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Children's ideas about what can really happen:

The impact of age and religious background

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Abstract

Five to 11-year-old U.S. children, from either a religious or secular background, judged whether story events could really happen. There were four different types of stories: magical stories violating ordinary causal regularities; religious stories also violating ordinary causal regularities but via a Divine agent; unusual stories not violating ordinary causal regularities but with an improbable event; and realistic stories not violating ordinary causal regularities and with no improbable event. Overall, children were less likely to judge that religious and magical stories could really happen than unusual and realistic stories although religious children were more likely than secular children to judge that religious stories could really happen. Irrespective of background, children frequently invoked causal regularities in justifying their judgments. Thus, in justifying their conclusion that a story could really happen, children often invoked a causal regularity whereas in justifying their conclusion that a story could not really happen, they often pointed to the violation of a causal regularity. Overall, the findings show that children appraise the likelihood of story events actually happening in light of their beliefs about causal regularities. A religious upbringing does not impact the frequency with which children invoke causal regularities in judging what can happen, even if it does impact the type of causal factors that children endorse.

Keywords: Possibility judgments, testimony, religion, causal thinking

1. Introduction

Children have a good grasp of the distinction between fantasy and reality from an early age (Rosengren & Hickling, 2000; Sharon & Woolley, 2004; Weisberg, 2013). By age 3, they can distinguish between mental entities (e.g., a thought of a ball) and physical entities (e.g., a real ball) (Estes, Wellman, & Woolley, 1989; Harris Brown, Marriot, Whittall, & Harmer, 1991, Studies 1 & 2; Woolley & Wellman, 1990) and can construct a coherent pretense episode while appreciating that what happens in that pretend world does not take place in real life (Harris & Kavanaugh, 1993). In the preschool years, they begin to engage in counterfactual thinking (German & Nichols, 2003; Harris, German, & Mills, 1996; Leevers & Harris, 2000; Nyhout & Ganea, 2019), to construct fictional stories (Appleyard, 1990), to appreciate that some characters and events exist only in stories (Woolley & Cox, 2007), and to reliably differentiate between historical and fictional characters (Corriveau, Kim, Schwalen, & Harris, 2009). They can also distinguish between multiple, pretend worlds: They claim that Batman can interact with Robin, but not with Sponge Bob Square Pants (Skolnick & Bloom, 2006b), hesitate to mix the pretend objects from two different game worlds (Weisberg & Bloom, 2009), and reliably match the suitable ending to science fiction and fantasy stories (Kibbe, Kreisky, & Weisberg, 2018). Beyond this ability to distinguish between reality and make-believe, young children rarely invoke magic as a causal mechanism (Mead, 1932; Woolley, Cornelius, & Lacy, 2011), frequently reject the possibility of magical or fantastical events in real life (Subbotsky, 1994; Woolley & Cox, 2007), approach unlikely events skeptically (Shtulman & Carey, 2007) and deploy their understanding of what can and cannot really happen to differentiate between historical and fictional narratives (Corriveau et al., 2009; Corriveau, Chen & Harris, 2015; Davoodi, Corriveau & Harris, 2016).

Yet children's grasp of the distinction between reality and pretense is often challenged by exposure to certain types of testimony (Harris & Koenig, 2006; Woolley, 2000). Throughout their development, children are exposed to narratives with supernatural elements—such as an omnipotent God with extraordinary powers—that seem to contradict their basic understanding of what might ordinarily happen. How do children respond to such challenges? In the present study, we aimed to address this question.

1.1. Adult Testimony, Community Consensus, and the Boundaries of Possibility

Across different cultures, children readily acknowledge God's superhuman status and his extraordinary powers (Barrett, Richert, & Driesenga, 2001; Giménez-Dasí, Guerrero, & Harris, 2005; Lane, Wellman, & Evans, 2010). Yet, this acknowledgement does not lead children to become dubious of his existence (Davoodi et al., 2020; Guerrero, Enesco, & Harris, 2010; Harris, Pasquini, Duke, Asscher, & Pons, 2006) or to view religious narratives referring to miracles as fairy tales (Corriveau et al., 2015; Davoodi et al., 2016; Vaden & Woolley, 2011). By implication, children put their skepticism towards ordinarily impossible outcomes aside—they turn off their "magic detector" (Harris, 2012; 2013)—and endorse the existence of God and his miracles. There is good reason to suspect that children do this because of the testimony that they receive from their immediate circle and often from the larger community, which endorses the existence of religious phenomena (see Harris, 2012). Below, we discuss the plausibility of this proposal before turning to our study.

First, children rely on adult testimony to make inferences about the ontological status of phenomena that they cannot observe firsthand. For example, when Harris and colleagues (Harris, et al., 2006; see also Guerrero et al., 2010; Harris, Abarbanell, Pasquini, & Duke, 2007) interviewed children regarding the ontological status of various types of invisible phenomena,

they found that children endorse the existence of both scientific entities and endorsed beings

(e.g., oxygen, God) whereas they are dubious about the existence of equivocally endorsed beings

(e.g., witches, ghosts), consistent with the pattern of testimony that they are likely to receive

from adults in their daily lives. In another study, Woolley, Boerger, and Markman (2004)

successfully convinced preschoolers to believe in a completely novel fantastical entity via

testimony: After repeatedly hearing about the "Candy Witch", who visits children's homes on

Halloween night and replaces the candy they have collected with a toy, the majority of the

children came to believe that such an entity really exists.

Second, adult testimony about the plausibility of ordinarily impossible events lures

children into accepting magical causality. When Subbotsky (1994, Experiment 1) asked 4- to 6-

year-olds whether they could stretch their hands through the wall of a box to pick up a toy, all

children initially denied that possibility, revealing a firm understanding of the impermeability of

solid objects. Nevertheless, after being told that some magic words would make the walls of the

box "just like air", children tried out these magic words and stretched out their hands in an effort

to reach the toy through the wall of the box, expressing disappointment upon being unsuccessful.

Similarly, although children appreciated the fact that "life does not go backwards", they refused

to drink a magic "potion" which would allegedly make them travel back in time and become a

little child (Subbotsky, 1994, Experiment 2).

Given the findings above documenting the role of testimony in children's beliefs in the

unobservable and the impossible, the strength of such beliefs are likely to vary based on the

cultural input that children receive in a given community (McLoughlin, Jacob, Samrow, &

Corriveau, 2021). This is indeed what the evidence suggests. When Evans (2001) interviewed 6-

to 11-year-olds and adults from Christian fundamentalist and Christian non-fundamentalist,

Midwestern communities about the origin of species, she found that references to a Divine force

or creator dominated responding at all ages in the fundamentalist Christian community, whereas

such references were less frequent in the non-fundamentalist Christian community. Thus, in the

fundamentalist community, participants of all ages consistently subscribed to creationist

explanations and denied theories of both spontaneous generation and evolution. By contrast, all

types of explanations were present at all ages in the non-fundamentalist community, and

endorsement of evolutionary explanations increased with age.

The evidence indicating the role of testimony in the transmission of beliefs regarding

unobservable phenomena is not limited to Western societies (Cui, Clegg, Davoodi, Harris, &

Corriveau, 2020; Davoodi et al., 2019; Harris & Corriveau, 2021; Harris et al., 2007; 2010). For

example, Davoodi and colleagues (2019) surveyed a group of parents and their children in Iran, a

relatively homogenous society with regards to religious beliefs and practices, about their

confidence in the existence of both unobservable religious (e.g., God, heaven) and scientific

(e.g., oxygen, electricity) phenomena. Iranian parents strongly endorsed the existence of both

types of phenomena, with significantly more confident endorsements in the existence of the

scientific phenomena. Echoing their parents, children of all ages were highly confident that both

types of phenomena exist. Moreover, with increasing age, children's responses aligned with

those of their parents: Older, but not younger children, expressed greater confidence in the

existence of the scientific compared to the religious phenomena, implying an increasing

sensitivity, with age and more years of formal schooling, to the consensus and everyday

discourse in the adult community. A similar pattern emerged among children from Christian and

secular families in China (Cui et al., 2020). Both Christian and secular parents and their children

expressed high levels of confidence in the existence of scientific entities. Christian parents and

their children, however, were also confident about the existence of religious entities, whereas secular parents and their children were skeptical. In sum, in each of these studies, children's beliefs about unobservable phenomena aligned with their parents' beliefs.

Given the evidence that adult testimony and community consensus guide children's ontological judgments about various types of unobservable phenomena, it is reasonable to argue that these factors also have a role in children's judgments about what can really happen. More specifically, to the extent that adult testimony renders children confident about the existence of God or angels (but dubious about the existence of ghosts or fairies), it may also signal to children when they should put their "magic detector" aside, notably in judging the real-world possibility of narratives describing Divine intervention. This is, indeed, what previous findings imply, as discussed next.

Woolley and Cox (2007) demonstrated that younger preschool children in the USA judged both religious and fantastical stories as impossible at comparable rates, exemplifying the conservative stance of young children towards what might happen. However, older preschool children judged religious stories as real almost as often as realistic stories, implying a growing sensitivity to adult testimony about the miraculous in their community. In another study, Vaden and Woolley (2011) told 4- to 6-year-olds either religious or nonreligious stories. Ordinarily impossible events occurred in both types of stories, but children judged the events and characters in the religious stories—where there was a reference to a Divine intervention—as 'real' more often as compared to those in closely matched, nonreligious stories. This pattern was more prevalent among older children and children with a religious (Christian) background.

Corriveau and colleagues (Corriveau et al., 2015, Study 1) tested the hypothesis that children's categorization of the characters in religious stories as 'real' should vary as a function

of religious exposure. Consistent with this prediction, and the argument regarding the impact of testimony on credulity towards religious miracles, 5- to 6-year-old U.S. children who had been exposed to religion (via church attendance, religious schooling, or both) often judged the protagonists in religious stories as 'real'. Their peers with no such exposure, on the other hand, often judged them as pretend.

Unexpectedly, children exposed to religion were also somewhat more likely to categorize the protagonists in fantastical stories (i.e., narratives involving magical elements but no reference to Divine intervention) as 'real'. A follow-up study (Corriveau et al., 2015, study 2), showed that this effect could not be explained by the existence of similar themes in the fantastical and religious stories. Replicating this pattern with a sample of children in Iran, Davoodi, Corriveau, and Harris (2016) speculated that exposure to miraculous content in the form of religious teachings might alter children's judgment of what is possible and promote a less naturalistic framework for the understanding of possibility and causality. Although a study by Orozco-Giraldo and Harris (2019) found no effect of religious education on Colombian children's judgments regarding what is possible and what is not, the authors argued that this seemingly contradictory finding likely stemmed from differences between the question format of the individual studies. Specifically, the study by Orozco-Giraldo and Harris (2019) asked children a question about the generic possibility of an event (i.e., "Could X really happen?") whereas studies that found an effect of religious background on possibility judgments (e.g., Corriveau et al., 2015) asked children to judge whether a specific story event or character was real or pretend.

In sum, the following conclusions can be drawn from the findings discussed so far: (i) children reliably distinguish what is real from what is pretend from an early age; (ii) they invoke their understanding of what can and cannot happen to make that distinction; (iii) this distinction

is challenged when children are encouraged to think that some ordinarily impossible phenomena (e.g., miracles) can actually happen; (iv) children use adult testimony and community consensus as a heuristic to diagnose what exists and what is possible, especially in domains where first-hand experience is not available; (v) exposure to religious teaching in school, in church, or both renders older children more credulous towards ordinarily impossible outcomes. Drawing on these conclusions, our goal was to systematically assess how children's possibility judgments shift based on different types of story events and how far religious background and age moderate such shifts.

1.2. The Present Study

The present study aimed to deepen previous research in a number of ways. Earlier studies have examined children's possibility judgments across different groupings of events, including: religious and non-religious events (Vaden & Woolley, 2011), across impossible and improbable events (Shtulman & Carey, 2007), across fantastical and realistic events (Davoodi et al., 2016) and across religious, realistic, and fantastical events (Woolley & Cox, 2007; Corriveau et al., 2015). In past research, children have also been asked to assess the status of the story protagonist (Corriveau et al., 2015; Davoodi et al., 2016), the story events (Shtulman & Carey, 2007), or both (Vaden & Woolley, 2011; Woolley & Cox, 2007). A primary goal of the present study was to bring these different types of events and assessments together to conduct a comprehensive examination of children's evaluation of a range of story types. We specifically focused on the role played by causal thinking in such evaluations given the central role of causal understanding in differentiating what is possible from what is not (Rosengren & Hickling, 1994; Shtulman & Carey, 2007; Shtulman & Philips, 2008; Gong & Shtulman, 2020). Within this comprehensive

framework, we also assessed the scope and nature of any differences between religious and secular children.

We invited children—from either a religious or secular background—to judge the reality status of four different types of stories: (i) Magical Stories that included events violating ordinary causal regularities via magic; (ii) Religious Stories that included events violating ordinary causal regularities via Divine intervention; (iii) Unusual Stories that included improbable events, but did not violate ordinary causal regularities; and (iv) Realistic Stories that included only ordinary events and did not violate ordinary causal regularities. Half of the participants were asked about the reality status of the story protagonist and half were asked about the reality status of the story event.

Based on previous findings, we expected that children's possibility judgments would vary systematically by story type. Specifically, we anticipated that children would display a hierarchy of possibility judgments with Magical stories judged as least possible and Realistic stories judged as most possible. Given that children deny the possibility of magical events in real life (Subbotsky, 1994; Woolley & Cox, 2007), we expected them to be especially skeptical about the reality of Magical stories. We anticipated that children would be less skeptical about Religious stories given that they are receptive to the adult testimony implying the possibility of divine intervention (Corriveau et al., 2015; Davoodi et al., 2016; Vaden & Woolley, 2011). Because children increasingly accept the possibility of improbable events starting from age 5 (Shtulman & Carey, 2007), we expected them to be more confident about the reality of Unusual stories than about Religious and Magical stories. Lastly, we expected them to be especially confident about the reality of Realistic stories because these stories did not include magical or fantastical elements and involved events that are fairly commonplace. To check on the robust nature of this

'reality ordering', we asked whether it would emerge irrespective of whether children were asked about the status of the story protagonist or the story event.

Given children's sensitivity to naturalistic causal regularities, especially in discriminating what is possible from what is not (Shtulman & Carey, 2007; Shtulman & Phillips, 2018), we expected children to often invoke such regularities when justifying their reality status decisions. Thus, we anticipated that children would often justify their judgment that a story event or character was real by affirming such regularities. Conversely, we anticipated that children would often justify their judgment that a story event or character was not real by referring to the violation of such regularities.

As discussed previously, earlier studies found that children do not judge stories about religious miracles as akin to fairy tales (Woolley & Cox, 2007; Vaden & Woolley, 2011) and this effect is especially strong for children from religious backgrounds. In the current study, we explored whether these findings would replicate with a different group of religious and secular children and a wider age range, notably younger (5- to 7-year-olds) and older (8- to 11-year-olds) children. In particular, we entertained two possible outcomes. Given their exposure to testimony affirming the violation of ordinary causal regularities, religious children might invoke causal considerations less often than secular children when justifying their judgment about the status of the story protagonist or event. An alternative possibility, however, is that exposure to religious testimony does not undermine children's disposition to invoke causal regularities. Instead, religious exposure leads children to invoke causal considerations just as often, but with more frequent references to—and affirmations of—Divine causation. In short, we asked if religious exposure impacts the frequency with which children invoke causal regularities in judging what

can happen or instead impacts the type of causal factors (i.e., naturalistic, divine, magical) that children endorse.

Our final goal was to assess children's judgments about magical stories. Previous findings had suggested that, as compared to secular children, children with greater exposure to religious teaching are more likely to accept that magical outcomes are possible (Corriveau et al, 2015; Davoodi et al., 2016). We sought to replicate this finding. In addition, in this context, we again asked whether exposure to religious teaching reduces chidren's tendency to invoke causal considerations or leads them to invoke and affirm different, notably non-naturalistic, causes more often than secular children.

Children in the religious group were attending Catholic schools whose stated mission was to provide a "faith-based" or "Christ-centered" learning environment. In addition to classes focusing specifically on religious education (e.g., "God as Creator and Father", "Jesus as Man and Son of God", "The Holy Family", "Saints and Angels"), children in these schools are exposed to religious teaching from pre-k through grade 8 via various "faith formation" activities. These activities include, but are not limited to, prayers recited each school day, a weekly mass (some of which is prepared by the students), and "praise and worship" programs. Children from the secular schools, on the other hand, had no exposure to religion in school and were not churchgoers (any churchgoers initially included in this group were excluded from later analyses).

We compared 5- to 7-year-olds with 8- to 11-year-olds for three reasons. First, previous research has shown that 5-year-olds—but not 3- to 4 year-olds—can clearly distinguish between what is real and what is pretend based on narrative cues (Corriveau et al, 2009; Corriveau & Harris, 2015). Second, previous research on the effect of religious exposure on possibility judgments has included 5- to 6-year-olds (Corriveau et al., 2015; Davoodi et al., 2016). Third,

we included 8- to 11-year-olds to examine potential age changes in children's justifications for their possibility judgments.

Previous research has suggested that children's pattern of judgment is similar whether they are asked about the status of the story event or the story character (Corriveau et al., 2009). To check whether this similarity held across the four different story types, half of the participants received the former question for all four story types, whereas the other half received the latter question for all four story types. As noted, this design offered a check on the robustness of the anticipated reality ordering of the four story types.

2. Method

2.1. Participants

We recruited 83 children from two Catholic elementary schools in the greater Boston area. We also recruited 86 children from public and private secular schools in the greater Boston area; 23 of them were excluded from subsequent analyses because they regularly attended church, either in the past or currently. A few additional children from the religious ($n = 4$) and secular ($n = 1$) schools were excluded from the analysis due to either inattentiveness or experimental error. Thus, the final sample included 141 children ($M = 8.00$ years, $SD = 2.03$ years, range: 5.25 years – 11.92 years, 71 females). The participants were predominantly White and middle-class, although different ethnicities and socio-economic backgrounds were represented. The dataset is openly available at https://osf.io/2z8n3/.

Participants were divided into two groups based on their upbringing: "religious", ($n = 79$, $M = 8.00$ years, $SD = 2.01$ years, range: 5.25– years – 11.25 years), and "secular" ($n = 62$, $M = 8.00$ years, $SD = 2.06$ years, range: 5.25 years – 11.25 years). Children in the "religious" and "secular" groups were further divided into a younger group of 5- to 7-year-olds (Religious: $n =$

42, $M = 6.24$ years, $SD = 0.71$ years, range: 5.25 years – 7.75 years; Secular: $n = 30$, $M = 6.14$ years, $SD = 0.72$ years, range: 5.33 years – 7.83 years) and an older group of 8- to 11-year-olds (Religious: $n = 37$, $M = 9.98$ years, $SD = 0.74$ years, range: 8.08 years – 11.25 years; Secular: $n = 32$, $M = 9.85$ years, $SD = 0.96$ years, range: 8.17 years – 11.92 years). An ANOVA confirmed that the mean age did not differ significantly between the secular and religious groups, F (1, 140) $= .001$, $p = .98$.

2.2. Materials and Procedure

Participants were tested individually. They were randomly assigned to either the character-based condition (i.e., judging whether the character in each story was "real" or "pretend") or the event-based condition (i.e., judging whether the event in each story was "real" or "pretend"). The experimenter first introduced two boxes: The "pretend" box, with an illustration of a giraffe painting a picture, and the "real" box, with a picture of a teacher standing by a blackboard. Next, the experimenter introduced the task using the following script (event-based condition instructions in brackets):

"Sometimes we hear stories about people that are real [about some things that really happened]. For example, you might have heard a story that is about your mommy when she was a little girl [about an accident that really happened a long time ago]. But sometimes we hear stories about people [about things] that are pretend. For example, you might hear a story about a superhero who fought and defeated a dragon [about a house and all the people inside rising from the ground and floating in space]. So, in this game, I have pictures of people [things], but they're all mixed up and I want you to help me. Some of the people [things] are real, so I want you to put those in the real box. Look, this is a picture of a teacher and she's really teaching. So, this box is for people [things] that

are real. But some of the people [things] are just pretend. So, I want you to put those in

the pretend box. See, this is a picture of a giraffe painting. Can giraffes really paint? No,

so, this box is for people [things] that are pretend. Let's begin."

2.2.1. Warm-up Trials

Following the introduction of the task, participants were invited to sort 4 familiar

characters or events into the real and pretend box. Children in the character-based condition were

presented with pictures of two fictional characters (i.e., Snow White & Harry Potter) and two

real characters (i.e., Abraham Lincoln & Martin Luther King). If children indicated not knowing

who a character was, they were told a short narrative about that character. Children in the event-

based condition were presented with pictures of two events that go against ordinary causal

regularities (i.e., a flying elephant & a frog that talks) and two events that do not go against

ordinary causal regularities (i.e., sailing in a boat & building a house out of wood). Children in

both conditions were then invited to sort each picture into either the real or pretend box. All

children in both conditions were able to correctly categorize the characters/events as real and

pretend.

2.2.2. Story-based Trials

Immediately after the warm-up trials, children were presented with 12 stories that

included a central event embedded in one of 4 different contexts: three in a magical context;

three in a religious context; three in an unusual context; and three in a realistic context. The

Magical stories included ordinarily impossible events brought about by magic. The Religious

stories included ordinarily impossible events brought about by Divine intervention. These latter

stories were adapted from the Old and New Testaments of the Bible; however, the context of the

events and the names of the characters were changed so that they were less familiar and more contemporary. The Unusual stories did not violate natural causal laws, but the events in these stories had a low probability of occurring. The Realistic stories were based on the religious stories but modified so that the event was brought about by ordinary human intervention and included no impossible elements (see supplementary files for the full script of the 12 stories presented across the four contexts). Thus, the stories differed from each other only with respect to the proposed causal mechanism or agent. For example, the story of Stephanie across the four contexts was as follows (the proposed causal mechanism/agent is bolded for each story):

Magical

*This is Stephanie. One night, Stephanie and her friends were sailing a boat and got caught in a bad storm. Lightning flashed and Stephanie fell out of the boat. Stephanie started to sink. **But a fairy flew to Stephanie and used her magic powers to save her. Stephanie walked on water back to the boat.** The storm passed and everyone was safe.*

Religious

*This is Stephanie. One night, Stephanie and her friends were sailing a boat and got caught in a bad storm. Lightning flashed and Stephanie fell out of the boat. Stephanie started to sink. **But she prayed to God that she could walk on water. She walked on water back to the boat.** The storm passed and everyone was safe.*

Unusual

*This is Stephanie. One night, Stephanie and her friends were sailing a boat and got caught in a bad storm. Lightning flashed and Stephanie fell out of the boat. Stephanie started to sink. **But just at that moment, a large whale came by. So Stephanie stood on the back of the whale who carried her back to the boat.** The storm passed and everyone was safe.*

Realistic

This is Stephanie. One night, Stephanie and her friends were sailing a boat and got caught in a bad storm. Lightning flashed and Stephanie fell out of the boat. Stephanie started to sink. ***But her friends threw her a rope and pulled her back into the boat.*** *The storm passed and everyone was safe.*

The experimenter read the stories to the participants one by one while presenting two illustrative pictures—one of the story character and one of the central event—printed side by side on a single card (147 mm X 105 mm). Immediately following the presentation of each story, the experimenter posed the task question. Children in the event-based condition were asked to judge whether the event in the story was real or not (e.g., "Is what happened in this story real or pretend?"); children in the character-based condition were asked to judge whether the character in the story was real or not (e.g., "Is Stephanie real or pretend?"). Next, children sorted the card into either the 'real' box or the 'pretend' box. Children were then reminded of their categorization and asked to justify their choice (e.g., "So you put the card in the 'pretend' ('real') box. Why do you think it goes in the 'pretend' ('real') box?"). Note that children in the event-based and character-based conditions went through the same procedure except for the modification of the test question.

Stories were presented in a random order. The story context (i.e., Magical, Religious, Unusual, Realistic) and the story character pairings varied across participants such that each child was presented with a particular character once. Thus, approximately one quarter of the children received the magical version of the Stephanie story, one quarter received the religous version, one quarter received the unusual version, and one quarter received the realistic version.

3. Results

3.1. Possibility Judgments

Fig. 1 shows the percentage of 'real' judgments for each of the four story types by participants' religious bckground and age. Inspection of Fig. 1 indicates that the percentage of 'real' judgments varied sharply by story type. Children were mostly skeptical about the reality status of magical stories. They were less skeptical about the reality status of religious stories, especially if they came from a religious background. They were prone to accept the reality status of unusual stories and especially of realistic stories.

Fig. 1

Percentage of 'real' judgments for each of four story types by child's religious background (religious, secular) and age group (younger, older).
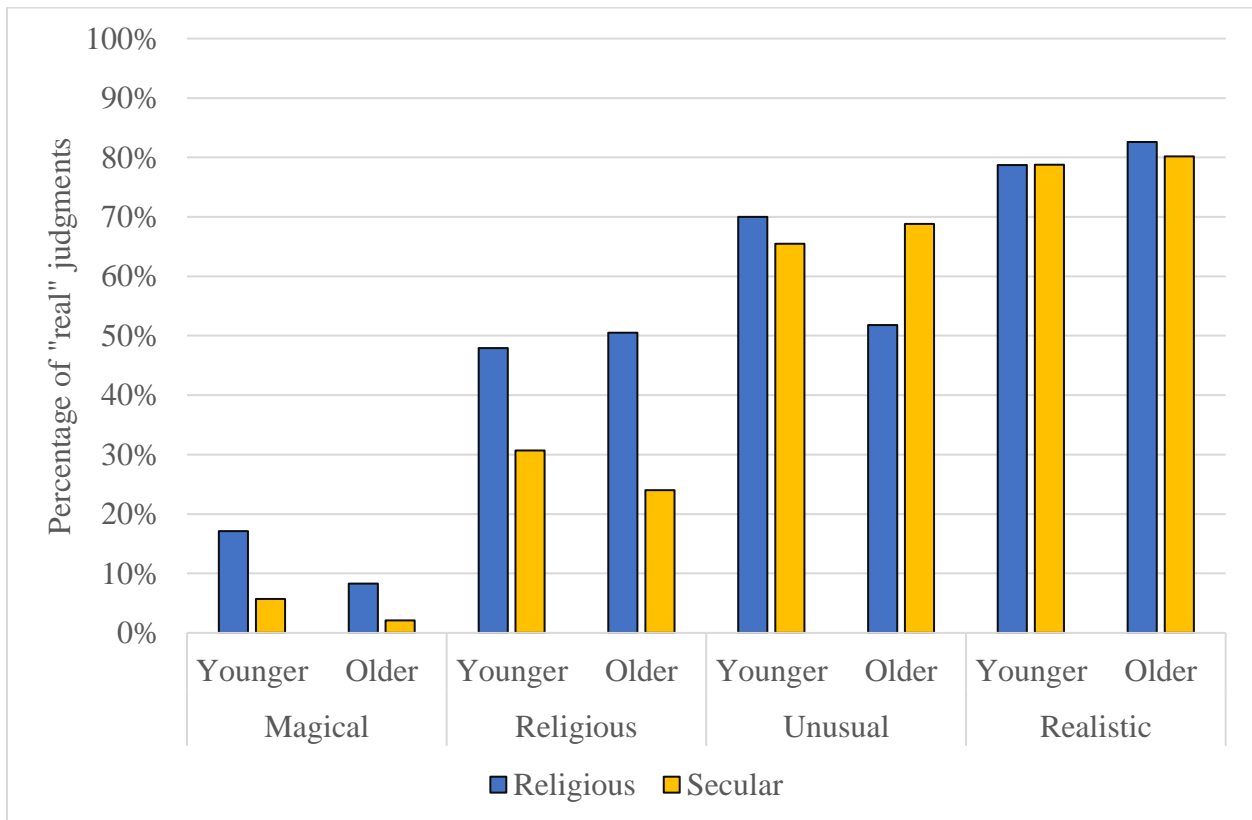
To further explore these patterns, we ran a series of mixed binomial logistic regression analyses with the *glmer* function of the *lme4* package in R statistical software (version 4.0.1) on the likelihood that children judged a story as 'real'. To examine whether Condition (Event-based vs. Character-based) and Gender (Female vs. Male) had any effect on children's judgments, we first ran a preliminary analysis with these variables as fixed effects. Participant ID and Story ID were entered as random effects to account for within-participant variability. These preliminary analysis revealed no effect of Condition, $\beta = -0.17$, $SE = 0.12$, $z = -1.41$, $p = 0.158$, or Gender, $\beta = -0.15$, $SE = 0.12$, $z = -1.24$, $p = 0.217$.

Therefore, we collapsed our data across these variables and ran binomial logistic regression models to explore the effect of Story Type (Magical, Religious, Unusual, Realistic), Religious Background (Religious, Secular), and Age (Younger, Older) on children's 'real' versus 'pretend' judgments. The models included Story Type (with Religious stories as the reference category, as we expected that the evaluation of these stories in particular would be affected by Religious background), Religious Background, and Age as fixed effects and Participant ID and Story ID as random effects. We ran our models using a backward elimination approach; thus, our initial model included all main effects and all possible two- and three-way interactions between these varibles and we excluded these predictors individually if they did not contribute to the model.

The results of the analyses confirmed the patterns observed in Figure 1. As summarized in Table 1, the final model revealed a significant effect of Story Type (Religious vs. Magical: $\beta = -2.34$, $SE = 0.43$, $z = -5.47$, $p < .001$; Religious vs. Unusual, $\beta = 1.88$, $SE = 0.24$, $z = 7.74$, $p < .001$; Religious vs. Realistic, $\beta = 2.58$, $SE = 0.26$, $z = 9.78$, $p < .001$), and Religious Background, $\beta = 1.06$, $SE = 0.26$, $z = 4.09$, $p < .001$, as well as a significant interaction between

Story Type and Religious Background when comparing Religious stories to Unusual, β = -1.32,

SE = 0.32, z = -4.19, p < 0.001, and Realistic, β = -0.95, SE = 0.34, z = -2.76, p = 0.006, stories.

To examine the remaining pairwise comparisons between the stories, we ran our final model two

more times, changing the reference category for Story Type. Confirming the patterns in Figure 1,

the results revealed that all of the remaining comparisons between the stories were also

significant (Unusual vs. Magical: β = - 4.22, SE = 0.43, z = - 9.84, p < .001; Unusual vs.

Realistic, β = 0.70, SE = 0.25, z = 2.77, p = .006; Realistic vs. Magical, β = - 4.92, SE = 0.44, z =

-11.14, p < .001). The tables including all the parameters of these analyses can be found in

supplementary materials (Table 1 & Table 2). Thus, children differentiated among the four story

types, with the differentiation between religious and unusual stories and between religious and

realistic stories being more evident among secular than religious children.

Table 1

Results from the mixed effects binomial logistic regression model predicting the likelihood of

children's 'real' judgments using Story Type (Religious as the reference category), Religious

Background, and Age as predictors.

	β *(SE)*	*Z*	*OR*	95% CI for OR	
				Lower	Upper
Intercept	-0.98 (0.22)***	-4.48	0.37	0.24	0.58
Religious Background	1.06 (0.26)***	4.09	2.89	1.74	4.80
Age	-0.22 (0.18)	-1.25	0.80	0.56	1.14
Story Type					
Religious – Magical	-2.34 (0.43)***	-5.47	0.10	0.04	0.22
Religious – Unusual	1.88 (0.24)***	7.74	6.57	4.08	10.59
Religious – Realistic	2.58 (0.26)***	9.78	13.24	7.89	22.22
Religious Background X Story Type					
Religious – Magical	0.23 (0.50)	0.46	1.25	0.47	3.31
Religious – Unusual	-1.32 (0.32)***	-4.19	0.39	0.20	0.76
Religious – Realistic	-0.95 (0.34)**	-2.76	0.27	0.14	0.50
Number of Observations	1654				
Number of Groups	141				

Log Likelihood	-839.2
AIC	1700.3

Note: * $p < 0.05$; ** $p < 0.01$, *** $p < 0.001$. *OR* = Odds Ratio. *CI* = Confidence Interval.

To further examine the two-way interaction between Story Type and Religious Background, we ran a series of binomial logistic regression models for each story type, with Religious Background as a fixed effect and Participant ID as a random effect. The *p*-value was adjusted for multiple comparisons using Bonferroni correction ($\alpha = 05/4 = .0125$). Table 2 displays the parameters for the four story types. Inspection of Table 2 confirms that Religious Background had no effect on Magical stories, $\beta = 1.51$, $SE = 0.99$, $z = 1.53$, $p = 0.127$, on Unusual stories, $\beta = -0.27$, $SE = 0.23$, $z = -1.17$, $p = 0.243$, or on Realistic stories, $\beta = -0.08$, $SE = 0.30$, $z = 0.26$, $p = 0.792$. By contrast, Religious Background did have a significant effect on Religious stories, $\beta = 1.04$, $SE = 0.25$, $z = 4.10$, $p < 0.001$.

Table 2

Results from the mixed effects binomial logistic regression model predicting the likelihood of children's 'real' judgments for each story type using religious background as a predictor.

		β (SE)	z	OR	95% CI for OR	
Story Type					Lower	Upper
Magical	**Intercept**	-7.13 (1.48)***	-4.82	0.00	0.00	0.15
	Religious Background	1.51 (0.99)	1.53	4.51	6.51	31.28
	Number of Observations	415				
	Number of Groups	141				
	Log Likelihood	-106.8				
	AIC	219.7				
Religious	**Intercept**	-1.08 (0.20)***	-5.39	0.34	0.23	0.50
	Religious Background	1.04 (0.25)***	4.10	2.84	1.72	4.68
	Number of Observations	414				
	Number of Groups	140				
	Log Likelihood	-265.3				
	AIC	536.5				
Unusual	**Intercept**	0.76 (0.18)***	4.27	2.13	1.51	3.01
	Religious Background	0.27 (0.23)	-1.17	0.77	0.49	1.20
	Number of Observations	413				
	Number of Groups	140				
	Log Likelihood	-268.6				
	AIC	543.3				
Realistic	**Intercept**	1.54 (0.25)***	6.25	4.69	2.89	7.61
	Religious Background	0.08 (0.30)	0.26	1.08	0.60	1.95
	Number of Observations	412				
	Number of Groups	140				
	Log Likelihood	-203.6				
	AIC	413.3				

*Note: * $p < 0.05$; ** $p < 0.01$, *** $p < 0.001$. OR = Odds Ratio. CI = Confidence Interval.*

In sum, children's judgments about the reality status of the stories varied sharply across the 4 story types in a consistent hierarchy. They typically judged Magical stories as 'pretend'. They were more willing to accept the reality of Religious stories. They mainly accepted the reality status of Unusual stories and especially of Realistic stories. This differential pattern of

judgement was stable. It emerged irrespective of children's gender and age, and regardless of whether children were asked about the story event or the story character.

Children's religious background did not override this overall differentiation by story type. However, it did impact the pattern of judgment for Religious stories; religious children, irrespective of age, were more likely to judge these stories as 'real' compared to secular children. Finally, neither age nor religious background impacted children's judgments of Magical, Unusual, and Realistic stories. As seen in Fig. 1, children mostly judged Magical stories as 'pretend' whereas they judged Unusual and Realistic stories as 'real'.

3.2. Justifications

3.2.1. Coding. Recall that once children had made a 'real' or 'pretend' judgment, they were asked to justify that judgment. Because the four story types differed from each other only with respect to the cause that led to the central story event, it was appropriate to scrutinize children's justification for references to such "target" causes as in similar studies (e.g., Gong & Shtulman, 2021). Accordingly, children's justifications ($N = 1654$) were first coded into *target-cause* justifications and *residual* justifications by the first author. *Target-cause* justifications were those that focused on the target cause in each story, explaining why that specific cause sounded plausible (e.g., "Because they could make juice out of apples very easily.") or not (e.g., "Because water couldn't turn into orange juice."). In other words, these justifications either affirmed or denied the causal mechanism provided in the story. *Residual* justifications, on the other hand, were those that either referenced some *other aspect* of the story that was shared by all story types (e.g., "Because there is a farmer and farmers are real.") or were *uninformative* (e.g., "Because it sounds real."; "I don't know."). A research assistant, blind to the hypotheses in the study, separately coded all justifications. Agreement between the coders was strong (93%,

Cohen's K = .82). Disagreements were resolved through discussion and all subsequent coding

was conducted on these agreed-upon cases ($N_{Target\ Cause}$ = 1033; $N_{Residual}$ = 621).

Next, to establish whether children used a *target-cause* justification to affirm a causal

regularity or, alternatively, to invoke the violation of such a regularity, the first author further

coded the *target-cause* justifications that both raters had previously agreed upon into two

categories, taking only the wording of the justification into account. *Positive target-cause*

justifications were those that explicitly affirmed the efficacy of the target cause in bringing about

the story outcome (e.g., "Because he prayed to God and God can make berries grow"). *Negative*

target-cause justifications, were those that explicitly denied the efficacy of the target cause in

bringing about the story outcome (e.g., "Because you can't just make bread out of thin air with

magical powers."). Some of the *target-cause* justifications were *indeterminate* in the sense that

the wording of the justification was not sufficient to determine whether they should be

categorized as *positive* or *negative* (e.g., "Because God made her walk on water"; "Because a

whale came by to save her").

To confirm interrater reliability, the same research assistant who had completed the

primary coding above separately coded all of the *target-cause* justifications into *positive*,

negative, and *indeterminate*. The agreement between the coders was again strong (95%, Cohen's

K = .89). Disagreements were resolved through discussion; the agreed upon justifications

included 380 *positive*, 623 *negative*, and 30 *indeterminate* cases. The indeterminate cases were

clarified by taking into account both the wording of the justification and the type of preceding

judgment (i.e., 'real' or 'pretend'). Because *positive target-cause* justifications were expected to

follow 'real' judgments and *negative target-cause* justifications were expected to follow

'pretend' judgments, we checked for the match between the judgment (i.e., 'real' vs. 'pretend')

and the justification (i.e., positive vs. negative). This comparison revealed that there was a match

for the vast majority of cases with the exception of two *negative target-cause* justifications

which followed a 'real' judgment. These two mismatch cases were excluded from the *target-*

cause justifications, and thus were not included in the subsequent analyses.

For the subsequent analyses, we focused solely on those possibility judgments that were

backed up by a *target-cause* justification ($N = 1031$)—either *positive* ($N = 396$) or *negative* ($N =$

635)—referred to hereafter as *cause-based* judgments. Information regarding the *residual*

justifications ($N = 623$), notably those that did not refer to the *target cause* can be found in

supplementary materials (Figure 1 & Figure 2). The final coding categories as well as samples of

each category by story type are provided in Table 3.

Table 3

*Categorization of justifications by story type.*

Story Type	Justification Type			
	Target-cause		Residual	
	Positive	Negative	Other Aspects	Uninformative
Magical	"Because fairies came, and actually the tooth fairy might have been the one who gave her the baby. Because that's the only fairy."	"Because fairies are not real and they can't sprinkle water over dry land and make strawberries."	"Because he is a farmer and he planted strawberries."	"I have no idea, really. I just believe that this may have happened."
	"Well, fairies can give you everything. Fairies are magical."	"Because you can't turn water into juice unless you use powder or something."	"Because it sounds like its from a movie and not all movies are real."	"I don't know."
Religious	"Because this could happen, since they prayed her guardian angel could help her."	"Because plants need rain to have food on them. It can't just appear magically."	"Because he was a soldier and he was a human being."	"Because he is walking to know where he is."
	"Because she prayed to God that she could walk on water and she thought anything was possible and God made that happen."	"Because well you can't exactly multiply two loaves of bread into so many. You'd have to buy them or make them."	"You mostly don't hear about fights and people with armor."	"She made the bread. Because it's real. I don't know."
Unusual	"Because a lot of people don't have enough money to take care of a baby so they leave it at people's door."	"Because onion juice doesn't make you get the sick gone."	"Because in this pciture the army looks real. The helicopter is real."	"Because that's possible to happen."
	"Somehow an earthquake could happen and you could've been like on a mountainside and a rock could've fallen."	"The sea is so big so it's not possible to make a tunnel. The water would ruin the tunnel."	"It reminds me of Star Wars and Star Wars doesn't actually exist."	"Because the baby wasn't from their family."
Realistic	"There are these things like you can plant seeds and make the flowers grow and you can water them or let it rain so they can grow."	"There is no chance that you throw a rock to somebody and it kills them."	"Becuase ships are real and because animals and people are real. The other stuff are real, too."	"Because someone could really do that."
	"Because people could look at the clouds and see if it's raining or not, because clouds could turn to grey which means storm is coming."	"Because it would take many many years and hours. The wall is so big, it could not break."	"Because there's probably not enough bread in the store and that would be alot of money."	"Because that cannot actually happen. it doesn't make sense to me. It doesn't sound real."

3.2.2. Cause-based Judgments

Fig. 2 shows the percentage of *cause-based* judgments by valence (i.e., positive vs. negative), children's religious background (religious vs. secular), and age (younger vs. older). Inspection of Fig. 2 reveals that the overall percentage of children's *cause-based* judgments varied by age. Across all four story types, older children were more likely than younger children to generate a *cause-based* judgment. The percentage of *cause-based* judgments also varied by story type. Children generated the highest number of *cause-based* judgments for the Magical stories, the stories that they were most skeptical of. Almost without exception, these *cause-based* judgments were made following a 'pretend' judgment and were negative, i.e., to *reject* the target cause. Children generated fewer cause-based judgments for the Religious stories. Secular children almost always made these judgments to *reject* the target cause whereas religious children made them sometimes to *affirm* and sometimes to *reject* the target cause. Children generated a similar number of *cause-based* judgments for Unusual stories as for Religious stories and both groups of children made these judgments to both *affirm* or *reject* the target cause. Finally, children generated the least number of *cause-based* judgments for Realistic stories, the stories that they were least skeptical of. When they did so, they almost aways made these judgments to *affirm* the target cause.

Fig. 2

Percentage of cause-based judgments by valence, story type, religious background, and age.
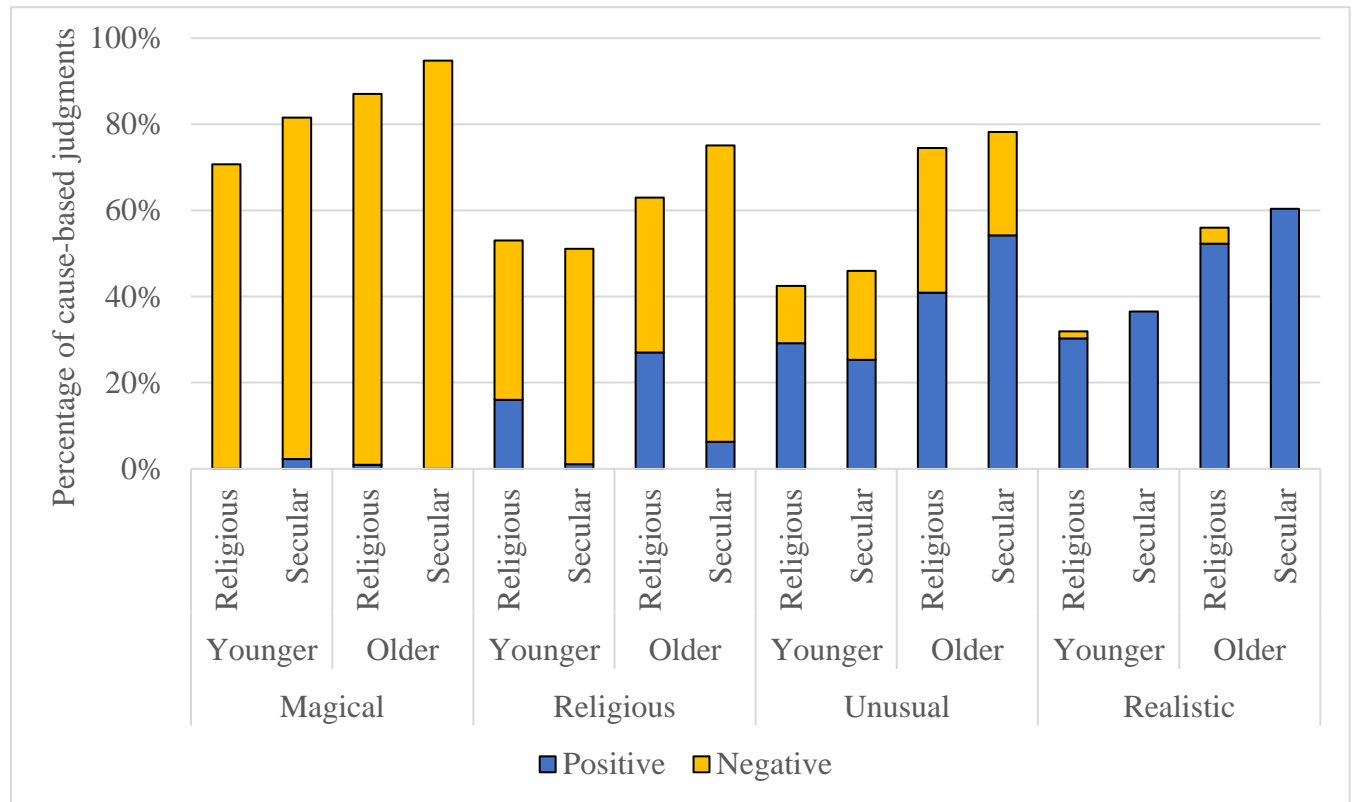
To further examine these patterns, we analyzed *cause-based* judgments using mixed-effects binomial logistic regression models with the *glmer* function of the *lme4* package in R statistical software (version 4.0.1). As in the first set of analyses, we first checked for the effects of Condition (Event-based vs. Character-based) and Gender (Female vs. Male). Again, this preliminary analysis revealed no effect of Condition, $\beta = -0.33$, $SE = 0.20$, $z = -1.69$, $p = 0.091$, or Gender, $\beta = 0.12$, $SE = 0.20$, $z = 0.62$, $p = 0.538$. Therefore, we collapsed the data across these variables. As noted above, for Magical stories, children provided only *negative cause-based* judgments (with very few exceptions: $n = 3$). Conversely, for Realistic stories, children provided only *positive cause-based* judgments (again, with very few exceptions: $n = 6$). For Religious and Unusual stories, however, children provided a mix of both *negative* and *positive* cause-based

judgments. Accordingly, we analyzed the justifications in two steps. We first examined the

likelihood of providing *cause-based* in comparison to *other* (i.e., judgments that were not backed

up by a *target-cause* justification) judgments for all stories. Next, for Religious and Unusual

stories, we ran an additional analysis to examine the likelihood of generating *positive* in

comparison to *negative cause-based* judgments.

To examine the likelihood of providing *cause-based* judgments (i.e., collapsing across

positive and *negative cause-based* judgments) in comparison to *other* judgments, we ran mixed-

effects binomial logistic regression models with Story Type (Religious stories as the reference

category), Religious Background, and Age as fixed effects and Participant ID and Story ID as

random effects. We employed a backward elimination approach; thus, our initial model included

all main effects and all possible two- and three-way interactions between these variables and

predictors were excluded individually if they did not contribute to the model.

The results of the analyses confirmed the patterns observed in Figure 2. As summarized

in Table 4, the effect of Story Type was significant when comparing Religious to Magical, $\beta =$

1.44, $SE = 0.18$, $z = 7.78$, $p < .001$, and to Realistic stories, $\beta = -0.72$, $SE = 0.16$, $z = -4.61$, p

$< .001$, but not when comparing Religious to Unusual stories, $\beta = -0.01$, $SE = 0.16$, $z = -0.06$, p

$= .955$. The significant effect of Age, $\beta = 1.23$, $SE = 0.20$, $z = 6.22$, $p < .001$, confirmed that

older children were more likely to provide a *cause-based* judgment as compared to younger

children. To examine the remaining pairwise comparisons between the stories, we ran our final

model two more times, changing the reference category for Story Type each time. Confirming

the patterns in Figure 2, the results revealed that all of the remaining comparisons between the

stories were also significant (Unusual vs. Magical: $\beta = 1.44$, $SE = 0.18$, $z = 7.83$, $p < .001$;

Unusual vs. Realistic, $\beta = -0.72$, $SE = 0.16$, $z = -4.56$, $p < .001$; Realistic vs. Magical, $\beta = 2.17$,

SE = 0.19, *z* = 11.55, *p* < .001). The tables including all the parameters of these analyses can be

found in supplementary materials (Table 3 & Table 4). In summary, these analyses confirmed

what is apparent from inspection of Figure 2. Children's production of cause-based judgments

varied in frequency depending on story type. In addition, older children produced more cause-

based jusdgments than younger chidren but children's background had no impact.

Table 4

Results from the mixed effects binomial logistic regression model predicting the likelihood of

children's cause-based judgments using Story Type (Religious as the reference category),

Religious Background, and Age as predictors.

	β (SE)	*z*	*OR*	95% CI for OR	
				Lower	Upper
Intercept	0.06 (0.20)	0.31	1.06	0.72	1.58
Religious Background	-0.33 (0.20)	-1.69	0.72	0.49	1.06
Age	1.23 (0.20)***	6.22	3.43	2.33	5.06
Story Type					
Religious – Magical	1.44 (0.18)***	7.78	4.22	2.93	6.06
Religious – Unusual	-0.01 (0.16)	-0.06	0.99	0.73	1.35
Religious – Realistic	-0.74 (0.16)***	-4.52	0.48	0.35	0.66
N. of Observations	1654				
Number of Groups	141				
Log Likelihood	-934.4				
AIC	1885.1				

*Note: * p < 0.05; ** p < 0.01, *** p < 0.001. OR* = Odds Ratio. *CI* = Confidence Interval.

        Next, we focused on Religious and Unusual stories given that, unlike the Magical and

Realistic Stories, they had attracted a mix of *positive* and *negative cause-based judgements*.

More specifically, we examined the likelihood of providing *positive* versus *negative cause-based*

judgments for these two story types. In each subsequent analysis, we adopted the backward

elimination approach as done previously, entering Religious Background, Age Group, and their

interaction together as fixed effects and excluding them one by one if they did not contribute to

the model. Participant ID was entered as random effect. The parameters of the final model for

each story type are provided in Table 5.

Table 5 (upper panel) displays the results for Religious stories. Confirming the

conclusions drawn from Figure 2, Religious Background was the only significant predictor, β =

2.71, SE = 0.60, z = 4.52, $p < .001$; religious children were more likely than secular children to

provide *positive cause-based* judgments for Religious Stories.

Table 5 (lower panel) displays the results for the Unusual stories. The initial model for

the Unusual Stories did not reveal an effect of Religious Background, β = 0.59, SE = 0.45, z =

1.32, p = 0.188, or Age, β = 0.62, SE = 0.41, z = 1.51, p = 0.132, but the Religious Background

by Age interaction was significant, β = -1.21, SE = 0.57, z = -2.15, p = 0.032, OR = 0.30, CI

[0.10, 0.90]. To further examine this interaction effect, we analyzed children's *positive* versus

negative cause-based judgments in each age group separately. We applied a Bonferroni

correction to adjust the p-value for the multiple comparisons (α = .05/2 = .025). The effect of

Religious Background was not significant for younger or older children (Younger: β = 0.69, SE =

0.55, z = 1.25, p = 0.212; Older: β = -0.62, SE = 0.33, z = -1.85, p = 0.064). We also analyzed the

effect of age for children from each religious background separately. The analysis revealed no

effect of Age among either secular, β = 0.62, SE = 0.40, z = 1.52, p = 0.128, or religious children,

β = -0.61, SE = 0.40, z = -1.53, p = 0.13.

Given that a very small number (N = 30) of the cause-based justifications were

indeterminate on the basis of their wording alone (i.e. when coded in isolation from the child's

preceding judgment), we re-ran this analysis excluding this small minority of cases. For

Religious stories, excluding the indeterminate cases revealed an additional effect of age, β =

1.00, $SE = 0.51$, $z = 1.99$, $p < .046$. Thus, older chidren were more likely than younger children

to provide *positive cause-based* judgments for Religious Stories.

    For Unusual stories, excluding the indeterminate cases revealed an effect of Religious

Background for older children, $\beta = -0.81$, $SE = 0.35$, $z = -2.33$, $p = 0.020$. Thus, among older

children, those from a secular background were more likely than those from a religious

background to provide *positive cause-based* judgments for Unusual Stories. The remaining

pattern of results was the same.

Table 5

Results from the mixed effects binomial logistic regression models predicting the likelihood of

children's positive cause-based judments for Religious and Unusual stories using religious

background and age as predictors.

		β (SE)	*Z*	*OR*	95% CI for OR	
Story Type					Lower	Upper
Religious	**Intercept**	-3.96 (0.75)***	-5.25	0.02	0.00	0.08
	Religious Background	2.71 (0.60)***	4.52	15.08	4.64	48.99
	Age	0.91 (0.50)	1.84	2.50	0.94	6.61
	Number of Observations	250				
	Number of Groups	127				
	Log Likelihood	-109.7				
	AIC	227.3				
Unusual	**Intercept**	0.20 (0.32)	0.63	1.22	0.65	2.30
	Religious Background	0.59 (0.4)	1.32	1.80	0.75	4.31
	Age	0.62 (0.41)	1.51	1.86	0.83	4.17
	Religious Background X Age	-1.21 (0.57)*	-2.15	0.30	0.10	0.90
	Number of Observations	248				
	Number of Groups	114				
	Log Likelihood	-162				
	AIC	333.8				

Note: * $p < 0.05$; ** $p < 0.01$, *** $p < 0.001$. *OR* = Odds Ratio. *CI* = Confidence Interval.

In sum, children's *cause-based* judgments echoed and consolidated the patterns that their 'real' vs. 'pretend' judgments had already revealed. Magical stories, which children were most skeptical of, led to the highest number of *cause-based* judgments. Moreover, as might be expected, these judgments were almost always *negative.* Thus, children invoked the cause mentioned in the story but denied that it could actually bring about the central event. At the other extreme, Realistic stories, which children were least skeptical of, led to the lowest number of *cause-based* judgments. These judgments were almost always *positive.* Thus, children invoked the cause mentioned in the story and affirmed that it could bring about the central event. Children generated similar numbers of these judgments regardless of religious background, although older children were more likely than younger children to provide them.

Religious and Unusual stories elicited a less uniform pattern, notably a mix of *positive* and *negative cause-based* judgments. Analysis of the Religious stories showed that this mix was more evident among religious than secular children. Thus, some of the *cause-based* judgments offered by the religious children affirmed the cause whereas some denied the cause. By contrast, the cause-based judgments of secular children overwhelmingly denied the cause. Finally, for Unusual stories, some of the cause-based judgments endorsed the cause and some rejected the cause. This mix did not vary systematically with religious background or age although, once indeterminate justifications were excluded, there was some indication that older secular children endorsed the cause more often than older religious children.

4. Discussion

Evidence collected over the last two decades (Harris, 2012, 2013; Harris & Corriveau, 2020; Rosengren & Hickling, 2000; Sharon & Woolley, 2004; Weisberg, 2013; Woolley & Ghossainy, 2013) indicates that, on the one hand, children are conservative about what can really

happen, so much so that they not only deny the possibility of magical or fantastical events, but they also approach unlikely but not impossible events skeptically (Shtulman & Carey, 2007). On the other hand, they put this skeptical stance aside for a special case of ordinarily impossible events: miracles brought about by Divine intervention. Thus, by implication, there is a hierarchy in children's possibility judgments regarding different types of events: Events that *violate* causal constraints via *magic* are at the bottom of this hierarchy. Events that *violate* causal constraints via *Divine intervention* are seen as intermediate between magical events and events that *do not violate* causal laws, but are *unlikely* or rare. And at the top of this hierarchy are events that are *consistent with* causal laws and relatively commonplace. To test this framework, we brought these four types of events together in a single study and examined the role played by children's causal thinking in categorizing the stories as 'real' versus 'pretend'. We also examined to what degree religious background and age moderate this categorization.

The results supported our expectations. Overall, children judged magical and religious stories, stories that are lower in the possibility hierarchy, as 'pretend'. Moreover, these stories led to a large number of *cause-based* judgments—children frequently invoked the *impossibility* of the target cause in these stories when justifying their 'pretend' judgment, arguably because they found the violations of causal constraints very striking. By contrast, children mostly judged unusual and realistic stories, stories that are higher in the possibility hierarchy, as 'real'. Also, given the lack of extraordinary elements in these stories, especially in the realistic stories, children referred to the target cause in them to a lesser degree, sometimes affirming the *possibility* of the target cause but sometimes referring to 'other' aspects of the story as well. In sum, children drew a clear boundary between the stories that were consistent versus inconsistent with causal laws. Religious background and age did not override this boundary but they did

impact children's judgments of story types within the overall hierarchy. To discuss these local effects in more detail, we focus next on the pattern of children's possibility judgments within each type of story, and relate our findings to previous research.

Consistent with their conservative stance towards events that defy causal constraints (Shtulman & Carey, 2007; Subbotsky, 1994, 2010; Woolley & Cox, 2007), children were very skeptical about the reality status of the magical stories. They systematically judged the characters or events in them as 'pretend' regardless of religious background and age. Moreover, they overwhelmingly invoked the violation of causal constraints in justifying this 'pretend' status of magical stories; with few exceptions, all *cause-based* judgments for these stories highlighted the *impossibility* of the target cause. For the small number of instances where children judged these stories as 'real', they did not refer to the target cause, and in that sense, did not affirm it as a possible cause.

These findings are line with the decades of evidence showing that children rarely invoke supernatural forces as a causal explanation even when faced with unusual or unexpected events (Cornelius, Lacy, & Woolley, 201; Huang, 1930, 1943; Mead; 1932; authors, under review) and typically deny the possibility of magical outcomes in real life (Nancekivell & Friedman, 2017; Orozco-Giraldo & Harris, 2019; Subbotsky, 1994, 2010; Woolley & Cornelius, 2017; Woolley & Cox, 2007). Moreover, tempering the earlier conclusions of Corriveau and collegues (Corriveau et al., 2015), we did not find any evidence that exposure to religious testimony renders children more credulous towards the impossible events embedded in magical stories.

Confirming the testimony account discussed earlier (Harris, 2012; 2013), children were generally less skeptical about the religious stories, which included the same causal violations as the magical stories, but the violation was presented as the result of a Divine intervention. This is

not surprising given previous evidence that by the age of five, children come to the conclusion

that God possesses certain qualities and powers that ordinary humans do not (Barrett et al., 2001;

Giménez-Dasí et al., 2005). Hence, children consider God as a special being whose extraordinary

powers can alter the natural flow of events (Harris & Corriveau, 2020). Moreover, replicating

previous findings (Vaden & Woolley, 2011; Corriveau et al., 2015), children with a religious

background—who are more likely to hear about God's extraordinary powers on a regular basis—

were more likely to judge these stories as 'real' than children with a secular background. The

events used in the religious stories were based on those found in the Old and New Testaments of

the Bible, as in earlier studies (Vaden & Woolley, 2011; Corriveau et al., 2015), although the

context of the events and the names of the characters were changed so that they were less

familiar and more contemporary. Nevertheless, future research could explore whether children

with a religious background would be more conservative about the reality status of religious

stories that are not based on the Bible.

Analysis of children's justifications revealed an additional, important feature of their

reaction to religious stories. As discussed in the introduction, earlier findings raised the

possibility that religious teaching might undermine children's recourse to causal thinking, insofar

as it encourages them to endorse the possibility of miraculous outcomes. The present findings

cast doubt on that line of thinking. Religious children showed no consistent tendency to invoke

causal considerations less often than secular children. Indeed, for the Religious Stories they were

more likely to provide *positive cause-based* justifications than were secular children. By

implication, exposure to religious testimony does not undermine children's disposition to invoke

causal factors in thinking about what can actually happen. Rather, religious testimony leads

children to make more frequent references to Divine rather than naturalistic causation.

Children were prone to endorse the reality of the unusual stories, judging them to be 'possible' 60% to 70% of the time. This finding is consistent with previous research showing that, although children fail to differentiate between 'impossible' and 'improbable' events at age 4, starting from age 5, they increasingly judge 'improbable' events to be 'possible'. On the other hand, in contrast to the findings of Shtulman and Carey (2007) and Lane, Ronfard, Francioli and Harris (2016), there was no age-related increase in children's judgments regarding the possibility of unusual outcomes. A plausible explanation of this difference is that the unusual stories included in the present study not only recounted an unusual outcome, but also described the unusual causal sequence that had brought about that outcome. By contrast, in those earlier studies, children were simply asked about the likelihood of unusual outcomes—with no information about how such outcomes might be brought about. By implication, older children are more capable than younger children at generating unusual causal sequences that could bring about an unusual outcome, even if there is little change with age in children's willingness to endorse such sequences as possible. This interpretation is consistent with other findings showing that older children are better able than younger children to generate unusual possibilities in the absence of external scaffolding, even if they are similarly receptive to such possibilities when presented with them (Harris, 2021).

Children's justifications for the unusual stories showed a mixed pattern. When they judged these stories as 'real', children sometimes backed up this conclusion via an affirmation of the target cause and at other times by referring to 'other' aspects of the story. The same pattern of justifications was observed for their 'pretend' judgments. Thus, children did not necessarily confirm the *possibility* of the target cause in these stories when they judged the story as 'real'. Also, a considerable number of 'pretend' judgments were backed up with a *rejection* of the target

cause. Taken together, these findings indicate that although children tended to judge unusual stories as 'real', they were less certain about the reality status of these stories as compared to the reality status of the realistic stories.

Not surprisingly, children were confident about the reality status of the realistic stories, regardless of religious background and age. This finding confirms previous research, showing that starting around five or six years of age, children can distinguish between realistic and fantastical events using the cues in the story context and judge story events and characters as 'real' upon detecting no violation of causal laws (Corriveau et al., 2009; 2015). Children's justifications further supported this conclusion. When they judged these stories as 'real', children backed up this judgment both by affirming the *possibility* of the target cause or by referring to 'other' aspects of the story. Moreover, unlike what was observed for the unusual stories, with a few exceptions, the small percentage of 'pretend' judgments were not justified by a reference to the *impossibility* of the target cause. Therefore, when taking their cause-based judgments into account, children were more confident about the reality status of the realistic stories than they were about the unusual stories.

Finally, the pattern of responses for the magical and realistic stories—the stories that represent the two extreme ends of the possibility hierarchy—highlight an asymmetry between 'real' versus 'pretend' judgments: Children were more systematic in judging the magical stories as 'pretend' than in judging the realistic stories as 'real'. Children's *cause-based* judgments revealed this asymmetry even more strikingly; the magical stories led to the highest number of *cause-based* judgments whereas the realistic stories led to the lowest number of cause-based judgments. A plausible explanation for this asymmetry is that detection of only one causal violation in a story was sufficient for children to determine with confidence that the story was

'pretend'. On the other hand, children needed to confirm that no element in the story was a causal violation to determine that the story was 'real'. Note that, in any case, analyzing story possibility by attending to whether or not the story elements follow causal laws is a heuristic rather than a fail-safe metric to determine whether a story is 'real' or 'pretend'. For instance, it is possible for a pretend story to include several, or indeed many, elements that are fully consistent with causal laws. Nevertheless, by applying a cause-based approach, 'pretend' judgments called for a less exhaustive appraisal of the story than 'real' judgments. Further research could assess this explanation by measuring, for instance, children's reaction times when judging a story as 'pretend' versus 'real'. We would expect 'pretend' judgments to be faster than 'real' judgments because they permit a less exhaustive appraisal.

In sum, the current study extends previous research on children's possibility judgments in a number of important ways. First, by bringing four different types of stories together for the first time, it has revealed that these judgments display a stable hierarchy from the least possible to the most possible among both elementary and middle school children. Second, by providing an in-depth analysis of children's justifications, it has shown that children frequently assess the possibility of story events and story characters being real via their understanding of causal regularities. Third, it has provided evidence that this cause-based strategy is adopted by religious and secular children alike. Thus, a religious background does not impact the frequency with which children invoke causation in judging what can happen. Instead, it impacts the particular type of causal factors that children affirm—religious children are more likely than secular children to affirm the possibility of divine causation. Lastly, the study has highlighted a notable asymmetry between making a 'pretend' as compared to a 'real' judgment. Children are

especially prone to rely on their causal understanding when discounting the possibility of

magical outcomes.

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Supplementary Information

Full Script of the Stories

Elisha Story

Magical

This is Elisha. One year, the crops in Elisha's hometown did not grow and the people had nothing to eat. Elisha used her magical powers to make many loaves of bread out of thin air! Then she was able to feed hundreds of hungry people.

Religious

This is Elisha. One year, the crops in Elisha's hometown did not grow and the people had nothing to eat. Elisha took two loaves of bread and, with the power of God, she turned them into many, many loaves. Then she was able to feed hundreds of hungry people.

Unusual

This is Elisha. One year, the crops in Elisha's hometown did not grow and the people had nothing to eat. Elisha was walking in the forest and she found many, many loaves of bread. She took them back home. Then she was able to feed hundreds of hungry people.

Realistic

This is Elisha. One year, the crops in Elisha's hometown did not grow and the people had nothing to eat. Elisa traveled to a town far away and bought enough loaves of bread for everyone in the town. Then she was able to feed hundreds of hungry people.

Michael Story

Magical

This is Michael. A mean king put Michael in a den of angry lions. But Michael had magical powers, and he was able to turn the angry lions into calm ones. Michael then left the den and walked away.

Religious

This is Michael. A mean king put Michael in a den of angry lions.

But Michael prayed to God and the God made the angry lions calm and they did not hurt Michael. Michael then left the den and walked away.

Unusual

This is Michael. A mean king put Michael in a den of angry lions. A large lion opened its mouth to bite him, but then an earthquake happened and huge rock fell onto the lion and killed it. Michael then left the den and walked away.

Realistic

This is Michael. A mean king put Michael in a den of angry lions. A large lion walked toward him wanting to bite him, but friends found Michael and saved him from the lion just in time. Michael then left the den and walked away.

Max Story

Magical

This is Max. Max was sent to a mean king in a land far away where there were terrible storms. Max used his magical powers to see into the future, and told the king how to protect his kingdom from the storms. The king was amazed by Max and they became friends.

Religious

This is Max. Max was sent to a mean king in a land far away where there were terrible storms.
But God made Max have many dreams warning about terrible storms, and Max used those
dreams to tell the king how to protect his kingdom from the storms. The king was amazed by
Max and they became friends.

Unusual

This is Max. Max was sent to a mean king in a land far away where there were terrible storms.
Max showed the king how to build a giant structure that protected the kingdom from storms.
The king was amazed by Max and they became friends.

Realistic

This is Max. Max was sent to a mean king in a land far away where there were terrible storms.
The king realized that Max was very good at looking at clouds and predicting when there would
be a storm. The king was amazed by Max and they became friends.

Stephanie Story

Magical

This is Stephanie. One night Stephanie and her friends were sailing a boat and got caught in a
bad storm. Lightning flashed and Stephanie fell out of the boat. Stephanie started to sink.
But a fairy flew to Stephanie and used her magic powers to save her. Stephanie walked on water
back to the boat. The storm passed and everyone was safe.

Religious

This is Stephanie. One night Stephanie and her friends were sailing a boat and got caught in a
bad storm. Lightning flashed and Stephanie fell out of the boat. Stephanie started to sink.
But she prayed to God that she could walk on water. She walked on water back to the boat.

The storm passed and everyone was safe.

Unusual

This is Stephanie. One night Stephanie and her friends were sailing a boat and got caught in a bad storm. Lightning flashed and Stephanie fell out of the boat. Stephanie started to sink. But just at that moment, a large whale came by. So, Stephanie stood on the back of the whale who carried her back to the boat. The storm passed and everyone was safe.

Realistic

This is Stephanie. One night Stephanie and her friends were sailing a boat and got caught in a bad storm. Lightning flashed and Stephanie fell out of the boat. Stephanie started to sink. But her friends threw her a rope and pulled her back into the boat. The storm passed and everyone was safe.

Robert Story

Magical

This is Robert. One day, he fought a mighty enemy, who was protected by armor. Robert had no armor so he didn't know what to do. But Robert found a magic stone and when he threw the stone, it killed the enemy instantly. Robert won the battle!

Religious

This is Robert. One day, he fought a mighty enemy, who was protected by armor. Robert had no armor so he didn't know what to do. But Robert prayed to God for help. When Robert threw a stone at his enemy, God gave the stone special powers so it would kill the enemy instantly. Robert won the battle!

Unusual

This is Robert. One day, he fought a mighty enemy, who was protected by armor. Robert had no armor so he didn't know what to do. But Robert noticed that there was no armor protecting the head of his enemy. Robert managed to trip him up. His enemy fell over and banged his head on a rock. It killed the enemy instantly. Robert won the battle!

Realistic

This is Robert. One day, he fought a mighty enemy, who was protected by armor. Robert had no armor so he didn't know what to do. But Robert noticed that there was no armor protecting the head of his enemy. He threw a huge stone at his enemy's head and it killed the enemy instantly. Robert won the battle!

Anna Story

Magical

This is Anna. Anna was very sick, and went to sleep. Her sisters were very sad and were crying. They asked some fairies for help. The fairies gave Anna a magic drink. Anna woke up and she was not sick anymore.

Religious

This is Anna. Anna was very sick, and went to sleep. Her sisters were very sad and were crying. They prayed to God for help. After the sisters prayed to God for many days Anna woke up and she was not sick anymore.

Unusual

This is Anna. Anna was very sick, and went to sleep. Her sisters were very sad and were crying. Just then a neighbor came and told them that onion juice could heal Anna. Anna's sisters gave some onion juice to Anna. Anna woke up and she was not sick anymore.

Realistic

This is Anna. Anna was very sick, and went to sleep. Her sisters were very sad and were crying.

They asked a doctor for help. The doctor gave Anna some medicine. Anna woke up and she was

not sick anymore.

Charlie Story

Magical

This is Charlie. Charlie was leading his people away from their enemies, but when they reached

the sea they didn't know what to do. Charlie had a magic staff and he waved it. The sea split in

two parts. Charlie and his people escaped through the dry land in the middle.

Religious

This is Charlie. Charlie was leading his people away from their enemies, but when they reached

the sea they didn't know what to do. Charlie asked God for help, and waved his staff. The sea

split in two parts. Charlie and his people escaped through the dry land in the middle.

Unusual

This is Charlie. Charlie was leading his people away from their enemies, but when they reached

the sea they didn't know what to do. Charlie found a tunnel underneath the ground by the side of

the sea. Charlie and his people used the tunnel. They got to the other side of the sea and escaped.

Realistic

This is Charlie. Charlie was leading his people away from their enemies, but when they reached

the sea they didn't know what to do. Charlie asked a fisherman for help, and borrowed his boat.

Charlie and his people sailed on the boat to the other side of the sea and they escaped.

George Story

Magical

This is George. He is a farmer. He used to plant strawberries on his farm. One summer, there was no rain so the plants did not have any berries. George wanted the plants to be loaded with strawberries. Then a fairy flew over the plants spraying some special water. After some time the plants were all loaded with strawberries.

Religious

This is George. He is a farmer. He used to plant strawberries on his farm. One summer, there was no rain so the plants did not have any berries. George wanted the plants to be loaded with strawberries, so he prayed to God at night. After some time, the plants were all loaded with strawberries.

Unusual

This is George. He is a farmer. He used to plant strawberries on his farm. One summer, the plants did not have any berries. George wanted the plants to be loaded with strawberries. One day when George was digging in his field, he found an underground spring that he could use to water the plants. After some time, the plants were all loaded with strawberries.

Realistic

This is George. He is a farmer. He used to plant strawberries on his farm. One summer, there was no rain so the plants did not have any berries. George wanted the plants to be loaded with strawberries, so he got some water from the dam for his farm. After some time the plants were all loaded with strawberries.

Alice Story

Magical

This is Alice. She always wanted to have a baby brother, so every night before going to sleep she made a wish to the fairies for a baby brother. After a while, the fairies granted her wish. So, one morning, when Alice woke up, there was a baby brother sleeping in her room.

Religious

This is Alice. She always wanted to have a baby brother, so every night before going to sleep she asked God to give her a baby brother. One morning, when Alice woke up, God had performed a miracle. There was a baby brother sleeping in Alice's room when she woke up.

Unusual

This is Alice. She always wanted to have a baby brother. One dark night, her mother heard a strange noise outside. She went outside, found a baby lying on the grass and brought the baby back inside. There was a baby brother sleeping in Alice's room when she woke up.

Realistic

This is Alice. She always wanted to have a baby brother, so every night before going to sleep she asked her mom for a baby brother. After a while, her mother got pregnant and sometime later she gave birth to a baby in the middle of the night. There was a baby brother sleeping in Alice's room when she woke up.

Kyle Story

Magical

This is Kyle. One year, the river in Kyle's hometown dried up and the people had nothing to drink. One night, Kyle used his magical power to call the rain, and the next morning people were

surprised to find that the river was filled with clean water. Everyone was happy that they had something to drink.

Religious

This is Kyle. One year, the river in Kyle's hometown dried up and the people had nothing to drink. People in the village all prayed to God for three days. On the fourth day, people were surprised to find that the river was filled with clean water. Everyone was happy that they had something to drink.

Unusual

This is Kyle. One year, the river in Kyle's hometown dried up and the people had nothing to drink. Kyle travelled to a place far away and found many oranges. He brought back the oranges and made orange juice for people in his hometown. Everyone was happy that they had something to drink.

Realistic

This is Kyle. One year, the river in Kyle's hometown dried up and the people had nothing to drink. Kyle went to another village to ask for help. People in that village brought water to Kyle's hometown. Everyone was happy that they had something to drink.

Chris Story

Magical

This is Chris. He is a soldier. One day his army was trying to get into a city with high walls. Chris rode a horse around the city, and played a magical guitar. After he stopped playing the guitar, the walls of the city fell down. Chris's army finally got into the city.

Religious

This is Chris. He is a soldier. One day his army was trying to get into a city with high walls.

Chris prayed to the God for help. God told Chris to march his army around the walls for seven

days. On the seventh day, the walls of the city fell down. Chris's army finally got into the city.

Unusual

This is Chris. He is a soldier. One day his army was trying to get into a city with high walls.

Chris and his army walked around the city and found an abandoned helicopter. Some soldiers

climbed into the helicopter and flew over the high walls. Chris's army finally got into the city.

Realistic

This is Chris. He is a soldier. One day his army was trying to get into a city with high walls.

Chris and his army found some huge pillars and used the pillars to ram the walls. After they

worked for many hours, the walls of the city fell down. Chris's army finally got into the city.

Aiden Story

Magical

This is Aiden. One day Aiden was holding a special feast but he forgot to buy juice for his guests

before the feast started. Aiden took his magical water bottle and filled it with water. As he

poured into the guests' glasses, the water turned into juice. All the guests were very pleased.

Religious

This is Aiden. One day Aiden was holding a special feast but he forgot to buy juice for his guests

before the feast started. Aiden was really upset and prayed to God for help. God told Aiden to

serve the guests with water. But as Aiden poured, the water turned into juice. All the guests were

very pleased.

Unusual

This is Aiden. One day Aiden was holding a special feast but he forgot to buy juice for his guests

before the feast started. Aiden was really upset but his wife told him that their apple tree just

turned ripe yesterday. So, they used the apples to make some apple juice for the guests.

Realistic

This is Aiden. One day Aiden was holding a special feast but he forgot to buy juice for his guests

before the feast started. Aiden was really upset and called his friends to bring bottles of juice to

his feast. His friends helped Aiden solve the problem. All the guests were very pleased.

All the guests were very pleased.

Additional Analyses

Table 1

Results from the mixed effects binomial logistic regression model predicting the likelihood of

children's "real" judgments using Story Type (Unusual as the reference category), Religious

Background, and Age as predictors.

	β (SE)	z	OR	95% CI for OR	
				Lower	Upper
Intercept	0.90 (0.21)***	4.22	2.47	1.62	3.75
Religious Background	-0.26 (0.25)	-1.02	0.77	0.47	1.27
Age	-0.22 (0.18)	-1.25	0.80	0.56	1.14
Story Type					
Unusual – Magical	-4.22 (0.43)***	-9.84	0.01	0.01	0.03
Unusual – Religious	-1.88 (0.24)***	-7.74	0.15	0.09	0.24
Unusual– Realistic	0.70 (0.25)**	2.77	2.01	1.23	3.30
Religious BackgroundStatus					
X Story Type					
Unusual – Magical	1.55 (0.50)**	3.12	4.70	1.78	12.41
Unusual – Religious	1.32 (0.32)***	4.19	3.75	2.02	6.95
Unusual– Realistic	0.37 (0.34)	1.09	1.45	0.74	2.82
Number of Observations	1654				
Number of Groups	141				
Log Likelihood	-839.2				
AIC	1700.3				

*Note: * $p < 0.05$; ** $p < 0.01$, *** $p < 0.001$. OR = Odds Ratio. CI = Confidence Interval.*

Table 2

Results from the mixed effects binomial logistic regression model predicting the likelihood of

children's "real" judgments using Story Type (Realistic as the reference category), Religious

Background, and Age as predictors.

	β (SE)	z	OR	95% CI for OR	
				Lower	Upper
Intercept	1.60 (0.24)***	6.78	4.96	3.12	7.89
Religious Background	0.11 (0.29)	0.38	1.12	0.63	1.97
Age	-0.22 (1.18)	-1.25	0.80	0.56	1.14
Story Type					
Realistic – Magical	-4.92 (0.44)***	-11.14	0.01	0.00	0.02
Realistic – Religious	-2.58 (0.26)***	-9.78	0.08	0.04	0.13
Realistic – Unusual	-0.70 (0.25)**	-2.77	0.50	0.30	0.82
Religious BackgroundStatus					
X Story Type					
Realistic – Magical	1.18 (0.52)**	2.28	3.24	1.18	8.91
Realistic – Religious	0.95 (0.34)*	2.76	2.59	1.32	5.08
Realistic – Unusual	-0.37 (0.34)	-1.09	0.69	0.35	1.34
Number of Observations	1654				
Number of Groups	141				
Log Likelihood	-839.2				
AIC	1700.3				

*Note: * $p < 0.05$; ** $p < 0.01$, *** $p < 0.001$. OR = Odds Ratio. CI = Confidence Interval.*

Table 3

Results from the mixed effects binomial logistic regression model predicting the likelihood of

children's cause-based judgments using Story Type (Unusual as the reference category),

Religious Background, and Age as predictors.

	β (SE)	z	OR	95% CI for OR	
				Lower	Upper
Intercept	0.05 (0.20)	0.26	1.05	0.71	1.57
Religious Backgound	-0.33 (0.20)	-1.69	0.72	0.49	1.06
Age	1.23 (0.20)***	6.22	3.43	2.33	5.06
Story Type					
Unusual – Magical	1.45 (0.18)***	7.83	4.25	2.96	6.11
Unusual – Religious	0.01 (0.16)	0.06	1.01	0.74	1.38
Unusual – Realistic	-0.72 (0.16)***	-4.56	0.49	0.36	0.66
N. of Observations	1654				
Number of Groups	141				
Log Likelihood	-934.6				
AIC	1885.1				

*Note: * $p < 0.05$; ** $p < 0.01$, *** $p < 0.001$. OR = Odds Ratio. CI = Confidence Interval.*

Table 4

Results from the mixed effects binomial logistic regression model predicting the likelihood of

children's cause-based judgments using Story Type (Realistic as the reference category),

Religious Background, and Age as predictors.

	β (SE)	z	OR	95% CI for OR	
				Lower	Upper
Intercept	-0.67 (0.20)***	-3.28	0.51	0.34	0.76
Religious Background	-0.33 (0.20)	-1.69	0.71	0.48	1.05
Age	1.23 (0.20)***	6.22	3.48	2.34	5.17
Story Type					
Realistic – Magical	2.17 (0.19)***	11.55	8.98	6.09	13.25
Realistic – Religious	0.73 (0.16)***	4.61	2.09	1.52	2.88
Realistic – Unusual	0.72 (0.16)***	4.56	2.08	1.51	2.86
N. of Observations	1654				
Number of Groups	141				
Log Likelihood	-934.6				
AIC	1885.1				

*Note: * $p < 0.05$; ** $p < 0.01$, *** $p < 0.001$. OR = Odds Ratio. CI = Confidence Interval.*

Residual Justifications

Justifications that did not refer to the *target* cause were coded into 2 categories. The *Other Aspects* category included references to aspects of the story context other than the *target* cause (e.g., "Pretend, because there are not storms as bad", "Real, because the ocean looks real"). The *Uninformative* category included unrelated, global, or "don't know" responses (e.g., "not real, because the story sounds fake", "real, because there is nothing fake in it"). As seen in Fig. 1, overall older children were less likely than younger children to provide *Other aspects* justifications. Similarly, older children were less likely than younger children to provide *Uninformative* justifications, as seen in Fig. 2.

Fig. 1

Percentage of the justifications that refer to the 'Other aspects' of the story by judgment type, story type, religious background, and age.
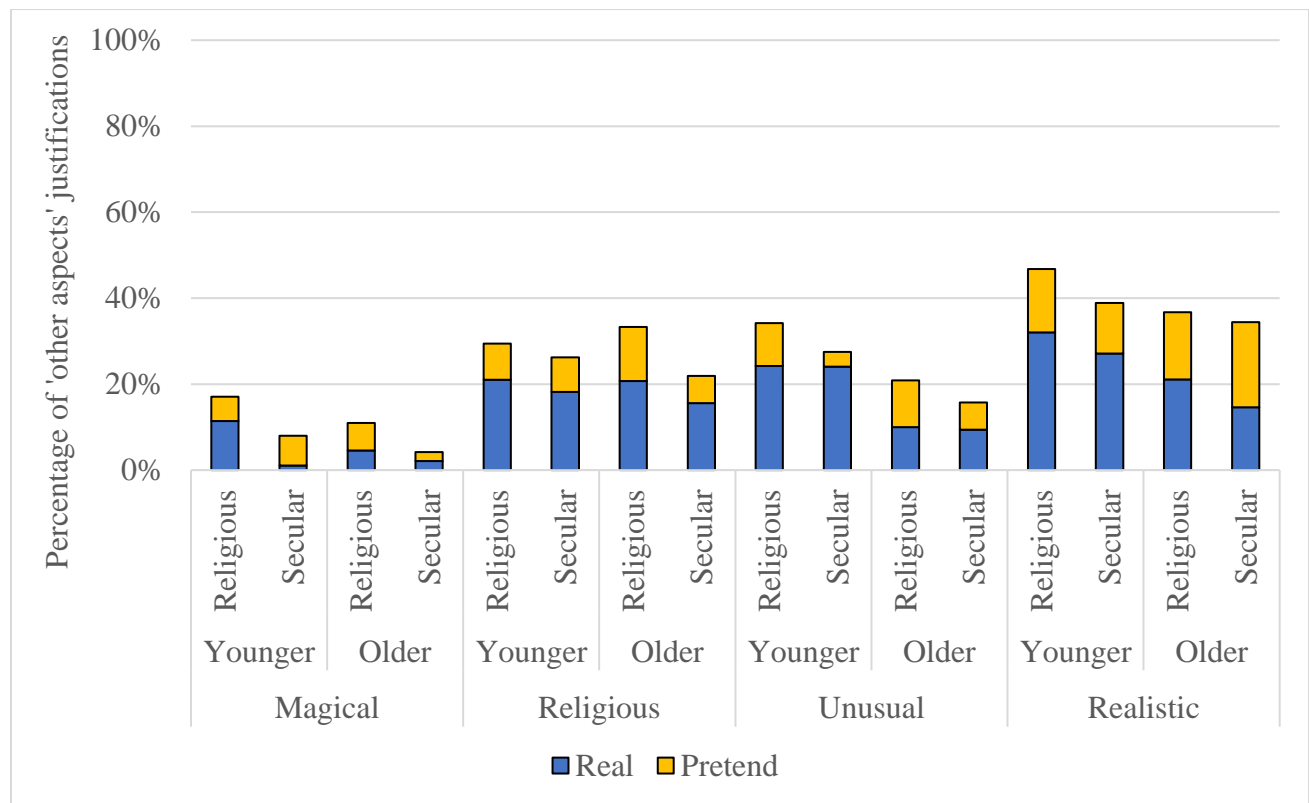
Fig. 2

Percentage of the justifications that are 'Uninformative' by judgment type, story type, religious background, and age.

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