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Epistemic justifications for belief in the unobservable: The impact of minority status

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ABSTRACT

Children hold beliefs about religious and scientific entities, such as angels or germs, that they cannot directly observe or interact with. Given their limited opportunities for first-hand observation, children's beliefs in these entities are a clear example of cultural learning and are likely to vary based on cultural factors. In the present study, we investigated variation in the epistemic stance of 4–11-year-old children growing up in a religious minority in China (N = 47), a religious majority in Iran (N = 85), and a religious majority in the U.S. (N = 74). To assess the role of community status as a domain-specific, as opposed to a domain-general, factor contributing to children's beliefs about unobservable entities, we compared children's beliefs about religious unobservable entities with their beliefs about scientific unobservable entities in these three communities. In all three communities, younger and older children were confident that unobservable religious and scientific entities exist. However, compared to children in Iran and the U.S., children from the religious minority group in China were more likely to justify their ontological beliefs about religious entities by appealing to the source of their beliefs. These results highlight the impact of community status on learning from testimony about unobservable entities. Additionally, the results show that under certain circumstances – notably when holding minority beliefs – tracking the source of beliefs serves as a central epistemic justification.

1. Introduction

How do children come to believe that unobservable entities exist? In many parts of the world, children are exposed to stories, teachings, and everyday talk that presume the existence of unobservable entities from religious traditions, such as gods, angels, heaven or hell. Children are also exposed to discourse and practices that presume the existence of scientific phenomena, such as oxygen or germs. Given that children do not have the opportunity to directly observe, or interact with, such unobservable phenomena, they are likely to form ontological beliefs about them based on culturally relevant norms, practices, and talk. Indeed, a variety of studies suggest that testimony plays a key role in children's developing beliefs about entities for which opportunities for first-hand experience and observation are limited (Harris, 2012; Harris, Koenig, Corriveau, & Jaswal, 2018).

There is, however, meaningful cultural variability in adults' beliefs and testimony about unobservable entities from different domains (Cui et al., 2020; Clegg, Cui, Harris, & Corriveau, 2019; Davoodi et al., 2018; Canfield & Ganea, 2014; Guerrero, Enesco, & Harris, 2010). For example, adults with religious beliefs express high confidence in the existence of unobservable religious entities whereas adults without religious beliefs express doubts about their existence. Yet, even highly religious adults express greater confidence in the existence of unobservable scientific entities as compared to religious entities. Children's ontological beliefs about unobservable entities are likely to reflect this cultural variability. In the current study, we examined the impact of a neglected but potentially important type of variation – the status of children's immediate religious community within the broader society. We systematically compared the development of children's beliefs about unobservable religious phenomena as well as their

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epistemic justifications for those beliefs across three religious communities that differed with respect to their minority or majority status within the broader society: Christian Chinese children (i.e., a religious minority in a majority secular society), Muslim Iranian children (i.e. a religious majority in a majority religious society), and Christian U.S. children (i.e., a religious majority in a pluralistic religious society). In addition to children's beliefs about unobservable religious entities in these three communities, we also investigated beliefs about unobservable scientific entities. Within each domain (religion and science), we focused on entities whose existence is presumed by most adults in children's immediate communities: God, angels, and heaven in the domain of religion, and oxygen, electricity, and germs in the domain of science.

Although children do not naively presume the existence of all unobservable entities, children in most of the religious communities studied so far have expressed a belief in religious entities such as God, angels, or heaven (Corriveau, Chen, & Harris, 2015; Davoodi et al., 2018; Guerrero et al., 2010). Moreover, in these same studies, children have also been shown to be confident about the existence of commonly endorsed scientific entities such as germs, oxygen, or electricity. However, children have proven less confident about the existence of fantastical entities, such as ghosts, that are not typically endorsed as real by adults in their communities (e.g., communities in Spain with a strong Catholic tradition). In past research, however, there has not been a systematic comparison of children across different community backgrounds or consistent information about the religious status of children's families. In the current project, we selected three religious communities that differ in their status with regard to the large-scale majority religious beliefs of their respective societies. We examined the impact of community status on children's beliefs in high consensus entities.

Given that the three communities differed mainly with respect to how their religious beliefs and practices differentiated (or did not differentiate) them from society at large, we did not expect differences in children's beliefs with respect to scientific unobservable entities nor in their justification of those beliefs. In other words, we selected highly-endorsed scientific entities such as *germs* and *oxygen*, for which children should receive consistent testimony about regardless of their religious background. On the other hand, we did expect specific, cross-cultural patterns in ontological beliefs, and justifications with respect to beliefs about unobservable religious entities. Before discussing these patterns and motivating our predictions, we first describe the cultural backgrounds of our three samples to highlight relevant similarities and differences.

1.1. Cultural background

In each sample, children were growing up within religious families, but these families were embedded in three societies – the U.S., Iran, and China – that differ greatly with respect to the social value of religion and the diversity of community religious belief. Below, we describe the cultural environment for each group of children.

1.1.1. U.S.

Children in the U.S. sample were attending parochial, Catholic, private elementary schools in the greater Boston metropolitan area. U.S. society includes a diverse array of religious ideologies and beliefs but in a recent Gallup survey, 73.7% of a nationally representative sample identified as "Christian" (Gallup, 2016). Thus, the U.S. can be characterized as a Christian-majority society, although 18.2% of the population identifies as having no religion, 2.1% affiliates with Judaism, and 0.8% identifies as Muslim (Gallup, 2016). Similarly, in the 5th wave of the World Values Survey (2005), 69% of U.S. adults indicated that they are a "religious person", with only 3.4% indicating that they are a "convinced atheist". Focusing more closely on statistics from the Boston metropolitan area, in 2014, 57% of adults surveyed affiliated with Christianity, with 29% of Christian respondents identifying as Catholic, and overall, 44% indicated that they were "absolutely certain" of the existence of God (Pew Research Center, 2014a, 2014b). The Catholic beliefs presented in the children's schools, emphasize, as stated by the Superintendent of the Archdiocese of Boston Catholic schools, "a rich exposure to the Catholic faith" including "mak[ing Christian] prayer a central part of their lives, affording frequent opportunities to experience the beauty of the Mass, and expos[ing] them to sacred music" (Carroll, n.d., retrieved 2019). These beliefs, therefore, which emphasize and reinforce the existence of a Christian God, are broadly aligned with majority values and ideology in U.S. society. Thus, although they live in a relatively pluralistic society with respect to religious belief, the children in our U.S. sample were exposed to religious teachings and ideology at school that is consistent with the kinds of religious ideology and belief espoused by a majority outside of their immediate communities.

1.1.2. Iran

Because the Iranian state is a theocracy, all children are exposed to uniform religious teaching based on Shia Islam, and the larger society subscribes to a uniform set of religious beliefs. Thus, our study included a relatively representative sample of Iranian children living in Tehran, who are exposed to mainstream Islamic (Shia) ideology and beliefs from several sources, including the family and school. Iranian society can be characterized as religiously homogenous, with 91% of the population identifying as "Shia Muslim" on a World Values Survey administered in 2005. Eighty-one percent of adults indicated that they are a religious person, with only 0.1% indicating that they are a "convinced atheist". As compared to U.S. society, which scored as "moderate" on an index of religious diversity, based on a 2010 religious composition estimate for the world's population, administered by the Pew Research Center (2014a, 2014b), Iran scored "low" on religious diversity, with an estimate of > 99% of the population affiliating with Islam. Moreover, all Iranian children who come from Shia families participate in mandatory Quran and Religious Studies classes at public and private schools, starting in first grade. In Quran lessons, children read and recite the Quran. In Religious Studies lessons, they learn about stories from the Quran, including the lives and miracles of the prophets (Mehran, 1997, 2007). Moreover, preschool education also emphasizes religious teachings and is presumed to contribute to the religious and spiritual growth of children as young as 2 years (Sorkhabi, 1992). The group of children we tested in Iran was representative of the society's majority with respect to their religious beliefs and practices.

1.1.3. China

China, in contrast to Iran and the U.S., is an atheist society where adherence to religious beliefs is unusual, and sometimes controversial, given that the larger society does not endorse any religion. In the Chinese sample, we included children who lived in several urban cities in Mainland China (Beijing, Tianjin, Jinan, and Shanghai), and were members of families who self-identified as Christian. According to a recent Gallup survey, 77% of Chinese respondents identify with no religion or are agnostic. The religiously unaffiliated make up the majority of the population in China (Pew Research Center, 2012). Moreover, Chinese children's exposure to religious beliefs and teachings is very limited in all aspects of public life, including formal education, since the national curriculum for all elementary schools is regulated by the Chinese government (OECD, 2016) and elementary school textbooks explicitly discourage beliefs in the superstitious beliefs associated with Chinese folk religions and 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). By contrast, evolutionary theory is part of public

education in Mainland China (Liang & Cobern, 2013) and is taught in both primary and secondary schools. Moreover, the curriculum for moral and political education, at the primary school level, is designed in accordance with Marxist theory, which renders religious belief as conflicting with science and modern history (Wang & Uecker, 2017). Thus, the group of Chinese participants belonged to a religious minority, in contrast to the secular beliefs and practices prevalent in the broader community, including the sphere of education.

In sum, all three samples of children were likely to be exposed to religious beliefs within their family and immediate circle. Those beliefs were likely to be shared by the broader society in both the U.S. and Iran but they were not shared by the broader society in China.

Consistent with our sampling objectives, when we asked the parents of the children included in our sample whether they were religious or not, 82% of Iranian parents indicated that they were religious and 100% percent of Chinese parents did so. We do not have comparable data from the U.S. parents, but regardless of the degree to which children in our U.S. sample were exposed to religious teachings and beliefs at home, all were exposed to Christian teaching at school. Thus, the Iranian sample represents Iranian society as a whole in terms of parents' religious identification and children's exposure to religious teachings, and the same is likely to be true of the U.S. sample. By contrast, the Chinese sample is markedly different from Chinese society as a whole.

These differences among the three samples allowed us to probe the role of community status in the development of beliefs about unobservable religious entities. Below, we discuss possible developmental patterns in ontological beliefs and justifications for those beliefs, against the backdrop of the differences in community status outlined above.

1.2. Children's confidence in the existence of unobservable entities (ontological beliefs)

Prior work has shown that children's ontological beliefs about unobservable entities are influenced by their home and school environments. For example, Corriveau et al. (2015) and Vaden and Woolley (2011) found that, as compared to children with limited exposure to religion, young children in the U.S. who are exposed to religion either at school or at home were more likely to believe that narratives about physically impossible occurrences – miracles – are true rather than fictional (see also Davoodi, Corriveau, & Harris, 2016). Iranian children's beliefs about the existence of unobservable religious entities reflected their parents' beliefs about those entities, especially among children in their early elementary school years, with both children and their parents indicating that they were very confident that entities like God and angels exist (Davoodi et al., 2018). Moreover, children growing up in religious families in China were very confident that religious unobservable entities exist whereas children growing up in secular families were skeptical. More generally, there was an association between children's beliefs and their parents' beliefs in these religious communities in China (Cui et al., 2020). In sum, prior work suggests that, in various cultural settings, exposure to religion contributes to children's high levels of confidence about the existence of unobservable religious entities. Accordingly, we expected children in all three communities in the current study (i.e., Chinese Christian children, Iranian Muslim children, and children from Catholic schools in the U.S.) to be confident about the existence of religious entities, given that all children were exposed to religion through various social institutions. However, we investigated whether, within the limits of these high levels, children's confidence about the existence of religious entities varies with their community status as religious majority or minority.

One possible pattern, especially as children grow older and engage with social institutions beyond the family and their immediate circles, is that their beliefs will be increasingly impacted by the dominant discourse of society. Thus, when children come from minority religious communities, their confidence in the existence of religious phenomena might decline as they come into contact with the alternative beliefs of the wider community. Such a decline should not, however, be observed among children who are from religious majority communities.

Another possibility is that children's ontological beliefs about religious unobservable entities will continue to reflect the beliefs espoused by their immediate family and community, even after exposure to the beliefs in the broader community. Hence, not only children from majority religious communities, but also those from minority communities, may continue to confidently believe that entities like God, heaven, or angels exist – even after learning that most people do not share their beliefs. In the current project, we systematically investigate these two possibilities.

Turning to children's ontological beliefs about unobservable scientific entities, it is plausible that children's beliefs will display a similar developmental pattern in all three samples, regardless of religious community status. This outcome is plausible in light of previous research showing a high consensus regarding the existence of scientific unobservable entities in Iran (Davoodi et al., 2018; Payir, Davoodi, Sianaki, Harris, & Corriveau, 2018), as well as China and the U.S. (Clegg et al., 2019; Cui et al., 2020).

1.3. Children's justifications for their beliefs in unobservable entities

In the current study, we focused on the way that children's experiences may impact their patterns of justification for their ontological beliefs. Past research examining children's justifications for their ontological beliefs about unobservable entities has identified three different types of belief justification among children: *encounter* (i.e., references to having seen the entity, e.g., "I have seen one before"), *source* (i.e., references to an oral or written source of information about the entity, e.g., "my mom told me that"), and *elaborations* which provide more information about what the entity is or does (e.g., "we can breathe with oxygen"; "angels are in the sky") and may refer to causal characteristics or powers of the entity (e.g., "oxygen provides air for us to breathe") (Guerrero et al., 2010; Harris, Pasquini, Duke, Asscher, & Pons, 2006).

Despite the considerable evidence highlighting the key role of various sources of information, both oral and written, in the development of children's beliefs about unobservable entities, children do not often refer to those sources. Indeed, references to sources were the least common mode of justification offered by children in previous research. When providing justifications for their ontological beliefs about unobservable scientific entities, 4–8-year-old children primarily offered elaborations. They also offered elaborations to justify their beliefs in fantastical entities whose existence is typically endorsed by adults in their communities (e.g., Santa Claus, the Tooth Fairy) (Guerrero et al., 2010; Harris et al., 2006). In addition, when children from Catholic communities in Spain were asked about unobservable religious entities, they also, offered elaborations as their most frequent justification (Guerrero et al., 2010). In sum, children in the communities studied to date rarely refer to the source of their ontological beliefs when asked for justifications. Rather, they often elaborate on the attributes, including the causal attributes, of the entity in question.

Other findings also indicate children's insensitivity to the source of their knowledge or belief. The ability to identify the source of their knowledge about simple facts in response to explicit, forced-choice questions (e.g., whether they have seen or been told where an object is located) emerges between 3 and 5 years of age (Gopnik & Graf, 1988). Nevertheless, research with 3–6-year-old children on the formation of false memories and false beliefs indicates that children frequently misidentify the source of what they believe or know. For example, they claim to have witnessed events that they learned of only via rumors (Principe, Cherson, DiPuppo, & Schindewolf, 2012; Principe, Daley, & Kauth, 2010; Principe, Haines, Adkins, & Guiliano, 2010; Principe & Schindewolf, 2012). Moreover, in a series of studies, Taylor and her colleagues showed that 4- and 5-year-old children are generally

inattentive to the way they acquire general encyclopedic information (Taylor, Esbensen, & Bennett, 1994). For example, having learned about a novel fact, such as how litmus paper turns pink when dipped in acid, most four-year-olds, as well as some five-year-olds, erroneously claimed that they had known this fact for a "long time". Research on the role of *evidentiality* in language (the linguistic encoding of the source of information) on children's ability to track and cite sources of information further supports the claim that source-tracking poses considerable problems even for children who learn a language that marks *evidentiality* in its morphology (see Papafragou, Li, Choi, & Han, 2007). In sum, several lines of evidence indicate that young children often have difficulty in encoding or retaining the source of their knowledge and beliefs.

However, children might be especially attuned to the source of their beliefs under certain circumstances. For example, Taylor and her colleagues showed that although 4–5-year-olds typically do not recognize how they acquire information, when a particular learning experience (e.g., learning new facts and exposure to novel information, such as the name of the color *ochre*) is highlighted in some way, children can more accurately identify the source of the information (Esbensen, Taylor, & Stoess, 1997; Taylor et al., 1994). In light of these findings, exposure to conflicting information might play an important role in children's ability to recognize and track sources of information. The past literature has typically focused on children's ability to identify sources when receiving consistent information, whereas, in many cases, children may encounter conflicting information. For example, our unpublished data show that children growing up in religious minority households are told that various unobservable religious entities exist whereas most people in the larger society believe that they do not exist. Thus, belonging to a minority group might enhance children's tendency to track and remember the source of their beliefs. We elaborate on this rationale below.

Consider a child growing up in a religious family, with parents who talk about God and Heaven, affirming their existence. Suppose further, that this child lives in a largely atheistic society, where many aspects of public life are governed by a secular ideology and where religious belief is regarded as suspect. By contrast, consider a different situation, notably a child growing up in a family of religious believers in a society governed by a theocratic regime, where many aspects of public life are governed by religious ideology and religious belief is encouraged by various social institutions. Unlike the child in the latter scenario, the child in the former scenario will experience a lack of consistency between the ontological beliefs espoused in their immediate community (e.g., in the family) and those promoted in the wider society. These hypothetical scenarios, presuming communication between religious parents and their children about religious beliefs and unobservable entities are, indeed, confirmed by work on the content, style, and frequency of conversations in religious households (Boyatzis & Janicki, 2003; Dollahite & Thatcher, 2008). In our unpublished data on parent-child talk from the three countries included in the current manuscript, we also observe higher frequency of talk about religious entities, as well as more belief-based talk, among religious families.

Experiencing a lack of consistency between the beliefs expressed in their homes and those promoted in the wider society might impact the development of children's beliefs in a number of ways. One possibility is that with increasing age and greater years of formal schooling, children's confidence in the existence of unobservable religious entities as well as their reliance on their parents or other information sources in their immediate communities might decline as a result of increased exposure to views that differ from those endorsed at home. In an effort to adjust their view to those of the mainstream, children from minority communities might no longer recognize, or fully endorse, information from parents or other domestic sources. Evidence supporting this possibility comes from studies with immigrant children in the U.S. showing that those who attend regular, mainstream schools, develop different views from their parents about the relevance and importance of their heritage language (Zhang & Slaughter-Defoe, 2009). If this is also the case for children's religious beliefs, Chinese Christian children should not only become less confident about the existence of religious unobservable entities after a few years of schooling, but they should also make fewer references to their source when asked to justify their ontological beliefs about religious unobservables. By contrast, no such developmental shift would be expected among U.S. Christian children or Iranian Muslim children.

An alternative possibility is that even as minority children begin to participate in social institutions beyond the family, they remain confident of the existence of unobservable religious entities (see Cui et al., 2020), but alongside this continued confidence, they increasingly recognize the significance of particular sources as a reason to believe. Specifically, if children from minority communities remain confident about beliefs encouraged at home, even after they are exposed to majority beliefs, they may start to realize the significance of cognitively and pragmatically separating private beliefs (i.e., those espoused at home) from publicly expressed beliefs (i.e., those espoused by the larger social structures). This pattern might be especially likely if the larger community, whether tacitly or explicitly, discourages the beliefs expressed within the home. To cognitively make such a separation between private and public beliefs, children would need to track the sources of their beliefs, thus increasing source salience. Therefore, when justifying their beliefs about the existence of unobservable religious entities, children in religious minority communities might be more attuned to the source of their beliefs. On this hypothesis, Chinese Christian children should cite the source of their beliefs more frequently than the U.S. or Iranian children in our sample, especially with increasing age.

Children growing up in a religious majority group, by contrast, whether in a pluralistic society with multiple religious beliefs, or a uniform society with one set of dominant religious beliefs, would not perceive a conflict between beliefs promoted at home and those espoused by the larger society. If there is no conflict between the beliefs of children's immediate circle and those of the broader society, children may have no pragmatic reason for tracking the sources of their beliefs, because the information provided by all sources converges. As a result, other patterns of justifications, such as elaborations about the powers or characteristics of unobservable entities (e.g., "God created us all") may predominate. On these hypotheses, elaborations should constitute the predominant mode of justification among the Iranian and U.S. children in our sample.

1.4. The current study

We examined the role of religious community status in children's developing beliefs about the existence of unobservable religious entities as well as their justifications for those beliefs. We assessed children's beliefs about the existence of three unobservable religious entities (God, angels, heaven) and three scientific entities (germs, oxygen, electricity) among younger children with limited exposure to formal education, as well as older children with several years of schooling. Motivated by the theoretical considerations outlined above, we anticipated that there might be meaningful differences between children from religious minority and majority communities in the frequency with which they justify their beliefs about unobservable religious entities in terms of the source of their beliefs, rather than in terms of encounters with, or elaborations about the entities in question. Moreover, if this line of reasoning is valid, the pattern of heightened source awareness should be confined to beliefs about unobservable *religious* entities. Hence, we did not anticipate meaningful cultural differences in the way that children justify their beliefs about unobservable scientific entities.

Table 1
Characteristics of the sample in each country with respect to the immediate circle of the family, the larger society and the community status.

Sample	Immediate circle	Society	Community status
U.S.	Exposure to religious (Catholic) values.	Exposure to religion is widespread, with some religious diversity.	Majority in a relatively diverse society
China	Exposure to religious (Protestant) values.	Publicly atheist. Exposure to religion is limited.	Minority in a relatively uniform society
Iran	Exposure to religious (Islamic) values.	Overtly religious. Exposure to religion is widespread with little religious diversity.	Majority in a relatively uniform society

2. Method

2.1. Design

Table 1 summarizes both the common and the distinctive characteristics of our samples in the three societies, Iran, China, and the U.S., with respect to their community status in terms of religious beliefs and in relation to the larger society. As shown in Table 1, the samples differ with respect to community status, with the sample from China representing a religious minority group and the samples in Iran and the U.S. representing majority groups.

2.2. Participants

Two hundred and six children (*Range* [4.16–11.41 years], $M = 7.76$, $SD = 2.08$) participated across the three countries. The breakdown by country, age and gender, as well as the recruitment methods in each setting are outlined below.

2.2.1. U.S.

74 5–11-year-olds (*Range* [5.28–11.34 years], $M = 7.64$, $SD = 0.46$, 35 female) participated in the U.S. Three additional children participated but were excluded from all analyses because their ages were unknown. Participants were recruited from two private religious schools in suburban neighborhoods of Boston. Consent forms were distributed to all parents of classrooms within the desired age range. Children whose parents returned a signed consent form to the schools were tested individually in a quiet room in their schools.

2.2.2. Iran

85 5–11-year-olds (*Range* [5.03–11.34 years], $M = 7.96$ years, $SD = 2.06$, 42 female) participated in Iran. Participants were recruited through social media, word of mouth, or from local cultural centers offering extracurricular summer classes to children free of charge. Advertisements were posted on social media groups and on "channels" devoted to parenting or children's events. Families who were recruited through social media travelled to the Mother-Child Center, a university-affiliated research and therapy center in Tehran. Families who were recruited from local cultural centers were informed by the Center about the study and individual children were tested during breaks and between classes. In both cases, testing took place in a quiet room with individual children. The sampling method in Iran ensured diversity and representativeness because the sample was not limited to a specific neighborhood or group. Parents identified their religious denomination as part of a parent questionnaire. All parents, with the exception of three who identified as "not affiliated with any religion", identified as Muslim. For reasons of confidentiality, all information was collected anonymously. Parents did not sign a consent form but were provided with an information sheet and asked to provide verbal assent if they agreed to testing. The institutional review board at the first authors' institutions approved this approach. All children were interviewed by Iranian research assistants, who were entrusted by parents and administrators of the cultural centers to ask children about their religious beliefs.

2.2.3. China

47 4–11-year-olds (*Range* [4.16–11.41 years], $M = 7.60$ years, $SD = 2.19$, 17 female) participated in China. Participants were recruited through a snowball sampling method by Chinese research assistants who self-identified as Christian in urban areas in China, including Beijing, Tianjin, and Shanghai. Parents of participating children were asked about their religious denomination in a questionnaire to confirm their religious identity. All parents identified as Christian Protestants. As in Iran, for reasons of confidentiality, all information was collected anonymously. Parents did not sign a consent form but were provided with an information sheet and were asked to provide verbal assent if they agreed to testing. All children were interviewed by a Chinese research assistant who self-identified as Christian and had the trust of the children's parents in asking children about their religious beliefs at a local church during Sunday school.

2.2.4. Age across samples

A one-way ANOVA with Age as the dependent variable and Country as a factor showed no significant differences in the average ages of the children in the three countries ($F(2, 203) = 0.65$, $p = 0.52$). Throughout the Results section, we include Age as a continuous variable in all initial models. Follow-up analyses, where needed, subsequently bin children into two theoretically-motivated age groups, notably to compare the patterns among younger children (with, at most, one year of formal schooling in each culture), and older children (with > 1 year of schooling). Accordingly, reflecting the culture-specific demographics of our sample, when we refer to "age groups", the breakdown is as follows: In the U.S., the younger age group consists of 5–7-year-olds ($N = 49$, *Range* [5.28–7.81]), all in kindergarten or first grade, again with a maximum of one year of formal schooling. The older group in the U.S. consists of 9–11-year-olds ($N = 25$, *Range* [9.00–11.34]), all in fourth or fifth grade. In Iran, the younger age group consists of 5–6-year-olds ($N = 42$, *Range* [5.03–6.95]) with, at most, one year of formal schooling, because elementary school education starts at the age of 6 in Iran, and the years before elementary school education are not part of formal education (ACEI Global, 2018). The older age group in Iran consists of 8–11-year olds ($N = 43$, *Range* [8.96–11.35]) with 3 to 6 years of formal schooling. Finally, in China, the younger age group consists of 4–7-year-olds ($N = 28$, *Range* [4.16–7.51]) with, at most, one year of formal schooling, because children begin school at the age of 7 (or 6 if they live in Beijing, Shanghai, or other major cities) (InterNations, 2018). The older group in China consists of 9–11-year-olds ($N = 19$, *Range* [9.20–11.41]), with 3 to 6 years of schooling. Note that because the exact range for each of these theoretically motivated age groups is not consistent across the three samples, our initial analyses include Age as a continuous variable, which as noted above, is not statistically different across the three samples.

2.3. Procedure

All materials presented in Persian and Chinese were first translated from English by native speakers into Persian and Chinese, then piloted with a group of adult native speakers and revised accordingly to ensure cultural relevance and appropriateness.

Children in all three countries completed the testing session in a

Table 2
Entities that children were asked about in all three countries.

Religious entities	Scientific entities
God [上帝; خدا]	Germs [细菌; میکروب]
Heaven [天堂; بهشت]	Oxygen [氧气; اکسیژن]
Angels [天使; فرشته ها]	Electricity [电; برق]

Note: Based on piloting different translations, the appropriate translation for the word "Germs" into Persian was the word "میکروب", which literally translates back to English as "microbes". Likewise, piloting showed that an appropriate translation for the word "Electricity" into Persian is "برق", which translates back into English as "power" and is equivalent to the way it is used in phrases such as "Department of Water and Power". Piloting in China showed that compared to other possible translations of "God", "上帝" was heard most often by children and was thus taken as the appropriate translation.

quiet room with one experimenter presenting the stimuli in the same manner across all sites. In all three countries, children were first presented with 2 warm-up items and asked about their existence (i.e., "Are dogs real or not real?" and "Are flying dogs real or not real?") with the experimenter providing feedback on both items. Note that across the three countries, only two children (one in China and one in Iran) in the younger age group did not provide correct answers to the warm-up trials, and in both cases, the experimenter ensured that children understood the questions by providing feedback, before moving on. Next, children were asked about their confidence (i.e., "How sure are you? Are you very sure or are you not very sure?"). Following these warm-up trials, children received two types of test trials (see Table 2), which included three religious entities (God, heaven, angel) common to all three religious tradition (Islam, Catholicism, and Protestantism), as well as three common scientific entities (germ, electricity, oxygen). The target items were also selected to be consistent with prior research (see Guerrero et al., 2010; Harris, Abarbanell, Pasquini, & Duke, 2007; Harris et al., 2006). These questions were part of a longer session probing various aspects of children's beliefs about unobservable entities.

Entities were presented individually, in a random order, by the experimenter who drew a card from a shuffled deck, with one of the six entities written on it. The experimenter then asked children three forced choice questions about each entity. First, children were asked whether or not they had heard about the entity. Testing for the relevant item discontinued if children indicated never having heard about it. Otherwise, the experimenter asked the second question about whether or not the entity exists (*existence question: "Is/Are X(s) real or not real?"*). Next, children were asked how certain they were about their answer to the existence question (*certainty question: "Are you very sure or not very sure?"*). Both the existence and certainty questions included a forced choice item, ("real" vs. "not real" and "very sure" vs. "not very sure") effectively yielding four categories of confidence: *very sure entity exists*, *not very sure entity exists*, *not very sure entity does not exist*, and *very sure entity does not exist*.

Following the certainty question about each entity, children were asked a justification question. Specifically, they were asked to say how they knew that the entity exists/does not exist: *"So you said that X(s) exists/does not exist. How do you know that X(s) exists/does not exist?"*.

2.4. Coding and measures

2.4.1. Confidence judgments

Children's responses to the *existence* and *certainty* questions formed a 4-level categorical variable (Confidence), which we used in all models of children's confidence judgments for each type of entity (religious, scientific).

2.4.2. Justifications

A coding scheme was created after systematic discussion among the collaborators from the three different countries. The final scheme was adapted from Harris et al. (2006) and Guerrero et al. (2010). Table 3 shows the final coding categories, as well as examples of each category. Note that, with the exception of the *uninformative* category, the other categories are not mutually exclusive. All responses were coded by a pair of research assistants, fluent in the local language. Agreement between the pair of coders in the U.S., Iran and China was respectively 94% ($\kappa = 0.88$), 91% ($\kappa = 0.82$), and 93% ($\kappa = 0.86$). Disagreements were resolved through discussion with the authors.

2.5. Results

Recall that children's confidence in the existence of the entities was measured through two forced-choice questions: the *existence* question and the *certainty* question. Children could indicate being very sure that an entity exists, not very sure that an entity exists, not very sure that an entity does not exist, and very sure that an entity does not exist. Thus, children's confidence level was an ordered, categorical variable.

Below, we first examine children's confidence in the religious entities as a function of age and culture. Next, we examine children's justifications for their beliefs about the religious entities. Finally, we examine children's confidence and justifications with respect to the scientific entities. For an overview of children's confidence level with respect to all of the individual entities in the domains of science and religion, see Table 1S in the Online Supplement.

All analyses were carried out in R statistical software, version 3.4.3.

2.5.1. Does children's confidence about the existence of religious entities vary by country or age?

Fig. 1 shows the overall percentage of responses that fell into the four categories of confidence, collapsed across all three religious entities, by age group and country.

Inspection of Fig. 1 reveals that almost all children in both age groups and in all three countries were very sure that the religious entities exist. To confirm these findings, we carried out a series of mixed-effects ordinal logistic regression models on children's confidence ratings. We used the *clmm* function of the *ordinal* package with "very sure about existence" as the reference category (i.e., examining the

Table 3
Coding categories, definitions, and representative examples of children's answers to the justification question.

Coding category	Definition	Example
Encounter	Answers indicating that the child has seen or personally experienced the entity or a phenomenon related to the entity. Also, answers that relied on information about "everyone" or "no one" having seen or experienced the entity.	"I have seen angels before"; "No one has seen it before"; "Every time I'm stuck on something, I think of God and God helps me"
Source	Answers referring to having heard or learned information about the entity from a source. Also, answers referring to testimony without specifying a particular source.	"My mom has told me about it"; "It's in the Bible"; "I've heard about it"; "I've read about it"; "It's on TV"
Elaboration	Answers providing descriptions of the entity or referring to properties of the entity, causal processes involving the entity, or concepts relating to the entity.	"In everything we do, God is with us"; "When we become sick, germs go into our bodies"; "Good people go to heaven"
Uninformative	Any answer providing insufficient content or information about the participants' reasoning, including "I don't know" and circular explanations.	"I don't know"; "Because it's real"; "Because it does not exist"

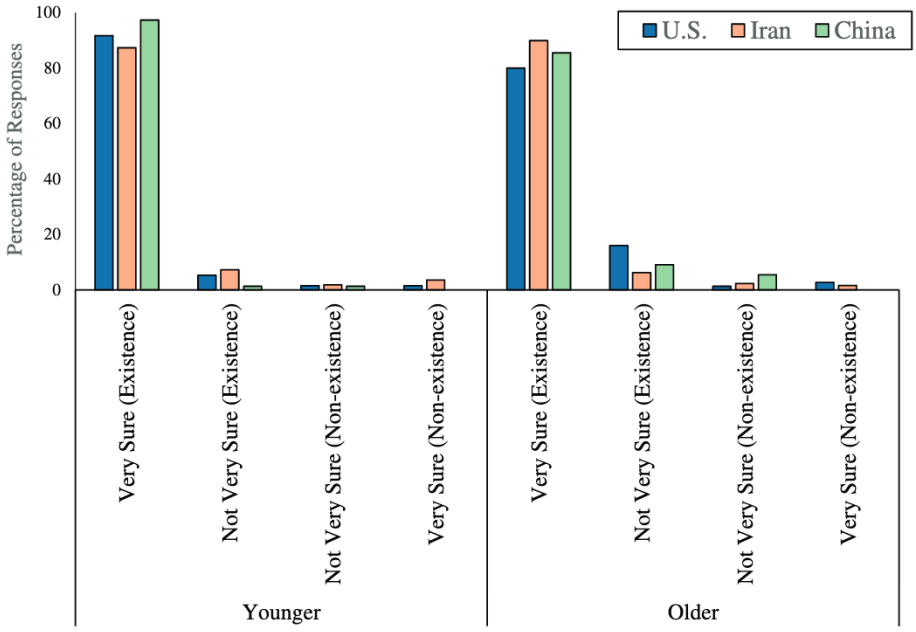

Fig. 1. Percentage of responses falling into four categories of confidence with respect to the existence of **religious entities**, by age group and country.
Note: Percentages show responses by children who indicated having heard about the entities, which is a subset of the complete sample in each age group and each country. Please see Table 1S in the Online Supplement for *N*s.

likelihood that children were "very sure about existence" versus not).

In the first model, we included Age, Country, and the Age × Country interaction term as fixed factors, and Participant ID as a random factor, on ratings of all those entities that children had indicated having heard about (see Table 1S in the Online Supplement for percentage of children in each country who indicated having heard about each individual entity). The Age × Country interaction term was not significant in this model (Age × Country $_{\text{China vs. Iran}}$: $B = 0.39$, $SE = 0.29$, $z = 1.32$, $p = 0.19$; Age × Country $_{\text{China vs. U.S.}}$: $B = 0.03$, $SE = 0.30$, $z = 0.10$, $p = 0.92$; Age × Country $_{\text{Iran vs. U.S.}}$: $B = -0.36$, $SE = 0.23$, $z = -1.54$, $p = 0.12$). Therefore, we dropped the interaction term and included only Country and Age as fixed factors, and ID as a random factor. Table 2S (in the Online Supplement) shows the parameters of this model. As shown in Table 2S, there was no systematic difference in children's confidence across the countries or across the two age groups. In sum, in all three countries, and across both age groups, children were very sure of the existence of the religious entities.

2.5.2. *Do children's justifications for their beliefs in the existence of religious entities vary by country or age?*

Next, we analyzed children's justification patterns. As set out in the introduction, we anticipated that children's justifications of their beliefs might vary by country – especially in the older age group – given the variation among them in the status of their religious beliefs relative to those of the broader community.

In each sample, a minority of younger children produced uninformative justifications for their beliefs. Thus, uninformative justifications accounted for 19.7% of justifications in the U.S., 26% in Iran, and 12.5% in China. Such uninformative justifications were less common among children in the older age group (6.7% of the justifications in the U.S., 3.2% in Iran, and 1.9% in China). There were no systematic differences in the percentage of *uninformative* responses among the three countries although, as noted, older children provided fewer such responses. In all following analyses, we excluded *uninformative* responses and focused on the content of children's informative justifications.

Fig. 2 shows the percentage of the three types of informative justification for belief in the existence of the religious entities, by Age Group and Country. As shown in Fig. 2, the overall pattern of responses by U.S. and Iranian children is similar across development, with *elaborative* responses as the most frequent justification, and *source* as the next most frequent justification. By contrast, Chinese children provided *source* responses significantly more frequently, especially in the older age group.

To confirm these conclusions, we first investigated the effect of Age and Justification Type in each country (see individual country analyses under Additional Analyses I in the Online Supplement). We then statistically tested for differences between the samples by conducting a mixed-effects binomial logistic regression analysis on children's answers to the justification question, with Justification Category, Age, Country, and all interaction terms as fixed predictors, allowing Justification Category to vary with Participant ID to account for the nature of our coding categories as mutually inclusive. We limited our analyses to the three types of informative justification, *elaborations*, references to *source*, and references to *encounters*. Note that the explanation categories were not mutually exclusive. To account for this, whether a given explanation included elements that were coded as a category or not was the dependent variable and justification category was a factor. Mixed-effects binomial regressions allow for several categories being coded as present in a given child's explanation.

As indicated by Fig. 2 and supported by the analyses within each country presented in the Online Supplement, the developmental patterns for the justifications display important similarities and differences across the three countries. Children in both Iran and the U.S. mostly produced elaborative responses in which they appealed to the characteristics of the entity in question. This overall tendency was evident among both younger and older children but became somewhat stronger with age in Iran. Among the Chinese children, there was a different developmental pattern. Prior to any sustained exposure to formal schooling, Chinese children appealed to the source of their beliefs as often as they produced elaborative responses. After some years of formal schooling, however, they overwhelmingly appealed to the source of their beliefs.

To statistically confirm the different patterns observed within each sample, we ran an overall model with the three-way interaction between Age, Country, and Justification Type. This model yielded a significant interaction between Age, Country, and Justification Type when comparing China to Iran, $B = -1.21$, $SE = 0.25$, $z = -4.92$, $p < 0.001$, $OR = 0.27$, CI [0.18, 0.48], and to the U.S. $B = -0.85$, $SE = 0.25$, $z = -3.41$, $p < 0.001$, $OR = 0.43$, CI [0.26, 0.70]. This interaction effect reflects the predominance of *elaborative* over *source* responses across all ages in the U.S. and Iran as well as the increasingly

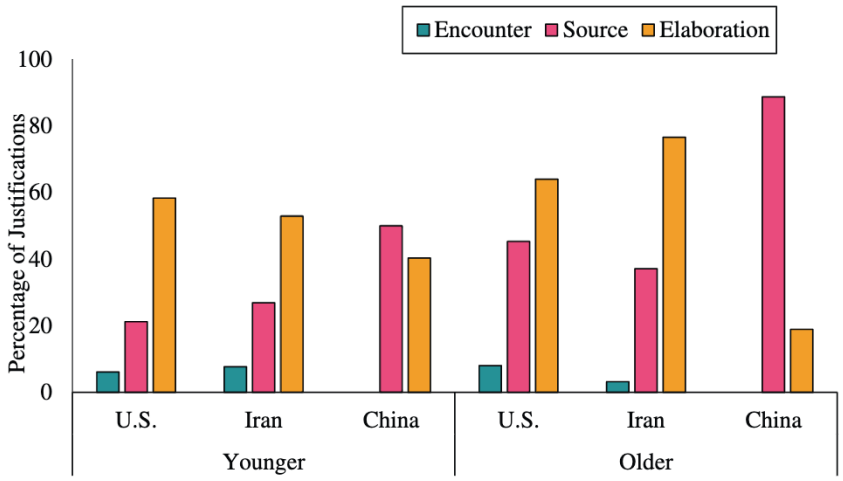

Fig. 2. Percentage of three types of (informative) justification for beliefs about the **religious entities**, by country and age group.
Note: Percentages show justifications produced by children who indicated having heard about the entities, which is a subset of the complete sample in each age group and each country. Please see Table 1S in the Online Supplement for *Ns*.

frequent references to source with age in China. Note that, in this model, we excluded references to *encounter* because in China, children made no such references.

Next, we turn to the confidence and justification patterns for the scientific entities among children in all three countries.

2.5.3. Does children's confidence about the existence of scientific entities vary by country or age?

Fig. 3 shows children's level of confidence in the existence of the scientific entities in all three countries. Similar to the patterns observed for children's beliefs about the religious entities, most children in all three countries were very confident about the existence of the scientific entities.

To confirm our interpretation of Fig. 3, we ran a series of ordinal logistic regression models on the responses that children gave after indicating that they had heard about the scientific entities. In the first model, we included Age, Country, and the Age × Country interaction term as fixed effects, with Participant ID as a random effect. This model revealed no significant interaction term (Age × Country $_{\text{China vs. Iran}}$: $B = 0.23$, $SE = 0.55$, $z = 0.43$, $p = 0.67$; Age X Country $_{\text{China vs. U.S.}}$: $B = -0.10$, $SE = 0.53$, $z = -0.18$, $p = 0.85$; Age × Country $_{\text{Iran vs. U.S.}}$: $B = -0.33$, $SE = 0.41$, $z = -0.81$, $p = 0.42$). Therefore, we dropped the interaction term and included only Age and Country as fixed effects. Table S3 in the Online Supplement shows the results of this model. Inspection of Table S3 indicates there were no systematic differences between the three communities in children's confidence judgments about the scientific entities, with almost all children expressing high confidence levels in the existence of these entities. Nevertheless, with age, children were even more likely to indicate that they are very sure about the existence of the scientific entities $B = 0.69$, $SE = 0.23$, $z = 2.97$, $p < 0.01$, $OR = 2.00$, CI [1.27, 3.16].

Next, we focus on the kinds of justifications that children gave for their ontological beliefs about unobservable scientific entities. In contrast to the pattern we anticipated for children's justifications of their beliefs about the religious entities, if religious community status influences children's epistemic justifications of beliefs only in the domain of religion, then we would not expect systematic differences across the three communities in the way that children justify their beliefs about scientific entities.

2.5.4. Do children's justifications for their beliefs in the existence of scientific entities vary by country or age?

Similar to children's justifications for their beliefs about the religious entities, a number of the justifications for beliefs about the scientific entities were uninformative: among the younger children, 16.5% of the justifications in the U.S., 18.2% in Iran, and 13.7% in

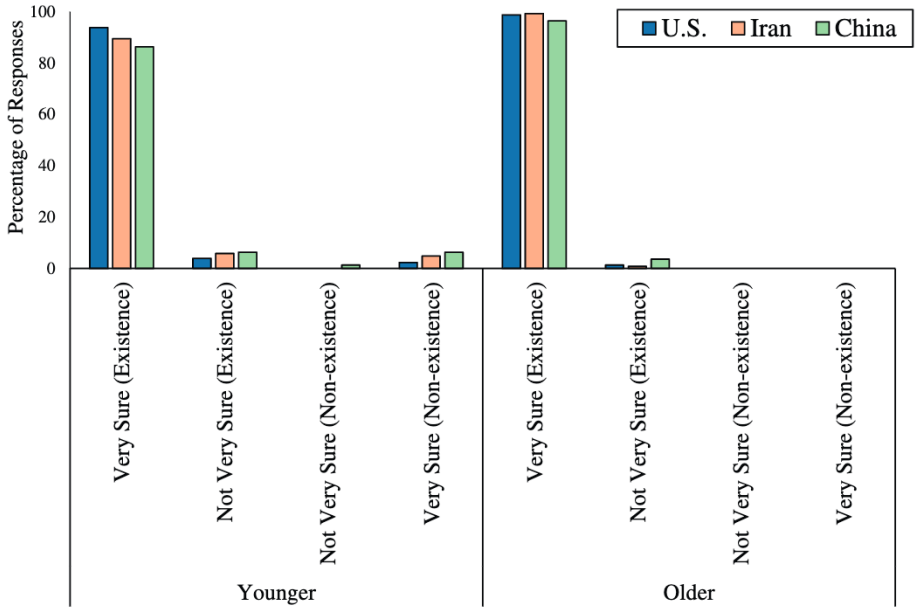

Fig. 3. Percentage of responses falling into four categories of confidence with respect to the existence of **scientific entities**, by age and country.
Note: Percentages show responses by children who indicated having heard about the entities, which is only a subset of the complete sample in each age group and each country. Please see Table 1S in the Online Supplement for *Ns*.

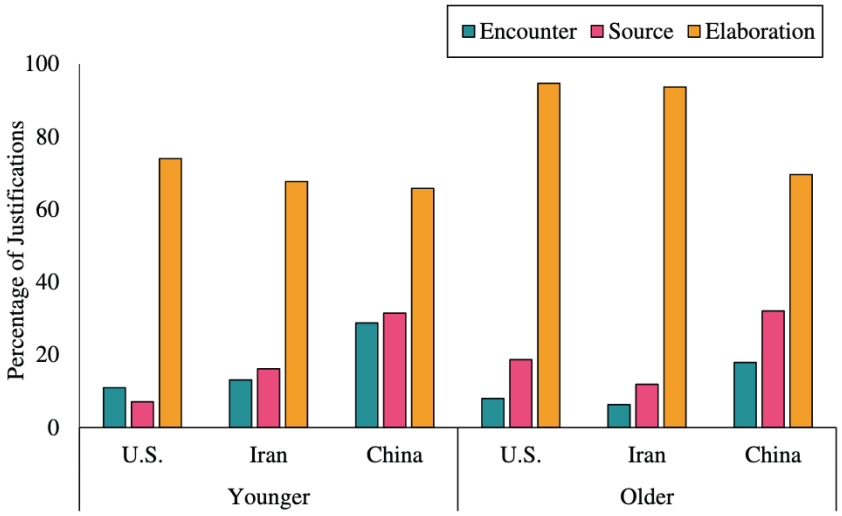

Fig. 4. Percentage of three types of (informative) justification for beliefs about the **scientific entities**, by country and age group.
Note: Percentages show justifications by children who indicated having heard about the entities, which is only a subset of the complete sample in each age group and each country. Please see Table 1S in the Online Supplement for *Ns*.

China. Again, such uninformative justifications were less common among children in the older age group (0% of the justifications in the U.S., 0.8% in Iran and 3.6% in China). There were no systematic differences in the percentage of *uninformative* responses among the three countries although, as noted, older children provided fewer such responses. In the following analyses, we excluded *uninformative* responses and focused on the content of children's informative justifications.

Recall that although children in the three countries were similar in their ontological beliefs about religious entities, children in China justified those beliefs differently as compared to children in Iran and in the U.S. by focusing on the source of their beliefs. We examined whether Chinese children's frequent appeal to source as a justification strategy was specific to the domain of religion or if they also justified their beliefs about the existence of scientific entities by primarily appealing to the source of those beliefs.

Fig. 4 shows children's informative justifications of their beliefs about the scientific entities. Inspection of Fig. 4 confirms that Chinese children did not rely primarily on the source of their belief when justifying their ontological beliefs about the scientific entities. In fact, similar to the patterns observed among children in the U.S. and Iran, Chinese children were more likely to provide *elaborative* responses, as compared to both *encounter* and *source responses* (see Additional Analyses II in Online Supplement for model parameters for individual countries). Because the within-sample analyses did not suggest different patterns, when comparing children's elaborative and source references, across the three samples, we did not follow up the within-sample analyses with a model including the three-way interaction between Age, Country, and Justification Type.

In summary, *elaborative* responses were the most common type of justification for beliefs in the existence of scientific entities in all three countries and in both age groups.

3. Discussion

We asked whether the degree of consistency between family religious beliefs and the values espoused by the larger society influences the development of children's ontological beliefs in unobservable religious entities and their epistemic justifications for those beliefs. We also investigated the extent to which religious minority status influences the development of beliefs in a domain-specific as opposed to a domain-general manner by examining its effect on the development of beliefs about scientific, in addition to religious, unobservable entities. To investigate these questions, we recruited children from a religious minority group in China as well as children from religious majority groups in Iran, a Muslim majority society, and in the U.S., a Christian majority society.

We observed striking similarities in children's beliefs in the existence of religious and scientific entities across these three communities. In all three communities, 4–11-year-old children were very confident that the unobservable religious and scientific entities exist. In addition, in all three communities, children's ontological beliefs about the unobservable, religious entities did not change with age, whereas they became even more confident about the existence of the unobservable, scientific entities.

The absence of cross-sample differences in children's ratings with respect to the scientific entities is consistent with prior work showing a strong consensus regarding the existence of such unobservable scientific entities in all three communities. However, the patterns observed in children's ratings of the religious entities speak to the two possibilities outlined above and contribute to our theoretical understanding of the role of testimony in the development of beliefs about unobservable entities.

In the domain of religion, the impact of the messages that children receive at home and in their immediate family network persists even after children are exposed to different views in broader public settings, such as school. In all three communities, children continued to express confidence in the existence of unobservable religious entities despite the fact that children in China, unlike children in Iran and the U.S. are likely to be exposed to secular beliefs that are inconsistent with the religious beliefs learned at home. As mentioned in the introduction, previous research on the development of ontological beliefs about unobservable entities has not focused on the role of community status. In particular, the degree of consistency between private (i.e. at home and in the immediate family network) and public testimony has not been studied as a potentially important variable. Our findings suggest that the early messages that children receive continue to influence their ontological beliefs, not just in contexts where such beliefs are reinforced through messages outside the home, but also in contexts such as China where such beliefs are not reinforced and are potentially contradicted in the broader social environment. As a caveat, it is also worth noting that despite major theological differences among the three communities, participants in all three religious communities displayed a strong consensus about the existence of the particular unobservable religious entities included in the study.

Despite marked similarities across the communities with respect to children's confidence in the existence of unobservable religious entities, religious community status did influence children's justifications for their beliefs. US Christian and Iranian Muslim children most often referred to elaborations to justify their beliefs. By contrast, Chinese Christian children growing up in a religious minority community

embedded in an atheistic society, often referred to the source of their beliefs. Indeed, this pattern was even stronger among older children who had been exposed to 4–6 years of schooling. Why might children from a religious minority regard references to sources as an appropriate justification for their beliefs? Below, we discuss our preferred interpretation which focuses on cognitive mechanisms, as well as alternative interpretations which focus on pragmatic considerations.

We propose that exposure to inconsistent information heightens children's attention to the source of the information and signals the importance of source tracking as a justification strategy. Indeed, the literature on children's selective trust in testimony shows that even 3-year-olds can competently track inconsistency in the claims made by different sources and choose among those inconsistent sources. For example, children display a firm preference for a source who provides more accurate information, or seems more competent, as compared to another source who provides more inaccurate information, or seems less competent (see Harris et al., 2018 for a review). The current study adds to this literature by highlighting children's sensitivity to "inconsistency" when they receive information from two different social contexts, namely the immediate circle and society at large, rather than from two different individuals.

In particular, our findings suggest that when messages in a particular epistemic domain are inconsistent, children show a greater tendency, not only to track sources, but also to recognize that the beliefs that set them apart from the larger society can be epistemically justified by appealing to the source of their beliefs. It is plausible that young Chinese children in the minority Christian community initially develop their belief in the existence of religious entities through testimony from their parents and their immediate circle, with only limited exposure to contrasting testimony. However, with increased years of formal schooling in the context of a state-mandated and uniformly secular curriculum across all schools, religious minority children in China are likely to become more sensitive to the source of their religious beliefs because they hear testimony that contrasts with what they have learned at home. More generally, growing up as a minority group member may heighten children's attention to inconsistencies between the distinctive beliefs of their family and its immediate network and the beliefs of the mainstream community. Heightened attention to such inconsistencies may increase recognition of the specific source of the beliefs that set their community apart. This is particularly plausible in light of the persistently high levels of confidence in the existence of unobservable religious entities among the older Chinese Christian children, despite their exposure to contrasting views.

If children belong to a majority group and rarely encounter inconsistencies in the various messages they receive in a particular domain, there is likely to be less immediate need for them to compartmentalize their beliefs by tracking and identifying specific sources. Indeed, this is the pattern that was observed when we asked children in Iran and the U.S. to justify their beliefs in religious entities and also when we asked children in all three communities to justify their beliefs in scientific entities.

In contrast to Chinese children, both Iranian and U.S. children justified their ontological beliefs about religious unobservable entities by frequently offering elaborations, i.e., by appealing to more general facts or attributes, such as the idea that God created everyone or that angels help people do good things. Note that appealing to information about these unobservable entities as a way to justify belief is only a "good" epistemic strategy when that information is generally accepted. Thus, providing elaborations about one's belief in unobservable religious entities makes sense in the context of children embedded in a majority group with respect to religious beliefs, as was the case for the Iranian and U.S. children in our sample.

Relatedly, children in all three countries justified their belief in unobservable scientific entities not by citing sources but instead by primarily offering elaborations. This pattern can also be considered a "good" epistemic strategy because there is a consensus among adults, both in their immediate communities and in their respective societies, about the attributes of, for example, germs and oxygen. Thus, consistency in the messages to which children are exposed was associated with elaborations both in the case of religious entities among children from religious majority groups and in the case of the scientific entities among children from all three communities. Future work should explore whether children who belong to minority communities with respect to belief in common scientific phenomena (e.g., children whose parents question the efficacy of vaccinations) also show heightened awareness of the source of their belief about these phenomena.

An alternative interpretation of the observed patterns is worth contemplating. We consider two variants of this alternative interpretation, both focusing on differences between the communities in pragmatic mores rather than differences in conceptual understanding. First, children in China may have perceived the request for a justification as asking a different question, compared to children in the U.S. and Iran. Specifically, given that they belong to a minority group, the Christian children in China may have interpreted the question, "How do you know that x exists?" as a social challenge, rather than as a purely epistemic query. This would be especially plausible if children believed that the experimenter asking this question did not share their minority views and was therefore asking for the source of the information that children were relaying about the existence of the entities. Children in Iran and the U.S., by contrast, given that they share the views of the majority, might be prone to interpret the question, "How do you know that x exists?" as a request for more information about the entity. That is, having common ground with the experimenter about the existence of a given entity, children with majority beliefs may have understood the question as asking for more information about the entity rather than for the initial source of information about the entity.

Despite its initial plausibility, we doubt this alternative interpretation given the sampling procedure that we adopted in China. Specifically, for the same reasons of confidentiality that drove our decision to not include signed consent, all children in China were recruited and interviewed by an experimenter who self-identified as a Christian Chinese. The experimenter's religious identification was apparent to the parents of the children, if not to the children themselves, who agreed to have their children interviewed about their religious beliefs by this specific experimenter at church. Indeed, the reason that we were able to recruit participants from this minority group in China and ask specifically about their religious beliefs was the personal connections and identity of the Chinese Christian experimenter. Parents from a religious minority group in China would otherwise be very unlikely to participate in our research. Thus, if Chinese children made any inference about the experimenter's belief, it is unlikely that they viewed her request as a challenge, and unlikely that they would have felt a greater need to justify the source of their beliefs than other children in our sample.

A second variant of the pragmatic interpretation of our results focuses on reasons other than the identity of, and trust in, the experimenter. According to this variant, children could have interpreted the question differently based on other cultural factors such as the degree of deference to parental authority or an emphasis on knowledge (rather than opinion). Note that a norm of deference to parental authority, as well as a cultural emphasis on "knowing" rather than "speculating" could lead to more frequent citation of sources rather than the description of general attributes. These values may prime children to defer to sources that they deem more credible than themselves as the "authority" when asked to justify beliefs in the unobservable. A cultural emphasis on "knowing", likewise, may prime children to cite sources that they believe more likely to relay accurate and factual information, rather than to express their own views about what they think the entities are or what they are like. However, we do not believe that the differences in how the Chinese children, as compared to the Iranian and the U.S. children, justified their beliefs can be best explained by such cultural differences. Both Chinese and Iranian societies have been

shown to be similar with respect to a number of cultural factors, including an emphasis on knowledge and the authority of parents and other adults (see Davoodi et al., 2016; Shahaeian, Peterson, Slaughter, & Wellman, 2011; Chen, Dong, & Zhou, 1997; Frank, Plunkett, & Otten, 2010; Sharifzadeh, 2004; Stevenson et al., 1990 for a discussion of the emphasis on parents and adults as authority figures and the value of knowledge in Iran and China). Thus, on the basis of this second variant, we would expect the patterns of justifications to be more similar between Chinese and Iranian children. However, children's justifications of their beliefs about the religious entities are very similar in Iran and the U.S. and significantly different from the patterns observed among children in China. Nevertheless, to further tease apart these various possibilities, future research should more systematically isolate specific cultural factors in various social contexts and investigate their role in the development of beliefs about the unobservable.

A remaining question is why minority status was not associated with variability in children's level of confidence in the existence of unobservable entities. Given the role of testimony in children's developing beliefs about unobservable phenomena, it is somewhat surprising that in Iran, and to some extent in the U.S., as compared to China, convergent testimony from various social sources did not lead to higher confidence in the existence of the religious entities. We believe this may have been a result of a ceiling effect, given our focus on high consensus entities. In both Iran and the U.S., children are already very confident that these entities exist prior to the onset of formal schooling, thus leaving little or no room for an increase in confidence levels with exposure to more testimony after a few years of schooling. Consistent with our interpretation of the patterns observed for children's justifications of their beliefs, it is possible that the social identity of the Chinese children is partly tied to their minority beliefs, so that it is particularly important for them to hold on to these beliefs, despite conflicting testimony at school, thereby leading to persistently high confidence in the existence of unobservable religious entities. We argue that such persistently high confidence is likely to be associated with a cognitive need to link private beliefs to their specific sources. To further investigate the relation between level of confidence in the existence of supernatural entities and justification for these ontological beliefs, future research could focus on individual variability in confidence ratings as a predictor of justification patterns.

To our knowledge, our findings are the first to investigate the role of community status in the development of an epistemic stance towards unobservable entities. They highlight the importance of examining consistency (or lack thereof) between private messages (at the level of the family and the immediate community) and public messages, especially for phenomena where testimony is a key source of information. Our data suggests that in cases where children do not have opportunities for first-hand experience, as is the case when they learn about unobservable religious entities, inconsistency between public and private messages highlights the importance of source identification as a belief justification strategy. By documenting cross-cultural differences in attention to source and the development of the ability to track sources, we are not suggesting differences in norms of reasoning. As argued in Karaslaan, Hohenberger, Demir, Hall, and Oaksford (2018), we believe that norms of reasoning, as related to argumentation or – as in the current study – to patterns of belief justification, likely reflect universal norms. However, the valuation of particular norms may vary depending on the cultural context. More specifically, although rational adults in all three communities included in the current study, are likely to recognize references to the source of information about unobservable entities as a rational form of justification, the tendency to offer such references may be more relevant and important for children growing up in a religious minority community. Indeed, literature on Bayesian argumentation as adhering to universal rational laws effectively explains cross-cultural differences in informal argumentation in terms of pragmatic and culture-dependent inductive biases (Karaslaan et al., 2018). Thus, in the context of our current work, these proposals imply that source tracking is a universally rational consideration in belief formation and justification, but that attention to this consideration varies based on cultural factors, such as minority status with respect to belief.

CRediT authorship contribution statement

Telli Davoodi: Conceptualization, Methodology, Formal analysis, Investigation, Resources, Data curation, Writing - original draft, Writing - review & editing, Visualization, Supervision, Project administration.**Kelly Yixin Cui:**Conceptualization, Methodology, Formal analysis, Investigation, Resources, Data curation, Writing - original draft, Writing - review & editing, Supervision, Project administration.**Jennifer M. Clegg:**Conceptualization, Investigation, Data curation, Writing - review & editing, Supervision, Project administration.**Fang E. Yan:**Data curation, Resources.**Ayse Payir:**Data curation, Writing - review & editing.**Paul L. Harris:**Conceptualization, Methodology, Writing - review & editing, Funding acquisition.**Kathleen H. Corriveau:**Conceptualization, Methodology, Writing - review & editing, Funding acquisition.

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Appendix A. Supplementary data

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