

Religious Testimony in a Secular Society: Belief in Unobservable Entities Among Chinese Parents and Their Children

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When learning about the existence of unobservable scientific phenomena such as germs or religious phenomena such as God, children are receptive to the testimony of other people. Research in Western cultures has shown that by 5 to 6 years of age, children—like adults—are confident about the existence of both scientific and religious phenomena. We examined the beliefs of secular and Christian children growing up in China as well as the beliefs of their parents. All participants—secular and Christian children, as well as their parents—were confident about the existence of the scientific phenomena. No such consensus emerged for religious phenomena. Whereas secular children and their parents were skeptical, Christian children and their parents were confident about the existence of the religious phenomena. Moreover, a similar pattern was found for Christian children in preschools and for Christian children with more extensive exposure to the secular state curriculum. Indeed, for religious phenomena, a positive association was found between the beliefs of Christian children and their parents, highlighting the potential influence of parental input in a predominantly secular society. Overall, the results indicate that children's religious beliefs are related to the beliefs of their parents, even when those beliefs go against the majority view.

Keywords: unobservable phenomena, testimony, science, religion, community consensus

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One contemporary view of cognitive development holds that children are like scientists in the way they construct and revise their theories about the world (e.g., [Gopnik & Wellman, 2012](#)). Children gather data to revise their naïve theories about physical, biological, and psychological constructs by observing and interacting with their surrounding physical and social environments. Although first-hand experience plays an important role in children's learning, what occurs in instances when children cannot directly observe a phenomenon that they are learning about? A

considerable amount of knowledge in domains such as science and religion cannot be acquired through first-hand experience. Instead, children learn a great deal about these domains through testimony—that is, conversations with other people, particularly trusted adults (e.g., [Harris, 2012](#); [Harris, Koenig, Corriveau, & Jaswal, 2018](#)).

At first glance, our proposal that children learn about religious and scientific entities in the same manner may seem counterintuitive. It is true that entities in these two domains differ in the extent


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to which their existence can be empirically examined. For naïve learners, however, it is difficult, if not impossible, to directly observe many religious and scientific entities. For example, children cannot see angels or oxygen. Children's beliefs in the existence of unobservable scientific and religious phenomenon reflect this counterintuitive similarity in that children endorse the existence of both scientific entities (e.g., germs, oxygen) and culturally endorsed entities (e.g., God, angels) but also recognize that they cannot see these entities (Harris & Koenig, 2006). Moreover, children tend to justify their claims about scientific and endorsed entities in a similar way. In each case, they focus on the properties, especially the causal properties, of a given unobservable entity to justify their belief in the existence of the entity (e.g., germs are real because they make us sick; Harris, Pasquini, Duke, Asscher, & Pons, 2006). Children's beliefs in the existence of these entities do not seem to be constrained by their early-developing, naïve theories about physical laws (Shtulman, 2009; Shtulman & Carey, 2007). Rather, children confidently affirm the existence of culturally endorsed entities (e.g., God, Santa Claus) even though many characteristics of these entities violate natural physical laws (Davoodi et al., 2018; Harris, Enesco, & Guerrero, 2010).

Parental Testimony and Children's Belief in the Unobservable

Among the various sources of testimony in young children's lives, parents are likely to be a familiar and authoritative source, especially prior to the onset of formal schooling (Corriveau, Harris, et al., 2009; Degner & Dalege, 2013). Recent findings from Canfield and Ganea (2014) indicate that when discussing the reality status of unobservable entities with their child, U.S. parents include subtle linguistic cues that might aid in children's ontological judgments. Specifically, when describing fantastical entities, parents included modulations of assertion, such as "I think" or "I believe," but did not include such modulations when describing scientific and historical entities. Moreover, with age, children attend to both explicit belief statements (e.g., "I believe in cusk") and implicit belief statements (e.g., "I know about cusk") when making decisions about societal consensus regarding the existence of entities (Dore, Woolley, & Hixon, 2019). There is also evidence that children's religious upbringing is related to what they believe to be real. As compared to children with little exposure to Christian religious narratives, children with a Christian religious upbringing are more willing to entertain the possibility that narratives containing ordinarily impossible events brought about by divine intervention recount real rather than fictional events (Corriveau, Chen, & Harris, 2015; Vaden & Woolley, 2011). Thus, exposure to testimony from parents and religious community members about the reality status of Biblical narratives that include impossible events (e.g., walking on water, being raised from the dead) was associated with children's judgments of their veracity.

The role of parental testimony with respect to children's beliefs in unobservable entities may be less prominent as children age and become more integrated within their cultural communities. When children start formal schooling around the age of 6, their teachers and the curriculum content that they encounter in school are likely to become an additional influence (Siegel, 2005). Around the same age, if not earlier, children start to read, and books can become another type of trusted source. Recent research has shown that, as

compared to prereaders, readers are more likely to trust written than oral information (Corriveau, Einav, Robinson, & Harris, 2014). Thus, as children are exposed to more varied sources, especially after several years of formal schooling, the role of parental testimony in children's belief in the existence of unobservable entities may become less central.

Indeed, if parental testimony is inconsistent with the information that children receive from schools or peers, children's beliefs may ultimately diverge from those of their parents. For example, research on children's moral development has revealed that their discussion with both parents and peers can predict children's moral judgments but on different dimensions (Walker, Hennig, & Krettenauer, 2000). Studies of immigrants in the U.S. show that despite parents' efforts to maintain the heritage language in the next generation, children at mainstream schools fail to see the relevance of the heritage language in their life (Zhang & Slaughter-Defoe, 2009).

Few studies, however, have systematically examined the relation between parental testimony and children's ontological beliefs before and after formal schooling. Indeed, to our knowledge, no clear association between parental testimony and their children's ontological beliefs has been previously established, especially when parental testimony conflicts with other sources. The current study investigated the role of parental testimony in children's developing beliefs about unobservable phenomena in the scientific and religious domains. Two distinct cultural communities were chosen in Mainland China: a secular community and a Christian community. We chose these communities because they vary in the consistency between parental testimony and information received from schools and the larger community. Moreover, these communities represent a distinct departure from the Christian-majority communities in which children's ontological beliefs have previously been explored (e.g., Harris et al., 2006). In the next section, we describe the cultural environment in China before turning to our research hypotheses.

Religion in Mainland China

Mainland China is a Communist nation and is regarded as one of the least explicitly theistic societies in the world (Rottman et al., 2017). A recent poll showed that 77% of Chinese respondents claimed to be atheist or agnostic (WIN-Gallup International, 2016), and, according to the sixth round of the World Values Survey, 79.4% of the Chinese participants viewed religion as not very important or not at all important in their lives (World Values Survey Association, 2014). In addition, when asked to choose from a list of important qualities that children should be encouraged to develop, only 1.2% of the Chinese participants indicated that devout religious belief should be encouraged. Thus, because most Chinese individuals do not value religion, it is unlikely that children growing up in the larger Chinese society are exposed to talk about religion and religious phenomena.

The testimony that children are exposed to through formal schooling also limits talk about religion. Indeed, the Education Law of the People's Republic of China (2015) declared that the state should separate education from religion. Organizations and individuals may not employ religion to obstruct activities of the state education system. To the knowledge of the authors, there are no state-registered preschools, elementary schools, or secondary

schools that share or endorse religious belief in Mainland China. The Chinese government imposes a national curriculum on all elementary and secondary schools, which constitutes a compulsory education as defined by the law (OECD, 2016). Indeed, textbooks in elementary school express objections to superstitious beliefs, and Chinese folk religious practices are viewed as superstitious practices (Feuchtwang & Ming-Ming, 1991). For example, in the Chinese Language Arts textbook for 3rd graders, one historical narrative recounts how a former official (Ximen Bao) called attention to the absurdity of people's belief in divine figures that live in the river, conveying the idea that supernatural beliefs should be abandoned (Institute of Curriculum and Textbook Development, 2004). Thus, Chinese children receive little to no testimony in support of religion or supernatural beliefs in school.

Previous research on children's understanding of culturally endorsed entities has been conducted in places where the existence of such entities is broadly endorsed by the cultural majority (Guerrero et al., 2010; Harris et al., 2006; Harris, Abarbanell, Pasquini, & Duke, 2007). The demography of religious affiliation in Mainland China provides a unique opportunity to assess children's perceptions of unobservable religious entities in a society in which the cultural majority does not endorse the existence of those entities. In particular, we were interested in comparing the beliefs of two understudied groups of children: (a) children raised in secular families who should receive relatively uniform testimony from both their parents and the larger community about the nonexistence of supernatural entities and (b) children raised in Christian families who receive distinct testimony at home and at school regarding the existence of supernatural entities.

Alongside a sample of secular, Chinese parent-child dyads, we chose to study parent-child dyads belonging to the Christian community in Mainland China. Chinese children raised in these Christian households are likely to receive two very different types of testimony about religion: testimony endorsing their existence from their parents and testimony against their existence from the secular community. This relation between Christian parental and secular community testimony in Mainland China provides an unusual opportunity for research on the role of consistency between testimony from mainstream cultural sources and testimony from parents or the immediate community in learning about unobservable entities. More generally, few studies have empirically examined beliefs in religious or scientific phenomena among Chinese children and adults (but see Lane, Zhu, Evans, & Wellman, 2016; Rottman et al., 2017; Schachner, Zhu, Li, & Kelemen, 2017). Indeed, to our knowledge, no study has examined beliefs in scientific and religious phenomena among children from Chinese Christian families, partly due to the difficulty of data collection. The Christian community is a particularly small community within the massive secular majority (Stark & Liu, 2011). Families in the minority Christian community are also reluctant to reveal their beliefs due to the sociocultural environment in the secular majority society. Thus, recruiting Chinese Christian families is difficult, which limits the amount of previous research examining the beliefs of this group.

The Current Study

The current study explored beliefs about religious (e.g., God) and scientific (e.g., germs) phenomena among children and their parents from the dominant secular community and from the Chris-

tian community in China. Past research indicates that children can form a stable and accurate understanding of the reality status of common, unobservable phenomena by the age of 5 (Kalish, 1996; Lane & Shafto, 2017; Rosen & Rozin, 1993; Woolley & Cox, 2007). Thus, to assess the role of experience with community testimony on children's judgments, we included 5- to 6-year-old children, who had not yet started or had recently started formal schooling. This younger age group had, therefore, received limited exposure to testimony from the broader society about religious entities but could nonetheless be asked to evaluate their reality status. We also included 9- to 11-year-old children, who were more immersed in the broader society through several years of formal schooling. We also checked for similarities between parental testimony and children's beliefs by examining the relation between children's judgments and their parents' judgments.

Previous research has shown that both children and adults express more confidence in the existence of scientific entities as compared to religious entities (Harris et al., 2006; Shtulman, 2013). However, these previous studies did not include information on the religious affiliation of the participants. The current study extends prior work by investigating the relation between religious affiliation (or lack thereof) and beliefs about the existence of religious as well as scientific entities. We chose three religious entities commonly accepted in the Judeo-Christian tradition: angels, Heaven, and God. For scientific entities, we chose three commonplace scientific entities: germs, electricity, and oxygen (Clegg, Cui, Harris, & Corriveau, 2019). We hypothesized that adults from the Christian and secular communities would differ sharply in their judgments about the religious entities but not the scientific entities.

With respect to children's developing beliefs in unobservable entities within the scientific domain, talk about such entities is likely to be widespread in both secular and Christian communities. Across different societies, including China, adults endorse the existence of the scientific entities that we asked children about (Clegg et al., 2019; Davoodi et al., 2018; Shtulman, 2013). Thus, assuming that children are exposed to adult testimony about the existence of these scientific entities, we expected children to be confident about their existence across both communities and both age groups. We also anticipated that children's confidence might increase with age, given that older children are likely to have learned more about science than younger children in the context of formal schooling. In addition, Woolley and McInnis Brown (2015) found that children's belief in the existence of unobservable entities is related to their understanding of appearance versus reality, which develops between 3 and 7 years of age. It was also possible, however, that there would not be an increase in confidence between the younger and older age groups, because the unobservable scientific entities we asked children about included everyday entities that most children are likely to have heard about from a young age. In contrast, children's developing belief in unobservable religious phenomena is likely to vary by community and age group. In the following paragraphs, we elaborate on our hypotheses regarding each of the two communities.

As compared to the Christian community, parents in the secular community may be less likely to talk to their children about religious phenomena due to the lack of valuation of religious belief (World Values Survey Association, 2014). By contrast, talk about commonplace, scientific phenomena is likely to be widespread. A plausible result of such paucity of talk about religious phenomena is that some

young children may not have heard about particular religious entities. On the other hand, for those young children who have heard about various religious phenomena before formal schooling, there are various possibilities. First, studies of children's conceptual development indicate that young children often doubt the existence of novel, unobservable entities. With a certain amount of exposure, however, children might dispel their doubts and hold beliefs in the existence of certain unobservable entities (Lane & Harris, 2014; Woolley & Ghosainy, 2013). Some parents might explicitly or implicitly imply either the existence or the nonexistence of unobservable religious phenomena in talking to their children. If so, parents' existence judgments are likely to be correlated with those of their children. Young children may also pick up cues about the existence or nonexistence of religious entities from other members of their immediate social circle (Harris et al., 2006; Shtulman, 2013). Thus, among younger children, children's beliefs about religious entities should reflect those of their parents and their immediate social circle, with secular children expressing doubt and Christian children expressing confidence in their existence.

After several years of formal schooling, two different outcomes seem feasible. First, any differences in the beliefs of children from the secular and Christian communities may wane or disappear. Recall that in school, Chinese children will be uniformly exposed to testimony casting doubt on the possibility that supernatural entities exist. Such testimony may lead older children, including those with Christian parents, to develop a critical stance toward the existence of unobservable religious entities and become less confident of their existence.

However, it is also possible that Christian children may retain their religious beliefs. In the Christian community, believers are expected to transmit the gospel to others, including the next generation (Fulton, 2015; Lian, 2010). Thus, precisely because their children are likely to be exposed to messages outside of the home that contradict parents' early teachings about religion, Christian parents in China may be exceptionally motivated to transmit their beliefs and to talk about religious phenomena with their children. Accordingly, we might expect to see a persisting correspondence between the beliefs of Christian parents and their children regarding the existence of unobservable religious entities.

Method

Participants

A total of 65 secular and 49 Christian children and their parents from mid- to high-socioeconomic status preschools and elementary schools were recruited in urban cities (including Beijing, Tianjin, Jinan, and Shanghai) in Mainland China. All children in the older age group attended public elementary schools. Except for two parent-child dyads from the preschool and elementary school sample, the remainder of Christian children and their parents were recruited through the snowball sampling method by research assistants who self-identified as Christian. Note that the Christian Chinese research assistants were critical for our study, because without connections to believers in Mainland China, it would be difficult to locate a large number of Christian families. Indeed, due to the difficulty of data collection, the number of children included in the older Christian group was smaller than we had originally planned. A power analysis indicated that a sample size of 30 per age group and per community group would be needed to yield an odds ratio of 9 for 80% statistical

power and a critical alpha level of 0.05 using mixed-effects ordinal logistic regression analysis (odds ratio based on research with a similar design, Davoodi et al., 2018). We collected data from 34 5- to 6-year-old secular children (16 girls, $M_{age} = 6; 2$ years), 31 9- to 11-year-old secular children (18 girls, $M_{age} = 10; 3$ years), 29 5- to 6-year-old Christian children (9 girls, $M_{age} = 6; 1$ year), and 20 9- to 11-year-old Christian children (10 girls; $M_{age} = 9; 10$ years). In total, the group of parents consisted of 114 adults (85 mothers, $M_{age} = 38; 2$ years). All parents were asked about their religious denomination in a questionnaire to confirm their religious identity. The 65 secular parents indicated "no religious denomination," and the 49 Christian parents identified as "Protestant." We return to the shortfall in the number of Christian children and their parents, especially in the older age group, in the final discussion. Each family received a book with a value of 15 RMB as a gift for participation.

We also collected data on parents' level of education. Among the 114 respondents, 21% reported holding a "high school diploma," 13.3% reported an associate degree, 44.7% reported a bachelor's degree, and 15.8% reported a graduate degree as the highest level of education completed. A small number of parents (7.9%) did not answer this question. Given that parent-child dyads were asked potentially sensitive questions regarding their beliefs about scientific and religious entities, all information was collected anonymously. This approach was approved by the institutional review board at Boston University, with approved protocol number 4631E, entitled "Children's and Adults' Understanding of the Invisible and the Impossible."

Procedure

Parents' judgments of unobservable entities. Parents were asked about their beliefs in the existence of three religious entities (angels 天使, Heaven 天堂, God 上帝). They were also asked about three scientific entities (germs 细菌, electricity 电, oxygen 氧气). Parents indicated their ratings on a 7-point scale ranging from 1 (*it definitely does not exist* 绝对不存在) to 7 (*it definitely exists* 绝对存在).

Children's judgments of unobservable entities. Children were first given two warm-up items (a real entity—dogs—and a nonexistent, impossible entity—flying dogs) in a fixed order and were asked if they were real or not real. All children correctly categorized these two warm-up items. Next, children were given the six test items (three religious items and three scientific items). Items were written on cards and presented in a random order. Children were first asked, "Have you heard about [entity]? 你听说过这条条目吗?" If children answered no, testing was discontinued for that item. If children answered yes, they were then asked, "Is/are there really [entity]? Is/are [entity] real or not real? 条目存在吗?" Immediately following the existence question, children were asked about their certainty: "You said that [entity] is/are real/ not real. Are you very sure or not very sure about your answer¹? 你说条目存在/不存在,对此你是非常确定还是不太确定?"

¹ In the context of a parallel research study, children were also asked to justify their beliefs with respect to each entity: "How do you know that xx exists/does not exist?" Although asking children about how they know something might prime them to think more carefully when answering subsequent questions, we do not believe that this is a problem for our design. At most, we may have increased the likelihood that children provided more careful and considered answers.

Results

First, we examined potential differences in parental beliefs in the scientific and religious entities depending on their secular versus religious background. Next, we examined the influence of children's religious background and age on their familiarity with, and judgments about the existence of, scientific and religious entities. Finally, we examined the relation between parents' beliefs in the existence of each entity and children's beliefs.

Parents' Judgments of Unobservable Entities

To assess the internal consistency of the scientific and religious items, Cronbach's alpha was computed. Consistency was high in both domains ($\alpha = .92$ for scientific and $\alpha = .97$ for the religious entities). Given the high consistency among the entities in each domain, we created two composite scores for parents' beliefs about the entities—one for each domain. The mean scores for secular and Christian parents' beliefs about the existence of the religious and scientific entities are shown in Figure 1, with higher numbers indicating more confidence that the entities exist.

Inspection of Figure 1 shows that both secular and Christian parents were very confident about the existence of the scientific entities with very low variability in their judgment. Christian parents were also very confident about the existence of the religious entities, whereas secular parents were confident that the religious entities do not exist. To confirm these conclusions, a 2×2 ANOVA was conducted on parents' mean existence judgment scores (range 1–7), with religious affiliation as a between-subjects variable and entity type (scientific vs. religious) as a within-subjects variable. The results revealed significant main effects of religious affiliation, $F(1, 111) = 276.41, p < .001, \eta^2 = .71$, and entity type, $F(1, 111) = 259.15, p < .001, \eta^2 = .71$, as well as a significant interaction between religious affiliation and entity type, $F(1, 111) = 210.87, p < .001, \eta^2 = .65$. Tests of simple effects showed that secular ($M = 6.72, SD = 0.94$) and Christian parents ($M = 6.94, SD = 0.21$) did not differ significantly in their confidence about the existence of scientific entities, $F(1, 111) = 2.64, p = .107, \eta^2 = .03$. However, a significant difference was found for religious entities. Christian parents were quite confident about their existence ($M = 6.71, SD = 0.87$), whereas secular parents were quite skeptical about their existence ($M = 2.37, SD = 1.55$), $F(1, 111) = 308.06, p < .001, \eta^2 = .72$. Finally, tests of simple effects also showed that both secular and Christian parents

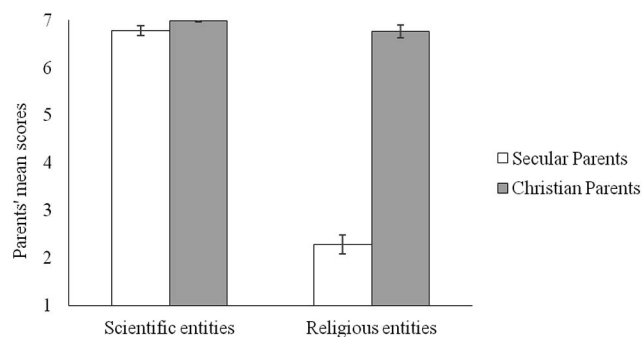


Figure 1. Mean scores of secular and Christian parents by entity type. Error bars represent standard error.

were more confident about the existence of the scientific entities as compared to the religious entities, $F_{secular}(1, 111) = 533.13, p < .001, \eta^2 = .83$, $F_{Christian}(1, 111) = 3.95, p < .05, \eta^2 = .03$, although, as inspection of Figure 1 confirms, the mean difference was much larger among secular parents ($M = 4.35$) than among Christian parents ($M = 0.23$), $t(111) = 14.51, p < .001$.

Children's Judgments of Unobservable Entities

Item familiarity. We first examined children's overall familiarity with the items by examining the number of entities from each domain that children said that they had heard about. Table 1 displays the percentage of children who had heard about all three, two, one, or none of the entities in each domain by age group and religious background. Inspection of Table 1 shows that almost all children, regardless of age or religious background, had heard about all three scientific entities. In addition, most 9- to 11-year-old children from both religious and secular backgrounds had heard about all three religious entities. However, younger children's familiarity with the religious entities depended on their background—secular 5- to 6-year-olds reported less familiarity with the entities than their religious peers. To confirm these results, a chi-square test of independence was performed to examine the relation between family background and the number of children who had heard about all three religious entities in the younger age group. The chi-square test confirmed that younger Christian children were more likely than younger secular children to have heard about all three religious entities, $\chi^2(1, 62) = 11.88, p < .001$.

Existence judgments. For the entities that children had heard about, children's replies to the two test questions concerning each entity were combined to yield four categories per entity (see Harris et al., 2006): very sure about nonexistence, not very sure about nonexistence, not very sure about existence, and very sure about existence. Note that because the four categories of children's responses were produced via children's answers to two separate, forced-choice questions, we treated these four categories as ordinal, rather than continuous, indices of children's confidence in a given item. A 4-point continuous scale would require equal distances between each point. Nevertheless, when we ran the same analyses treating children's answers as a continuous scale and used a mixed-effect linear model, the results remained similar (see online supplementary materials).

Figure 2 displays the proportion of children's responses for each type of entity (religious and scientific) falling into each of the four categories by age group and religious affiliation. Inspection of Figure 2 indicates that both 5- to 6-year-old and 9- to 11-year-old secular and Christian children were very sure about the existence of the scientific entities, with very low variability in their judgment. By contrast, whereas Christian children were mostly very sure of the existence of religious entities, secular children were often very sure of their nonexistence. Thus, the overall pattern of judgment by both age groups was similar to that of their parents.

To confirm these conclusions, we conducted a mixed-effects ordinal logistic regression analysis on children's existence judgments, with "very sure of nonexistence" as the reference level. The mixed-effects ordinal logistic regression allowed us to consider the variability within each individual by including each entity individually in the model. The initial model included entity type (scien-

Table 1
Percentage of Children Who Had Heard About a Given Number of Items (0–3) in Each Domain

Domain	Item familiarity	5- to 6-year-olds		9- to 11-year-olds	
		Secular (n = 34)	Christian (n = 29)	Secular (n = 31)	Christian (n = 20)
Scientific	0 items	.0	.0	.0	.0
	1 item	.0	.0	.0	.0
	2 items	2.9	6.9	3.2	15.0
	3 items	97.1	93.1	96.8	85.0
Religious	0 items	17.6	3.4	.0	.0
	1 item	26.5	3.4	.0	.0
	2 items	23.5	17.2	6.5	5.0
	3 items	32.4	75.9	93.5	95.0

tific, religious), religious affiliation (based on parents’ reported affiliations; religious, secular), and age group (younger, older) as fixed effects and participant as a random effect to account for within-subject variability. Adding the interaction between religious affiliation and entity type as a fixed effect significantly improved the model fit, ($df = 1$) = 94.95, $p < .001$, and this interaction was retained in the final model. Adding other interaction terms in the model did not significantly improve the model fit. As summarized in Table 2, the final model revealed significant main effects of religious affiliation and entity type, as well as a significant interaction between religious affiliation and entity type. The main effect of age group was not significant.

To further explore the significant interaction between religious affiliation and entity type, we first ran two mixed-effects ordinal logistic regressions on children’s judgments of the scientific and religious entities separately, with religious affiliation as a fixed effect and participant as a random effect. To account for multiple comparisons, we applied a Bonferroni correction and adjusted alpha level to 0.025. The results showed that Christian children and secular children did not differ significantly in their confidence in the existence of scientific entities ($\beta = -0.88$, $SE = 0.61$, $p = .15$, $OR = 0.41$, $CI [0.13, 1.36]$). By contrast, Christian children were more likely than secular children to be confident of the existence of religious entities ($\beta = 8.88$, $SE = 1.30$, $p < .001$,

$OR = 41.71$, $CI [10.76, 161.64]$). We also ran two mixed-effects ordinal logistic regressions on children’s judgments of each type of entity in the secular community and Christian community, respectively, to further explore the interaction between entity type and parental religious affiliation, with entity type as a fixed effect and individual child as a random effect. We accounted for multiple comparisons and adjusted critical p value to 0.0125. The results showed that secular children were more likely to be confident of the existence of the scientific as compared to the religious entities ($\beta = 7.33$, $SE = 0.82$, $p < .001$, $OR = 1524.7$, $CI [302.02, 7697.05]$). By contrast, there was no significant difference between Christian children’s judgments about the existence of religious and scientific entities ($\beta = -0.11$, $SE = 0.45$, $p = .80$, $OR = 0.89$, $CI [0.37, 2.16]$). Thus, the overall pattern of judgment by secular children and Christian children was very similar to that of their parents. In one respect, however, Christian children differed from their parents: whereas there was no significant difference in Christian children’s existence judgments with respect to religious and scientific entities, their parents were somewhat more confident about the existence of scientific as compared to religious entities. The relation between parents’ judgments and their children’s judgments is discussed in more detail in the next section.

The relation between parents’ and children’s judgments.
To examine the relation between parents’ and children’s judg-

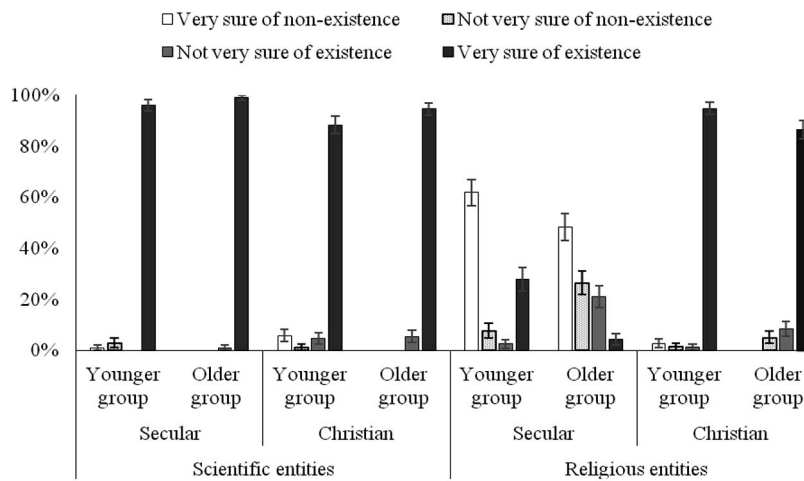


Figure 2. Children’s judgments about entities from each domain (religious and scientific) by age group and religious affiliation. Error bars represent standard error.

Table 2
Mixed-Effects Ordinal Logistic Regressions on Children's Existence Judgments

Variable	β (SE)	Z	Odds ratio	95% CI for OR	
				Lower	Upper
Intercept (Level 1)	-6.6 (.69)	.76	1.34	.63	2.84
Intercept (Level 2)	-5.44 (.63)	3.56	4.28	1.92	9.52
Intercept (Level 3)	-4.48 (.6)	5.58	11.2	4.79	26.1
Age group (younger as reference)	.09 (.42)	.21	1.09	.47	2.52
Religious affiliation (secular as reference)	5.55 (.64)**	8.63	992	263	3740
Entity type (religious entities as reference)	6.89 (.68)**	10.18	258	73.2	913
Religious Affiliation \times Entity Type	-7.02 (.82)**	-8.56	.001	.001	.004
-2LL	-304.34				
AIC	624.69				

Note. "Very sure of nonexistence" was used as a reference group. CI = confidence interval; OR = odds ratio.
** $p < .01$.

ments, we planned to analyze responses in the scientific domain and the religious domain separately. However, given the low variability of both children's and parents' judgments about the existence of scientific entities (i.e., consistently high levels of confidence in the existence of the scientific entities), only the relation between parents' and children's judgments about the religious entities could be analyzed through a mixed-effects ordinal logistic regression model. In the model for religious entities, the dependent variable was children's existence judgments for each religious entity, with "very sure of nonexistence" as a reference group. The initial model included parents' judgments of each entity (range 1-7), religious affiliation (based on parents' affiliation; religious, secular), and age group (younger, older) as fixed effects and participant as a random effect to account for the within-subject variability. Adding the interaction between religious affiliation and parents' judgments as a fixed effect significantly improved the model fit, χ^2 ($df = 1$) = 8.35, $p < .01$, and was retained in the final model. Adding other interaction terms in the model did not significantly improve the model fit. As summarized in Table 3, the final model revealed significant main effects of religious affiliation, parents' judgments, and age group, as well as a significant interaction between religious affiliation and parents' judgments.

The interaction between religious affiliation and parental existence judgments is illustrated in Figure 3. To further explore this interaction, we ran two mixed-effects ordinal logistic regressions on judgments of the religious entities by secular and Christian children, respectively, with parents' judgments and age group as fixed effects and individual child as a random effect. To account for multiple comparisons, we applied a Bonferroni correction and adjusted alpha level to 0.025. For secular children, the regression showed that neither parents' judgments ($\beta = 0.10$, $SE = 0.18$, $p = .55$, $OR = 1.11$, $CI [0.79, 1.57]$) nor age group ($\beta = -0.24$, $SE = 0.71$, $p = .73$, $OR = 0.78$, $CI [0.19, 3.13]$) had a significant main effect on children's judgments. As illustrated in Figure 3, parents' mean scores for the religious entities showed very little variation across all four levels of children's existence judgments, confirming the lack of any relation between parents and children. For Christian children, by contrast, there was a significant main effect of parents' existence judgments ($\beta = 3.92$, $SE = 1.97$, $p < .01$, $OR = 50.37$, $CI [1.06, 240.18]$) on children's existence judgments. The main effect of age group was not significant ($\beta = 0.18$, $SE = 2.89$, $p = .95$, $OR = 1.20$, $CI [0.0042, 345]$). As shown in Figure 3, Christian parents who were more confident about the existence of the religious entities had children who were also more confident about the existence of the religious entities. Note that the existence

Table 3
Mixed-Effects Ordinal Logistic Regression Models on Children's Existence Judgments of Religious Entities

Variable	β (SE)	Z	Odds ratio	95% CI for OR	
				Lower	Upper
Intercept (Level 1)	.003 (.003)	1.314	1.00	1.00	1.01
Intercept (Level 2)	1.75 (.003)**	671.008	5.75	5.72	5.78
Intercept (Level 3)	3.17 (.003)**	1223.863	23.85	23.73	23.97
Religious affiliation (secular as reference)	-7.74 (.003)**	-2869.95	.001	.001	.001
Parents' judgments	.07 (.003)**	26.08	1.07	1.07	1.08
Age group (younger as reference)	-.38 (.003)**	-141.78	.68	.68	.69
Religious Affiliation \times Parents' Judgments	2.22 (.003)**	825.44	9.22	9.18	9.27
-2LL	-196.33				
AIC	408.65				

Note. "Very sure of nonexistence" was used as a reference group. CI = confidence interval; OR = odds ratio.
** $p < .01$.

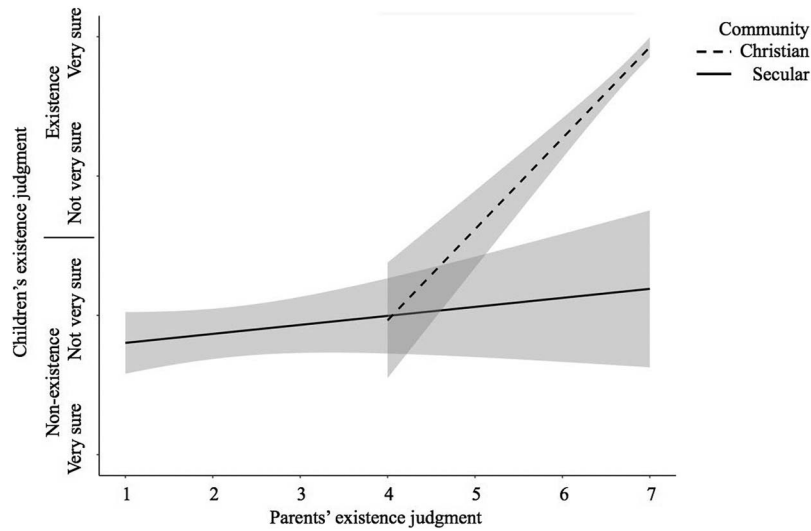


Figure 3. The relation between parents' and children's existence judgments with respect to unobservable religious entities.

judgment scores of Christian parents range from 4 to 7, as shown in Figure 3.

Discussion

We examined beliefs about the ontological status of unobservable scientific and religious entities among children and adults with different religious backgrounds in Mainland China, a largely secular society. We also examined the relation between the beliefs of children and their parents and the extent to which that relation was associated with consistency between parents' beliefs and those of the larger community. We found that both Christian and secular adults were very confident about the existence of unobservable scientific entities such as germs and oxygen. Christian adults were also confident about the existence of unobservable religious entities such as God and Heaven even if they expressed slightly less confidence in the existence of these religious entities as compared to the scientific entities. Secular adults, by contrast, were skeptical about the existence of the religious entities. Like their parents, Christian and secular children were very confident about the existence of the unobservable scientific entities. Also similar to their parents, Christian children were confident about the existence of the unobservable religious entities, whereas secular children were skeptical. Thus, the overall pattern of belief was similar for children and adults from the same backgrounds. Christian children resembled Christian adults and secular children resembled secular adults.

When we looked more closely at the relation between the beliefs of parents and the beliefs of their children, no analyses could be conducted for the scientific entities due to near universal confidence in their existence. In the case of religious entities, however, children's beliefs were similar to their parents' beliefs in the Christian sample, whereas no such relation was observed in the secular sample. In the following paragraphs, we first discuss adults' beliefs in the two domains for each community. We then consider children's beliefs. Finally, we discuss the relation be-

tween parents' beliefs and children's beliefs with respect to each domain and for each community.

It is not surprising to find that parents from both communities were very confident about the existence of unobservable scientific entities. These results echo the findings of Shtulman (2013) and Davoodi et al. (2018), showing that college students in the U.S. and adults in Iran express little doubt about the existence of such familiar and widely known scientific entities. With respect to the religious domain, the judgments of secular and religious parents followed the anticipated consensus within their respective communities. Whereas Christian parents were confident about the existence of the religious entities, secular parents expressed skepticism. These findings are also consistent with the finding of Shtulman (2013) that college students' confidence in the existence of both scientific and supernatural entities was significantly correlated with their perception of the community consensus regarding such entities. Finally, it is noteworthy that, like the secular parents, even the Christian parents were more confident of the existence of scientific as compared to religious entities, arguably because they are aware of the societal consensus and prevalence of beliefs about familiar scientific entities such as germs, as well as the lack of consensus about the existence of unobservable religious entities such as God, despite their fundamental role in Christian doctrine.

Children expressed a strong belief in the existence of unobservable scientific entities in both communities. There was also low variability in both communities, similar to the judgments of their parents. Children may have heard about these widely known scientific entities from a variety of sources, such as parents, teachers, TV shows, or textbooks. Importantly, these sources are likely to be consistent with each other, effectively generating a community consensus.

The results for children's belief in unobservable religious entities were both novel and informative. In the secular community, a considerable number of 5- to 6-year-olds had not heard about

some, or indeed any, of the religious entities. This result corroborates the paucity of testimony available to young children in the larger secular community of Mainland China about the existence of religious unobservable entities that are central to the Christian faith (e.g., God and Heaven). Without such testimony, it is difficult for children to form a belief in the existence of the relevant, unobservable entities. For secular children who had heard about the religious entities, despite the variability of children's and parents' judgments, we did not find a significant correspondence between parents' judgment and their own children's judgment. Does this mean that children spontaneously arrive at their own assessment of the existence of unobservable religious entities? We doubt this possibility because the mean judgments of children were similar to the mean judgments of parents in the secular community. Both parents and their children were similarly skeptical about the existence of unobservable religious entities. Thus, a more plausible explanation is that children in the secular community attend to subtle cues about the ontological status of religious entities from a variety of sources, such as parents, peers, cartoons, storybooks, and so forth, to form beliefs consistent with the consensus in their community (Harris, 2012; Harris et al., 2006; Shtulman, 2013). Future research should explore the influence of various sources beyond parental testimony on secular children's judgment of religious entities, as well as the way that these sources might change with age. For the time being, it is reasonable to conclude that most children living in China have little or no exposure to testimony affirming the existence of religious entities.

More 5- to 6-year-olds had heard about the religious entities in the Christian community as compared to the secular community, implying greater access to religious testimony in the Christian community. In addition, children's mean existence scores were similar to their parents' mean existence scores. Effectively, both parents and their children subscribe to the existence of the religious entities. More importantly, parents' endorsement of and confidence in the existence of religious entities was positively associated with the pattern of endorsement and confidence displayed by their children in both age groups. It is plausible that parents' degree of confidence in their beliefs is transmitted through linguistic cues, just as parents talk differently about historical as compared to fantastical entities (Canfield & Ganea, 2014; Woolley, Ma, & Lopez-Mobilia, 2011). Indeed, as noted in the introduction, due to the minority status of Christian belief in Mainland China, Christian parents may be highly motivated to talk about religious entities that are fundamental to their faith in order to sustain the beliefs that distinguish them as a minority group (Chavkin, 1989; Cho, Cho, & Tse, 1997; Fulton, 2015; Lian, 2010). The linguistic cues that Christian parents use to convey their confidence in the existence of unobservable religious phenomena warrant further exploration. It is also important to keep in mind the possibility that Christian children may not learn exclusively from their parents but also from other members of the Christian community to which their parents are likely to be affiliated.

We did not find any change in Christian children's ontological judgments about religious entities before and after the start of formal schooling, nor did we find any age-related change in the association with parents' judgments. Indeed, Christian children from both age groups were as confident about religious entities as they were about scientific entities. There are several possible

explanations for the stability in children's beliefs. First, as mentioned, children in the Christian community may learn about religious entities from sources other than their parents and may already be exposed to these sources by age 5 through community events such as church services and Sunday schools. Exposure to these different sources might help children infer a community consensus about the existence of unobservable religious phenomena. Moreover, Christian parents are likely to echo this community consensus via discussion in the home. Such consensus information from various sources may serve to override alternative views (Corriveau, Fusaro, & Harris, 2009). This interpretation is in line with earlier findings that the confidence expressed by children and adults in the existence of unobservable entities is highly correlated with their perception of the degree of community consensus surrounding such entities (Harris et al., 2006; Shtulman, 2013).

Second, although 9- to 11-year-old Christian children are likely to encounter objections toward superstitious beliefs in textbooks, it is possible that they differentiate such superstitious beliefs from their Christian beliefs and view them as two different systems. Admittedly, miracles in Bible stories, such as walking on water, are not fundamentally different from the magical or supernatural powers described in fantastical stories—in each case there is a violation of natural causal laws. Nevertheless, adults who believe in Christianity do differentiate Biblical miracles from other types of supernatural transformation and have faith in the former but not the latter. Corriveau et al. (2015) found that 5- to 6-year-old Christian children were more likely to view stories as real if they included a Biblical miracle rather than a magical or fantastical transformation. It remains an open question as to how far 9- to 11-year-olds differentiate between religious miracles, the magical powers that are present in fantastical stories, and the superstitious beliefs that are criticized in Chinese textbooks. Future exploration of this question could help to assess the impact of textbook and broader school-based criticism on the beliefs of Christian children.

Finally, despite talk about superstition in elementary school in China, there is not much explicit talk about belief in a specific religion, including Christianity, until secondary school. As reviewed in the introduction, there is little discussion of religious phenomena in the larger society of Mainland China. The paucity of testimony about other religions and religious beliefs may allow Christian children to develop a firm confidence in the existence of unobservable phenomena in Christianity that persists into late childhood. Guerrero et al. (2010) interviewed children in Spain, where there is a relatively homogenous set of religious beliefs. They found that 4- to 6-year-olds and 7- to 9-year-olds confidently endorsed both scientific and endorsed entities, and there was no significant difference in the confidence about the existence of two types of entities. Most of these children also claimed that everyone else believes in the existence of such entities. However, older children, aged 10 to 12 years, differentiated between the two groups of entities—they were more confident about the existence of scientific as compared to religious entities. They also judged that other people would be less confident about the existence of the religious entities, as compared to the scientific entities. By implication, older children have more opportunities to be exposed to inconsistent talk about endorsed concepts from various sources. Thus, Christian children in Mainland China may eventually have more confidence in scientific as compared to religious entities, just like their parents, through exposure to the mainstream, secular

beliefs in the community. To summarize, several different factors likely contribute to the correspondence between Chinese Christian children and their parents' belief in the religious entities through age 11. As stated in the literature, multiple factors including the credibility and quality of sources and information, children's cognitive abilities to decipher that information, and the affective context are likely to influence children's evolving beliefs and attitudes (Lane & Harris, 2014; Woolley & Ghossainy, 2013). The extent to which our results can be applied to other contexts or domains where parental testimony does not match the broader cultural pattern is an important topic for future research.

One limitation of our approach is that in order to present children with simple and easily understood questions about the existence of unobservable entities, the scales that we used for children and parents were different. Parents' judgments were measured with a 7-point Likert scale, whereas children's judgments were assessed through two binary questions that yielded a categorical score. It would be desirable for future studies to employ a rating scale for children's judgment that more closely matches the rating scale for parents. Our study is also limited by the relatively small number of older children in the Christian sample compared to other groups, mainly due to the challenges associated with recruiting people who self-identify as Christians in Mainland China, as discussed earlier in the section on participants. However, despite limited numbers, clear patterns emerged in our results, suggesting an association between testimony and ontological beliefs among Christian populations in China. In addition, among secular children, familiarity with the religious items was low, especially among the younger children. This limited the sample size in this group, possibly affecting comparisons to the Christian sample. Although mixed-effects ordinal logistic regression analyses allowed us to make use of every data point available for each participant, it is recommended for future studies to expand the sample size with a view to reaffirming these conclusions. Finally, beyond the documented association between community consensus and children's beliefs about unobservable entities, children's developing cognitive and conceptual abilities are also likely to influence their representations of the unobservable and merit inclusion in future research (Lane & Harris, 2014; Woolley & McInnis Brown, 2015).

In summary, the current study is the first to examine the judgments of children and their parents concerning the ontological status of various unobservable scientific and religious phenomena in two different samples in Mainland China—one belonging to the larger secular majority and the other to the Christian minority. Children's beliefs about religious phenomena were found to be similar to those of their parents. Thus, although the Christian children were growing up in a society where most adults profess skepticism about religious entities, they expressed confidence in such entities, paralleling the beliefs of their parents.

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