barking at her, and after that she was scared of dogs. Jon wants to help his friend to be brave and not scared of dogs anymore. If Jon <i>[wishes/prays to God]</i> for his friend to be brave and not scared anymore, will his friend still be scared of dogs or not scared anymore?

	Impossible		Plausible
7	<i>[show drawing]</i> One of Mark's friends lives in a town. <i>[show drawing]</i> One day, it rained and rained in the town. It rained so much that it started to flood the whole town. Mark's friend can't open the door to go out, or his house would flood. Mark wants to help his friend get rid of the water. If Mark <i>[wishes/prays to God]</i> for all of that water to go away right now, will the water stay or will it go away?	8	<i>[show drawing]</i> One of Mark's friends lives in a house. <i>[show drawing]</i> One day, there was a small earthquake, making the house shake. <i>[shake drawing]</i> It's shaking enough that his friend's fishbowl is starting to slide to the edge of its table. Mark wants to help his friend and save the fishbowl from falling and breaking. If Mark <i>[wishes/prays to God]</i> for the fishbowl to stay on the table, will the fishbowl stay on the table or will it fall off?
9	<i>[show drawing]</i> This is one of Mark's friends. <i>[show drawing]</i> It's Mark's friend's birthday, and for her birthday, she got a frog. She <i>really</i> does <i>not</i> like frogs and she's <i>always</i> wanted a kitten. Mark wants to help his friend have a kitten, not a frog. If Mark <i>[wishes/prays to God]</i> for his friend's frog to change into a kitten, will the frog stay a frog or turn into a kitten?	10	<i>[show drawing]</i> This is one of Mark's friends. <i>[show drawing]</i> One day, Mark's friend was watching TV when he started to feel very sick; his head and tummy hurt and he got <i>very</i> tired. He is so sick, he can't go to school. Mark wants to help his friend feel better. If Mark <i>[wishes/prays to God]</i> for his friend to feel all better, will his friend feel better or will he stay sick?
11	<i>[show drawing]</i> This is one of Mark's friends. <i>[show drawing]</i> Mark's friend is sick and doesn't know where her medicine is. It could be in her dresser <i>[point to drawing of dresser]</i> , it could be anywhere <i>[wave hand over picture]</i> . Mark's friend wants to find her medicine right now, without looking around. And Mark wants to help her. If Mark <i>[wishes/prays to God]</i> for his friend to know where the medicine is right now without looking, will his friend know where it is or not know?	12	<i>[show drawing]</i> This is one of Mark's friends. <i>[show drawing]</i> Mark's friend had a very bad day at school; his friends teased him. So now he feels very sad. Mark wants to help his friend feel better. If Mark <i>[wishes/prays to God]</i> for his friend to feel better, will his friend feel better or will he still feel sad?

*Note.* Half of the participants received scenarios in the above order; the other half received scenarios in the following order: 6, 5, 4, 3, 2, 1, 12, 11, 10, 9, 8, 7. For female participants, protagonists were named Jen (rather than Jon) and Mary (rather than Mark), and feminine pronouns were used accordingly.