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PAPER

Do attitudes toward societal structure predict beliefs about free will and achievement? Evidence from the Indian caste system

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Abstract

Intuitive theories about the malleability of intellectual ability affect our motivation and achievement in life. But how are such theories shaped by the culture in which an individual is raised? We addressed this question by exploring how Indian children's and adults' attitudes toward the Hindu caste system – and its deterministic worldview – are related to differences in their intuitive theories. Strikingly, we found that, beginning at least in middle school and continuing into adulthood, individuals who placed more importance on caste were more likely to adopt deterministic intuitive theories. We also found a developmental change in the scope of this relationship, such that in children, caste attitudes were linked only to abstract beliefs about personal freedom, but that by adulthood, caste attitudes were also linked to beliefs about the potential achievement of members of different castes, personal intellectual ability, and personality attributes. These results are the first to directly relate the societal structure in which a person is raised to the specific intuitive theories they adopt.

Research highlights

- We examine whether Indian children's and adults' intuitive theories are related to their attitudes toward the Hindu caste system.
- Caste attitudes were linked to intuitive theories beginning in middle school and continuing into adulthood.
- The more important individuals thought caste was to their identity and in society, the more deterministic were their intuitive theories.
- Caste attitudes are initially linked in children to broad beliefs about personal freedom, but are later linked in adulthood to beliefs about personal attributes.

Introduction

Intuitive theories affect how we interpret and respond to our experiences from early in life. For example, children's beliefs about the nature of intellectual ability affect their motivation and achievement in school (Blackwell, Trzesniewski & Dweck, 2007; Dweck, 1999, 2006; Dweck & Leggett, 1988; Good, Aronson & Inzlicht, 2003; Hong, Chiu, Dweck, Lin & Wan, 1999; Robins & Pals, 2002). Children who believe that intellectual abilities are malleable ('incremental theorists') are more likely to attribute academic failures to changeable contextual factors – e.g. insufficient studying – and thus to respond adaptively, by working harder. In contrast, children who believe that success is determined by natural ability ('entity theorists') are more likely to attribute failures to fixed attributes of the self – e.g. being bad at school – and thus to withdraw their effort and respond less adaptively to academic challenges. The present study explored the developmental origin of such theories and, in particular, how they are related to the culture in which a child is raised. To do so, we investigated the role of societal structure in urban India and, in particular, children's attitudes towards the Hindu caste system. Historically,

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the caste system has defined an explicit hierarchy of societal roles, which rigidly determines an individual's position in society from the moment of birth. We asked whether children's attitudes toward this system and its deterministic worldview predicted more deterministic intuitive theories in other domains, and thus whether cultural systems of social organization like caste are related to individual children's personal beliefs about achievement and free will.

A number of studies have shown that, in the United States, intuitive theories play an important role in how children interpret life events and develop motivational orientations, with lasting consequences for future achievement (Blackwell *et al.*, 2007; Dweck, 1999, 2006; Dweck & Leggett, 1988; Good *et al.*, 2003; Hong *et al.*, 1999; Robins & Pals, 2002). For example, individuals who believe that intelligence is fixed are more likely to avoid challenging problems that could demonstrate limitations in their ability, and are thus more likely to miss critical opportunities for intellectual development (e.g. Dweck, 1999; Dweck & Legget, 1988; Hong *et al.*, 1999; Robins & Pals, 2002). In contrast, individuals who believe that intelligence is malleable show greater persistence in the face of challenges and are more likely to set learning goals aimed at self-improvement. Previous studies indicate that these differences have a direct impact on achievement in school. For example, holding an incremental as opposed to an entity theory of intellectual ability in the 7th grade predicts higher math grades two years later (Blackwell *et al.*, 2007). Also, training studies find that children's intuitive theories can be modified to become more incremental, resulting in greater academic success (Blackwell *et al.*, 2007; for related evidence, see Aronson, Fried & Good, 2002; Good *et al.*, 2003; Niiya, Crocker & Bartmess, 2004; Thompson & Musket, 2005).

While most studies of children's theories of intelligence have focused on children educated in the US, some have begun to explore children's attitudes in other cultures, and have argued that broad cross-cultural differences can affect children's attitudes (e.g. Chen & Stevenson, 1995; Heine, Kitayama, Lehman, Takata, Ide *et al.*, 2001; Rattan, Savani, Naidu & Dweck, 2012; Stevenson & Stigler, 1992). For example, some studies have focused on differences between children educated in Western societies, like the US and Canada, and in East Asian societies, like Japan and China. In one study, Chen and Stevenson (1995) found that Japanese and Chinese children, as well as Asian-American children, hold more incremental attitudes than Caucasian-American children, and that this difference is associated with higher mathematics test scores in the groups with Asian backgrounds (see also Stevenson & Stigler, 1992). More recently, Heine and colleagues (2001) reported that Japanese students are more likely than American and Canadian students to persist on intellectually challenging tasks at which they have previously failed, and that this is related to their stronger belief in the utility of effort (for related findings, see Blinco, 1992; Hoshino-Browne & Spencer, 2000).

To explain these cross-cultural differences in children's beliefs about intelligence, some researchers have appealed to evidence that East Asian societies are more collectivist than Western societies (e.g. Markus & Kitayama, 1991; Morris & Peng, 1994; Triandis, 1989, 1995), and have argued that this difference may explain children's diverging theories across cultures (Chen & Stevenson, 1995; Heine *et al.*, 2001; Stevenson & Stigler, 1992). Specifically, it is argued that in collectivist cultures, the self is defined by participation in societal roles, such that individuals are required to adapt their personal attributes to meet the standards defined by these roles. On this view, an emphasis on adapting to group roles – rather than on stable individual differences – highlights the possibility of change through effort, and reinforces incremental reasoning. However, while globally plausible, this idea has not been tested directly, leaving open whether cross-cultural differences in collectivism mediate the relation between attitudes toward intelligence and education, or instead whether other cultural differences are at work. For example, besides broad differences in societal structure, the Eastern and Western populations tested in previous studies also differ with respect to factors like population density, labor markets, GDP, and climate (for evidence regarding the psychological import of these factors, see Georgas & Berry, 1995; Georgas, van de Vijver & Berry, 2004; Hofstede, 1980; Kashima & Kashima, 2003; Triandis, 2001).

Critically, to determine whether specific cultural factors like differences in societal structure might shape beliefs about intelligence, studies that test direct links between the two are required (for a clear articulation of this strategy and its merits, see Matsumoto & Yoo, 2006). For example, in the present context, if a child's beliefs about societal structure shape their attitudes toward intelligence, then individual differences in children's attitudes toward societal structure should predict differences in their intuitive theories. However, while compelling, this approach may be challenging to implement in some cases, because systems of social organization like collectivism are often abstract and may exist and impact individuals – especially children – without their explicit knowledge. Thus, in many cases, it may be difficult to assess individual children's attitudes toward their culture's social structure in order to explore how this relates to their beliefs about achievement.

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In the present study, we attempted to address this challenge by testing Indian children's attitudes toward the Hindu caste system – a central aspect of Indian societal structure. We chose the caste system as a case study for two reasons. First, in contrast to an abstract construct like collectivism, caste is an explicitly defined system that is familiar to Indian children from early in life and taught as part of grade school curriculum, making it possible to directly assess individual children's attitudes toward this aspect of societal structure. Second, the explicit determinism embodied by the caste system allowed us to make clear predictions about how children's attitudes toward societal structure should be related to their intuitive theories. Specifically, belief in the importance of caste should be linked to more deterministic intuitive theories. Below, we provide some background on the caste system to motivate and expand upon this idea.

The Hindu caste system defines a rigid hierarchy of social roles that are passed down from parent to child at birth, and which remain stable throughout life (Bayly, 1999; Dirks, 2001). Historically, each caste has been associated with a distinct occupation and level of status. For example, individuals born into the *Brahmin* caste have traditionally been priests and scholars, individuals born into the *Kshatriya* caste have traditionally been kings and warriors, individuals born into the *Vaishya* caste have traditionally been merchants, and individuals born into the *Shudra* caste have traditionally been laborers. Finally, an additional group of 'out-casted' individuals, *Dalits*, have traditionally been responsible for the disposal of dead bodies and removal of waste, such that they have historically been regarded and referred to as 'untouchable'. Although recent reports suggest that the power of caste has diminished with governmental reforms and modernization, it nevertheless remains correlated with socioeconomic status (Thorat & Newman, 2007) and is an important arbiter of social relationships, especially marriage (Das, Das, Roy & Tripathy, 2010). Critically, Indian children are exposed to caste from early in life, both in daily interactions and via formal instruction in grade school, and thus are typically aware of its structure and significance. Indeed, by at least third grade, independent of their own caste, children exhibit implicit preferences for members of higher castes relative to members of lower castes, although they continue to acquire more articulated knowledge about caste as they get older (Dunham, Srinivasan, Dotsch & Barner, 2014).

Because caste is conveyed at birth from parent to child, moving from one caste to another within a lifetime is not possible (though according to Hindu scripture, movements are possible between lives through the karmic cycle of reincarnation). Consequently, the caste system represents a rigid social hierarchy that explicitly dissociates individual effort from changes in social status in one's lifetime, potentially encouraging deterministic beliefs. For example, regardless of their individual efforts, children born as *Dalits* – who have historically inherited the lowest status – will remain *Dalits* throughout their lives. Consistent with this, previous studies have found that Indian adults and children *essentialize* caste, and conceptualize an individual's caste and caste-related properties as fixed, and causally determined by an unobservable essence (Mahalingam, 1999). These findings suggest that, if cultural constructs like caste are related to children's individual intuitive theories, then the more importance children place on the caste system, the more likely they will be to adopt entity theories, at least with respect to the status and achievement of members of different caste groups. Thus, although children educated in India may in general endorse more incremental views than children educated in Western cultures (Rattan *et al*., 2012), individual differences in incremental reasoning among Indian children may be linked to differences in their attitudes toward the caste system.

Further, if caste is a central lens through which children view their social identity, it may have a pervasive effect on their attitudes, and predict not only how children view the status and achievement of members of different caste groups, but also how they view their own attributes in different domains. Although the majority of work on intuitive theories has focused on the domain of intellectual ability, researchers have also formulated and tested parallel theories in the domain of personality attributes (Chiu, Hong & Dweck, 1997; Erdley, Cain, Luomis, Dumas-Hines & Dweck, 1997; Heyman & Dweck, 1998). For example, just as individuals who endorse entity theories about intelligence are more likely to attribute negative intellectual traits to themselves when facing setbacks, individuals who hold entity theories about personality are more likely to attribute negative personality traits to themselves in the face of rejection (Chiu *et al*., 1997; Erdley *et al*., 1997).

These specific intuitive theories of personal attributes might even be related to broader philosophical stances regarding personal freedom. For example, a person who holds an entity theory and believes that their successes and failures in life are controlled by fixed personal traits may also be more likely to subscribe to determinism more generally, including the idea that human action is tightly constrained by factors beyond our control. Thus, beliefs about free will versus determinism can be characterized as generalized forms of entity versus incremental beliefs, raising the possibility that such

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beliefs will covary with the intuitive theories of personal attributes described above (for discussion, see Dweck & Molden, 2008). To our knowledge, these ideas have not been tested: previous studies have not systematically explored whether people hold related theories across different domains of personal attributes (cf. Heyman & Dweck, 1998), let alone whether such theories are linked to broader beliefs regarding personal freedom or related to cultural factors like caste.

The present study had two goals. First, we explored whether cultural systems of social organization are linked to beliefs about the malleability of achievement by testing the relationship between individual children's attitudes toward the caste system and their intuitive theories of achievement. Second and relatedly, we explored whether attitudes toward caste are related to children's intuitive theories more broadly. To test this, we probed whether attitudes toward caste not only predict how children view the achievement of members of different castes, but also predict how they view their own attributes in different domains, as well as their more general view of personal freedom.

We tested the relationship between attitudes toward caste and intuitive theories across development, by studying Indian children between the 3rd and 11th grades, as well as Indian adults. All participants completed two surveys. A first survey probed participants' beliefs regarding the importance of caste in their own lives and in society more generally, while the second asked participants to endorse or reject statements expressing incremental and entity views. To explore how broadly attitudes toward caste may be related to intuitive theories, the second survey probed beliefs regarding the potential achievement of members of different castes, but also of two additional domains of personal attributes not directly tied to caste (i.e. intelligence and personality), and of a more general stance toward personal freedom and control over one's own life. Finally, in addition to exploring whether an individual's attitudes toward caste are related to their intuitive theories, we also explored whether other characteristics of the individual might moderate this relationship – e.g. their own caste or socioeconomic status.

Method

Participants

There were a total of 301 participants, including 73 adults, who were recruited on-line via Amazon's Mechanical Turk (MTurk) and restricted to subjects with Indian IP addresses who self-reported as Indian, and 228 children, who were recruited from two English-language primary schools in Gujarat, India. Because we conducted our studies across a wide range of ages, our sample included individuals with differing levels of language comprehension ability and attention spans. To address this, we split our sample into three age groups, and administered matched but simplified measures to younger age groups (see below). The first group comprised adults, the second group comprised older children (i.e. in middle school and high school), and the third group comprised younger children (i.e. beginning from the 3rd grade).

Adult participants (n = 73) ranged in age from 20 to 61 (M = 30; 64% male), were mixed with respect to religious background (70% self-identified as Hindu, 16% Christian, 10% Muslim, 4% other), and were drawn from a number of different regions within India (41% were from Tamil Nadu, 36% Kerala, 8% Karnataka, 4% Maharashtra, 1% Rajasthan, 1% West Bengal, 1% Delhi, 1% Uttar Pradesh, 1% Andhra Pradesh, 1% Haryana, 2% other). The subset of participants that were Hindu were also mixed with respect to caste background. A total of 8% self-identified as Brahmin, 10% as Kshatriya, 6% as Vaishya, 2% as Shudra, and 8% as Dalit. Another 17% did not report an identifiable caste. Finally, the remaining 49% of Hindu participants reported that their caste was 'Other Backward Class' (OBC), a government-designated term that entitles lower-status castes, mostly Shudras, to additional opportunities for employment in the public sector and to positions in higher education institutions. An additional 29 adults participated, but were excluded for missing catch trials (described below), which indicated that they were not paying attention and likely contributed poor quality data (Oppenheimer, Meyvis & Davidenko, 2009).

Children were recruited from two primary schools. These schools differed with respect to the socioeconomic status of the families of enrolled children: at the lower SES school, over 80% of children came from families earning less than $2000 per year (~$5.50/day), while at the higher SES school, over 80% of families earned $2727 or more per year (~$7.47 /day), with 55% earning $6364 or more per year (~$17.43 /day). All of the children's religious and caste backgrounds were obtained via self-report and verified using school records and by consulting teachers and local experts (see Supplementary Materials).

The older group of children (n = 111) consisted of 6th through 11th graders from the higher SES school and 11th graders from the lower SES school. They ranged in age from 10 to 18 (M = 14; 58% male) and were mixed in religious background (70% were Hindu, 18% Muslim, and 12% had a different religion or could not be

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classified). The Hindu children had mixed caste backgrounds (15% were Brahmin, 10% Kshatriya, 26% Vaishya, 36% Shudra, 2% Dalit, and 10% could not be classified).

The younger group of children (n = 117) consisted of 3rd and 5th graders from the higher SES school and 3rd and 7th graders from the lower SES school. The 7th graders from the lower SES school were included in this group – and not in the older group of children – due to their poorer language abilities relative to children at the higher SES school, which required the use of the simplified measures given to younger children. Across the two schools, the children in this younger group of participants ranged in age from 7 to 13 (M = 10; 59% male) and were mixed in religious background (74% were Hindu, 17% Muslim, and 9% had a different religion or could not be classified). The subset of Hindu children also had mixed caste backgrounds (28% were Brahmin, 7% Kshatriya, 19% Vaishya, 23% Shudra, 3% Dalit, and 20% could not be classified). No children were excluded from the analyses reported below.

Procedures

We tailored our items to our three groups of participants because they varied greatly in age and thus in their language comprehension ability and attention spans. Specifically, we gave groups of younger participants simplified versions of the items given to older participants (e.g. by shortening sentences and replacing difficult vocabulary), while taking care to preserve the content of the items across groups (see the Supplementary Materials for the full set of items from each survey). A consequence of this choice was that items varied slightly across age groups, such that direct comparison of items across groups was not possible in some cases. Consequently, we analyzed the results from the three groups separately, except for cases in which the different groups received identical items.

All participants were tested in English (the primary language of instruction at both schools), and first completed the Caste Attitudes portion of the study, followed by the Intuitive Theories assessment. As described in detail below, to tailor our items to our different age groups, we created a 'full' and 'simplified' version for both the caste attitudes and intuitive theories surveys. Adults received the full versions of each of these surveys, older children received the full version of the intuitive theories survey and simplified version of the caste attitudes survey, and younger children received the simplified versions of both surveys.

Children received the two surveys within a week of one another, while adult participants completed both on-line in one session. To minimize reading demands, all 3rd graders – our youngest participants – were read the questions and responded on an answer sheet. The children that participated in this study also received a larger battery of measures, some of which are reported in Dunham *et al*. (2014); a subset of the data from the Caste Attitudes assessment were also analyzed and reported in that study (see Supplementary Materials).

Measures

For more details about these measures, as well as additional analyses, see the Supplementary Materials.

Caste attitudes survey

This survey asked participants to evaluate the importance of caste in their own lives, and in society more generally. A full version of the survey, administered to adults, consisted of 22 critical questions. With the results from adults in hand, we then constructed a simplified version of the survey for older and younger children – consisting of seven critical items – which focused on a subset of items from the longer survey that were most representative of adults' responses. Despite differences between the surveys, participants in our three groups gave qualitatively similar responses, as described below in the Results section.

In the full version of the survey given to adults, one set of questions focused on the perceived importance of caste in organizing social interactions, and asked participants to rate how willing members of a low caste would be to interact with members of a high caste, and vice versa. On a 5-point Likert-like scale, adult participants rated whether members of low and high caste groups would be willing to (1) talk to, (2) accept food from, (3) become friends with, (4) hug, (5) invite to their homes, (6) marry, (7) hire, (8) work for, or (9) let their children play with each other. Other questions focused on the importance of caste to personal identity and life decisions. For example, adult participants were asked to indicate how important their caste is to who they are as a person, how likely they would be to mention their caste when telling others about themselves, and how much importance people place on caste when choosing friends and marriage partners. In the simplified version given to both groups of children, children were asked to rate (on a 3-point Likert-like scale) whether members of specific high and low caste groups (i.e. Brahmins and Dalits) would be willing to eat with, play with, or marry each other. Children were also asked to indicate how important their caste is to who they are as a person.

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For all groups, we expected that if participants believe that caste plays an important role in structuring social interactions, they would judge that members of lower castes would be more willing to interact with members of higher castes than the reverse, reflecting the hierarchical structure of caste relations. Further, in light of previous findings (Das *et al.*, 2010), we expected that caste would be judged as especially important in the context of marriage.

Intuitive theories survey

This survey asked participants to endorse or reject statements regarding four different domains including (1) the malleability of achievement of members of different castes, (2) the malleability of personal intellectual attributes, (3) the malleability of personality attributes, and (4) personal freedom. For (2) and (3) materials were adapted from Dweck (1999). For (4), materials were adapted from Vohs and Schooler (2008). The adults and older children received a full version of this survey that included 21 critical statements, which were drawn evenly from the four domains (with six statements about the achievement of members of different castes and five each from the other domains). The group of younger children received a simplified version that included only nine critical statements, which were spread evenly across three of the domains (the simplified version did not include statements about personal freedom, which we judged to be too abstract to be understood by the younger children). Despite differences between the surveys, participants in our three groups gave qualitatively similar responses, as described in the Results section below.

Within each domain, statements were phrased either in terms of entity/deterministic views, or in terms of incremental/free will views. Examples from each domain, taken from the full version of the survey given to adults and older children, are provided in Table 1. Items from the simplified version given to younger children used simpler language (see the Supplementary Materials for the full set of items).

Participants indicated how much they agreed with each of these statements on a 6-point Likert-like scale. Responses to entity/deterministic statements were reverse-coded, such that all responses reflected the degree of incremental/free will endorsement. Responses for each participant were then averaged together to create incremental/free will scores for each domain. Of particular interest to us was whether participants' responses across these domains would be inter-correlated, and thus whether participants might hold related intuitive theories across different domains of personal attributes and personal freedom.

Table 1 *Examples of critical statements from the intuitive theories survey given to adults and older children*

Domain	Incremental / Free will	Entity / Determinism
Intelligence and Achievement of Different Castes	If a low caste child works hard, they can accomplish as much in life as a high caste child	Even if a low caste child works hard, they can never accomplish as much in life as a high caste child
Personal Intelligence and Achievement	I can change how smart I am by working hard and studying a lot	People are born with a certain level of smartness, and that basically never changes
Personality Trait	All people can change even their most basic personality	The kind of person someone is cannot be changed very much
Personal Freedom	People have complete control over life's decisions	People's biology determines their successes and failures

In addition to judging the critical statements like those in Table 1, participants also judged unrelated filler statements, such as, 'I think that making new friends is an important part of life.' There were nine filler statements in the full version of the survey given to adults and older children, and three in the simplified version given to younger children. Adult participants also received three catch trials, which directed them to choose specific values as their responses. Participants who did not respond as directed on these three trials were excluded for failing to attend to the task ($n = 29$; for discussion of how such procedures increase data quality, see Oppenheimer *et al.*, 2009). Finally, for all groups, we created two random orders of each survey, and counterbalanced them across participants.

Results

We begin by providing a broad overview of responses to the caste attitudes and intuitive theories surveys. For the caste attitudes survey, we were primarily interested in whether participants in our different age groups would believe that caste asymmetrically organizes social interactions. To test this, below we present a number of planned analyses, which ask whether participants judged that lower castes would be more willing to interact with members of higher castes than the reverse, and whether participants judged that caste is more important in some domains of interaction, like marriage, compared to

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others. Meanwhile, for the intuitive theories survey, our planned analyses focus on whether participants in our different age groups held related intuitive theories across different domains: i.e. whether there was a relationship among beliefs regarding personal freedom, the malleability of personal achievement and personality, and the achievement of members of different castes.

After presenting results from these two surveys, we address our primary research question: whether beliefs regarding caste are related to intuitive theories at the individual level, and whether this relationship holds across different domains of intuitive theories. To test this, we present formal tests of the relationship between responses to the caste attitudes and intuitive theories surveys for each of our age groups.

As noted above, because our three groups of participants received slightly different versions of the surveys, we conducted our analyses for these groups separately, except for cases in which the groups received identical measures (as explicitly noted below).

Results from caste attitudes survey

Figure 1 plots adult participants' judgments of the willingness (on a 5-point scale, with higher numbers indicating more willingness) of members of lower castes to interact with members of higher castes, and vice versa, for different forms of interaction. Consistent with the belief that caste status asymmetrically organizes social interactions, adults judged that members of lower castes would be more willing to interact with members of higher castes for a number of forms of interaction, including becoming friends with each other (Low to high: $M = 3.85$, $SE = .13$; High to low: $M = 3.48$, $SE = .13$; $t(72) = 2.13$, $p = .024$), letting their children play with each other (Low to high: $M = 3.82$, $SE = .12$; High to low: $M = 3.47$, $SE = .15$; $t(72) = 2.12$, $p = .038$), talking to each other (Low to high: $M = 3.89$, $SE = .11$; High to low: $M = 3.37$, $SE = .13$; $t(72) = 4.02$, $p < .001$), inviting each other to their homes (Low to high: $M = 3.68$, $SE = .13$; High to low: $M = 3.30$, $SE = .15$; $t(72) = 2.16$, $p = .034$), working for each other (Low to high: $M = 3.75$, $SE = .12$; High to low: $M = 3.25$, $SE = .16$; $t(72) = 2.62$, $p = .011$), accepting food from each other (Low to high: $M = 3.86$, $SE = .12$; High to low: $M = 3.12$, $SE = .15$; $t(72) = 4.21$, $p < .0001$), and marrying each other (Low to high: $M = 3.26$, $SE = .15$; High to low: $M = 2.68$, $SE = .15$; $t(72) = 3.30$, $p = .002$). The one exception to this pattern was that lower castes were not reliably judged to be more willing to hire members of higher castes than the reverse (Low to high: $M = 3.63$, $SE = .12$; High to low: $M = 3.48$, $SE = .13$; $t(72) = .88$, $p = .38$), which is sensible in light of the fact that members of lower castes are often employed by members of higher castes in India.

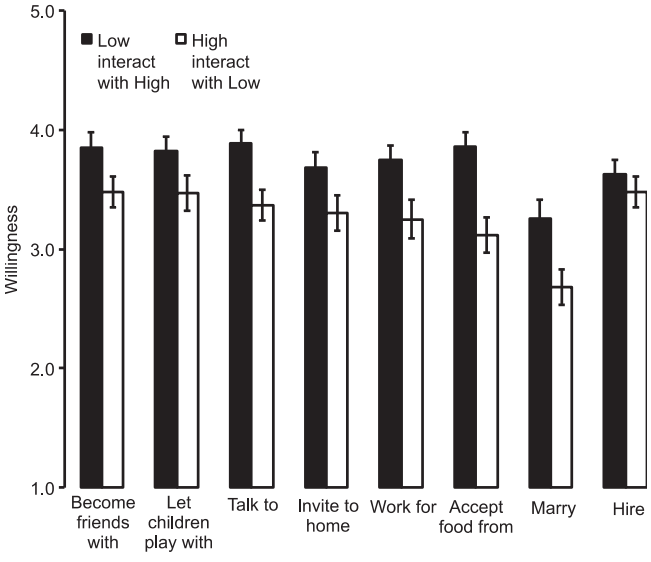

Figure 1 *Adult participants' judgments of the willingness of members of low and high castes to interact with one another in different ways.*

Consistent with previous findings (e.g. Das *et al.*, 2010), we also found that caste is judged to be especially important in the choice of marriage partners: adults' ratings of the willingness of castes to intermarry were lower than their ratings of other forms of inter-caste interaction, both for low castes interacting with higher castes ($t(72) = 3.94$, $p < .001$) and for high castes interacting with lower castes ($t(72) = 5.04$, $p < .001$). Further, adults also indicated that they place more importance (on a 5-point scale) on caste when choosing marriage partners ($M = 3.41$, $SE = .08$) compared to when choosing friends ($M = 2.41$, $SE = .08$; $t(72) = 5.16$, $p < .001$).

Younger and older children, despite receiving a simplified version of the survey given to adults, provided responses that were qualitatively similar to those of adults. Figure 2 plots younger and older children's judgments of the willingness (on a 3-point scale) of non-Brahmins to eat with, play with, and marry Brahmins (the highest caste group), and non-Dalits to eat with, play with, and marry Dalits (the lowest caste group). Beginning with the older group, children judged that non-Brahmins would be more willing to interact with Brahmins than that non-Dalits would be willing to interact with Dalits for each form of interaction, including playing with each other (non-Brahmin to Brahmin: $M = 2.48$, $SE = .06$; non-Dalit to Dalit: $M = 1.85$, $SE = .06$; $t(107) = 7.13$, $p < .001$), eating with

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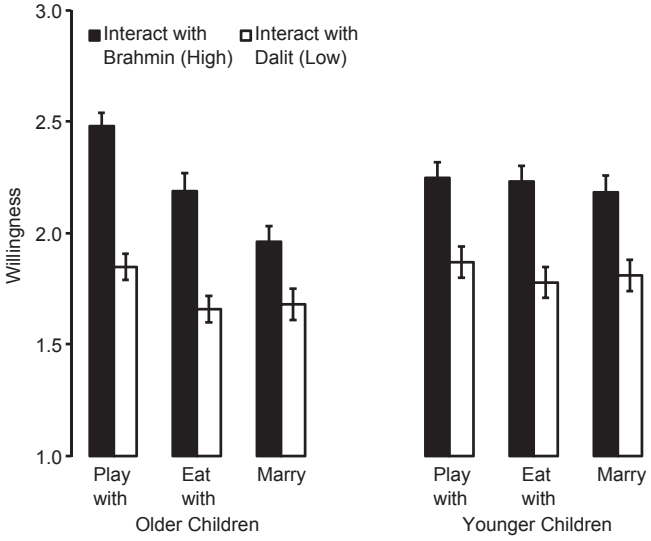

Figure 2 *Older and younger children's judgments of the willingness of non-Brahmins to interact with Brahmins (a high caste) and non-Dalits to interact with Dalits (a low caste).*

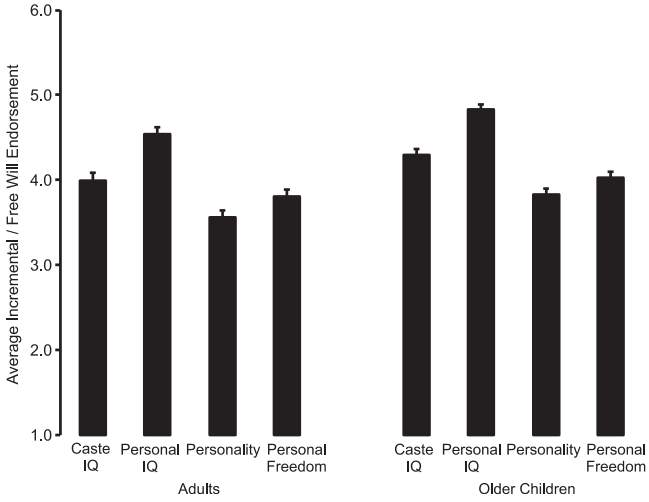

Figure 3 *Adults' and older children's endorsement of incremental views of the malleability of intelligence and achievement of members of different castes ('Caste IQ'), personal intellectual ability ('Personal IQ'), personality attributes, and of views supporting personal freedom.*

each other (non-Brahmin to Brahmin: $M = 2.19$, $SE = .08$; non-Dalit to Dalit: $M = 1.66$, $SE = .06$; $t(107) = 5.39$, $p < .001$), and marrying each other (non-Brahmin to Brahmin: $M = 1.96$, $SE = .07$; non-Dalit to Dalit: $M = 1.68$, $SE = .07$; $t(101) = 2.87$, $p < .005$). Younger children responded similarly for each form of inter-caste interaction, including playing with each other (non-Brahmin to Brahmin: $M = 2.25$, $SE = .07$; non-Dalit to Dalit: $M = 1.87$, $SE = .07$; $t(111) = 4.23$, $p < .001$), eating with each other (non-Brahmin to Brahmin: $M = 2.23$, $SE = .07$; non-Dalit to Dalit: $M = 1.78$, $SE = .07$; $t(111) = 4.75$, $p < .001$) and marrying each other (non-Brahmin to Brahmin: $M = 2.18$, $SE = .08$; non-Dalit to Dalit: $M = 1.81$, $SE = .07$; $t(111) = 4.25$, $p < .001$). Thus, like adults, younger children and older children each judged that members of lower castes would be more willing to interact with members of higher castes, compared to the reverse, suggesting that for all age groups, caste status asymmetrically organizes social interactions.

One interesting difference between children and adults did emerge: while marriage across castes stood out as the least likely form of inter-caste interaction for adults, this was not as true for children. While older children's ratings of the willingness of non-Brahmins to marry Brahmins were lower than their ratings of the willingness of non-Brahmins to eat with or play with Brahmins ($t(105) = 4.73$, $p < .001$), their ratings of the willingness of non-Dalits to marry Dalits were not lower than their ratings of the willingness of non-Dalits to eat with or play with Dalits ($t(104) = .97$, $p = .33$). Further, younger children's ratings of the willingness of members of different castes to intermarry were not lower than their ratings of the willingness of members of different castes to eat with or play with each other, independent of whether they were asked about interactions with Brahmins or Dalits (both ps > .40). This qualitative difference between children and adults may represent an intergenerational change in attitudes toward intercaste marriage, or alternatively may indicate a developmental change that occurs as children approach the age of marriage. Evidence for the latter comes from the fact that older children's ratings of the willingness of members of different castes to intermarry ($M = 1.82$, $SE = .05$) were significantly lower than younger children's ratings ($M = 2.00$, $SE = .06$; $t(222) = 2.13$, $p = .03$).

Results from intuitive theories survey

Figure 3 plots the degree (on a 6-point scale) to which adults and older children (who both received the full version of the survey) endorsed incremental views regarding the malleability of three kinds of attributes (i.e. the achievement of members of different castes, personal intellectual ability, and personality attributes), as well as broader views regarding personal freedom.

Older children's and adults' responses were broadly similar: Both groups of participants differentially endorsed incremental views according to the domain of attribute in question. In particular, they endorsed incremental views of personal intellectual ability (Older

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children: $M = 4.83$, $SE = .06$; Adults: $M = 4.54$, $SE = .08$) significantly more than they did for any of the other three domains (all ps $< .001$). They also endorsed incremental views of the achievement of members of different castes (Older children: $M = 4.30$, $SE = .07$; Adults: $M = 3.99$, $SE = .09$) to a greater extent than they endorsed statements of free will (Older children: $M = 4.03$, $SE = .07$; Adults: $M = 3.81$, $SE = .08$; both ps $< .05$), and endorsed incremental views of personality attributes (Older children: $M = 3.83$, $SE = .07$; Adults: $M = 3.56$, $SE = .08$) to a lesser degree than any of the other three domains (all ps $< .05$). Older children's responses only differed from those of adults in that, across each of the four domains, they endorsed more incremental/free will views than adults did (all ps $< .05$).

Our youngest age group, who received a simplified version of the survey (which did not include items regarding personal freedom), gave qualitatively similar responses. In particular, like older children and adults, younger children endorsed incremental views of personal intellectual ability ($M = 4.76$, $SE = .06$) to a greater degree than they endorsed incremental views of the achievement of different castes ($M = 4.28$, $SE = .10$; $t(116) = 4.02$, $p < .001$). They also endorsed incremental views of personality attributes ($M = 3.52$, $SE = .09$) to a lesser extent than of the other two domains (both ps $< .001$).

Our primary interest with this measure was whether intuitive theories were consistently held across domains. In support of this idea, we found that adults' responses across domains were highly inter-correlated (Cronbach's $\alpha = .74$). Specifically, views of personal intellectual ability were significantly correlated with views of personality attributes, the achievement of different castes, and personal freedom. Also, views of caste-related ability were reliably correlated with views of personality attributes and personal freedom (all rs $> .4$, ps $< .005$). While older children's responses were not as highly inter-correlated as those of adults (Cronbach's $\alpha = .47$), their views of intellectual ability and personality attributes were reliably correlated, and their view of the achievement of different castes was also related to their views of personal intellectual ability and personal freedom (all rs $> .22$, ps $< .05$). Finally, younger children's responses were also inter-correlated (Cronbach's $\alpha = .48$): In particular, their view of the achievement of different castes was reliably correlated with their views of personal intellectual ability and personality attributes (both rs $> .25$, ps $< .01$). Taken together, these findings provide evidence that beginning early in childhood, individuals hold related theories across different domains of personal attributes, which are in turn linked to broader stances regarding personal freedom.

Relations between caste attitudes and intuitive theories

Our primary research question concerned the relationship between attitudes toward caste and intuitive theories (e.g. of intelligence, personality, etc.) at the individual level. Because attitudes toward caste were tested with multiple items that exhibited significant variability in each group of participants, we used factor analyses to extract meaningful components of covariation from the items in the caste attitudes survey. For each group, we first used eigenvalue criteria to identify the number of factors needed, and then performed exploratory factor analyses, rotating the factors using the varimax method. These factors were then used as predictors in linear mixed-model regressions to predict responses on the intuitive theories survey, taking into account both variability across participants and across the different domains probed in the intuitive theories survey – i.e. the achievement of different castes, personal intellectual ability, personality attributes, and personal freedom (note that this last domain was only probed in older children and adults). Using this method, we asked whether attitudes toward caste were related to intuitive theories, and whether this relationship held across different domains. Follow-up analyses tested whether Hindu participants' own status within the caste system moderated relations between caste attitudes and intuitive theories. Finally, because our youngest group of participants did not receive items probing their beliefs about personal freedom, we also present analyses for adults and older children in which responses to these items of the intuitive theories survey have been excluded, to maximize comparability across groups.

Results from adults

Using the method described above, we extracted five factors to characterize adults' responses on the caste attitudes survey. These factors are summarized in Table 2, and for the current discussion are labeled as: 'Interact with lower caste', 'Interact with higher caste', 'Identity and decisions', 'Inter-caste marriage', and 'Accept food from higher caste'.[1] We entered these factors into a mixed model regression, along with domain of response on the intuitive theories survey as fixed effects, and participant as a random effect, treating responses on the intuitive theories survey as the dependent measure. The model also tested interactions between each of the factors and domain, to explore

[1] For all factor analyses reported here, values above 0.4 were considered to be meaningful factor loadings, and are consequently bolded in the loading matrices.

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Table 2 *Rotated factor loadings for adults' responses to the caste attitudes survey*

Item	Factor loadings				
	Factor 1 'Interact with lower caste'	Factor 2 'Interact with higher caste'	Factor 3 'Identity and decisions'	Factor 4 'Intercaste marriage'	Factor 5 'Accept food from higher caste'
Willingness of high caste to invite low caste to home	**0.91**	0.14	0.01	−0.03	−0.15
Willingness of high caste to let children play with low caste children	**0.87**	0.15	0.04	−0.02	−0.09
Willingness of high caste to become friends with low caste	**0.84**	0.09	−0.01	0.00	−0.01
Willingness of high caste to accept food from low caste	**0.83**	0.09	0.02	0.19	0.20
Willingness of high caste to hug low caste	**0.79**	0.01	−0.26	0.10	0.19
Willingness of high caste to work for low caste	**0.70**	0.01	−0.03	−0.06	−0.21
Willingness of high caste to talk to low caste	**0.64**	0.17	−0.10	−0.19	0.26
Willingness of high caste to marry low caste	**0.59**	−0.05	0.18	**0.55**	0.03
Willingness of high caste to hire low caste	**0.56**	−0.11	−0.36	0.29	0.33
Willingness of low caste to work for high caste	0.00	**0.88**	−0.18	0.08	−0.08
Willingness of low caste to let children play with high caste children	0.05	**0.87**	−0.11	0.08	−0.12
Willingness of low caste to hug high caste	0.15	**0.80**	−0.09	−0.04	0.20
Willingness of low caste to invite high caste to home	0.11	**0.78**	0.02	0.12	−0.07
Willingness of low caste to become friends with high caste	0.15	**0.76**	−0.09	−0.09	0.22
Willingness of low caste to hire high caste	0.02	**0.74**	−0.12	0.35	−0.01
Willingness of low caste to talk to high caste	0.16	**0.65**	0.10	−0.33	0.35
Willingness of low caste to accept food from high caste	−0.05	**0.61**	−0.07	0.04	**0.59**
Willingness of low caste to marry high caste	−0.09	**0.49**	−0.19	**0.74**	0.01
Importance of caste to who you are	−0.13	−0.06	**0.82**	−0.04	−0.03
Likelihood of telling others your caste	−0.02	−0.12	**0.71**	0.07	−0.03
Importance of caste when choosing friends	0.11	−0.08	**0.69**	0.05	−0.03
Importance of caste when choosing marriage partners	−0.12	−0.06	**0.49**	−0.19	0.03

how broadly attitudes toward caste are related to intuitive theories of attributes and personal freedom.[2]

Table 3 summarizes the findings of this analysis. The analysis yielded the expected effect of domain ($F(3, 201) = 47.48$, $p < .001$), indicating that adults differentially endorsed incremental views depending on the domain of attribute in question, as was shown in the 'Results from intuitive theories survey' section. Further, consistent with the idea that attitudes toward caste are related to intuitive theories, we found that two factors extracted from the caste attitudes survey were reliable predictors of responses on the intuitive theories survey: the 'Identity and decisions' factor, which had high loadings from items about how important caste is to personal identity and to decisions about friends and marriage partners ($F(1, 67) = 4.79$, $p = .032$), and the 'Accept food from higher caste' factor, which had a high loading from a question about how willing members of low castes are to accept food from higher castes ($F(1, 67) = 5.09$, $p = .027$).

In brief, the more that adults thought caste was important to their identity and life decisions, including who to marry, and the less they thought that low caste individuals would be willing to accept food from higher castes, the more likely they were to endorse entity or deterministic views in the intuitive theories survey. This fits with previous accounts, which have argued that caste

[2] A preliminary analysis did not find effects of participants' region of residence ($p = .22$), so this factor was not considered further.

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Table 3 *Summary of effects from mixed-model regression analysis for factors predicting adults' responses on the intuitive theories survey (N = 292)*

Factor	DF (numerator)	DF (denominator)	*F* Ratio	*p*
Domain	3	201	47.48	< .001**
Factor 1: 'Interact with lower caste'	1	67	0.93	.34
Factor 2: 'Interact higher caste'	1	67	3.49	.07
Factor 3: 'Identity and decisions'	1	67	4.79	.032*
Factor 4: 'Intercaste marriage'	1	67	1.92	.17
Factor 5: 'Accept food from higher caste'	1	67	5.09	.027*
Domain * 'Interact with lower caste'	3	201	0.40	.75
Domain * 'Interact with higher caste'	3	201	1.70	.17
Domain * 'Identity and decisions'	3	201	1.47	.22
Domain * 'Intercaste marriage'	3	201	2.28	.08
Domain * 'Accept food from higher caste'	3	201	3.43	.018*

Note: Adjusted $R2 = 0.64$; * $p < .05$; ** $p < .001$.

is prominent in the choice of marriage partners (Das *et al*., 2010) as well as in sharing food (perhaps due to beliefs that relate caste to notions of purity and contamination; see Appadurai, 1981; Marriott, 1968). These relationships held across the multiple domains probed by the intuitive theories survey, such that there was no significant interaction between domain and the 'Identity and decisions' factor ($p = .224$). This suggests that the more that individuals believe that caste is important to their identity and decisions, the more likely they are to endorse entity views across domains. There was, however, a significant interaction between the 'Accept food from higher caste' factor and domain ($F(3, 201) = 3.43$, $p = .018$) such that less willingness to accept food from higher castes was related most strongly to less incremental views of the achievement of different castes, personal intellectual ability, and personality attributes, but less related to views of personal freedom.

Because the group of younger children did not receive items regarding personal freedom, we repeated our analyses while excluding adults' responses to these items, to maximize comparability across groups. The results were broadly similar. Specifically, we again found that the 'Identity and Decisions' factor ($F(1, 67) = 5.17$, $p = .026$) and the 'Accept food from higher caste' factor ($F(1, 67) = 8.75$, $p = .004$) were reliable predictors of responses on the intuitive theories survey, and we also did not find a reliable interaction between the 'Identity and Decisions' factor and domain ($p = .144$). However, in contrast to before, we did not find a reliable interaction between the 'Accept food from higher caste' factor and domain ($p = .406$), suggesting that this factor was less predictive of views of personal freedom than of the achievement of different castes, personal intellectual ability, and personality attributes.

Finally, to explore whether participants' own caste moderated the effects described above, we conducted a final analysis on the subset of Hindu participants that reported their castes ($n = 42$) by including an additional predictor for caste status. Neither the main effect of caste status nor the interaction between caste status and domain reached significance (both ps > .40), suggesting that it is a person's attitude toward caste, rather than their actual position in the caste hierarchy, that predicts their intuitive theories.

Results from older children

The previous section indicates that attitudes toward caste are related to intuitive theories in adults. Next, we asked whether these relations are also present in older children. We used factor analyses to characterize older children's responses in the caste attitudes survey, to ensure comparability to the analyses conducted with adults. We extracted four factors, which are described in Table 4,

Table 4 *Rotated factor loadings for older children's responses to the caste attitudes survey*

Item	Factor loadings			
	Factor 1 'Play/eat with higher caste'	Factor 2 'Eat with lower caste'	Factor 3 'Marry higher caste'	Factor 4 'Caste importance'
Willingness of non-Brahmin to play with Brahmin	**0.99**	0.04	0.04	0.01
Willingness of non-Brahmin to eat with Brahmin	**0.53**	0.01	0.13	−0.03
Willingness of non-Dalit to eat with Dalit	0.03	**0.98**	−0.04	0.18
Willingness of non-Brahmin to marry Brahmin	0.22	0.10	**0.97**	0.04
Importance of caste to who you are	0.10	−0.20	−0.17	**0.96**
Willingness of non-Dalit to play with Dalit	0.02	0.37	0.08	−0.07
Willingness of non-Dalit to marry Dalit	−0.03	0.04	0.04	0.13

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and for the current discussion are labeled as: 'Play/eat with higher caste', 'Eat with lower caste', 'Marry higher caste', and 'Caste importance'. These factors were entered as fixed effects into a mixed model regression, along with domain of response on the intuitive theories survey, interactions between each of the factors and domain, age, gender, and school (which served as a proxy for the child's SES), treating responses on the intuitive theories survey as the dependent measure. In addition, we accounted for variability across children by entering participant as a random effect.

Table 5 summarizes the findings of this analysis. The analysis indicated that domain was a reliable predictor of responses on the intuitive theories survey ($F(3, 279) = 46.02$, $p < .001$), suggesting that older children differentially endorsed incremental views, depending on the domain of attribute in question (as reported in the 'Results from Intuitive Theories survey' section). We also found a reliable effect of the 'Marry higher caste' factor, which had a high loading from a question about how willing non-Brahmins would be to marry Brahmins ($F(1, 90) = 5.77$, $p = .018$). Specifically, the less children thought that non-Brahmins would be willing to marry Brahmins, the more likely they were to endorse deterministic views. Thus, although inter-caste marriage did not stand out as a taboo for older children on average (i.e. in their responses to the caste attitudes survey), children who were more sensitive to this aspect of caste were also more likely to hold deterministic beliefs, as measured by the intuitive theories survey. Finally, effects of age, gender, and school were not reliable predictors of responses (all ps > .30).

Interestingly, our data suggest that the observed relationship between caste attitudes and intuitive theories was not equally strong across domains, but was instead most strong for beliefs regarding personal freedom. First, there was a significant interaction between domain of response on the intuitive theories survey and the 'Caste importance' factor, which had a high loading from a question about how important caste is to personal identity ($F(3, 279) = 4.29$, $p = .006$). Specifically, the more important children thought that caste was to their identity, the more deterministic they were, but this effect was strongest for views of personal freedom. Second, when we excluded older children's responses to items regarding personal freedom (to ensure comparability with the results from younger children to follow), we no longer found a reliable effect of the 'Marry higher caste' factor ($p = .206$) or a reliable interaction between 'Caste importance' and domain ($p = .348$).

To sum up, when compared to the results from adults reviewed above, we found both similarities and differences. For both older children and adults, we found that the less willing that an individual thinks that low castes are to interact with higher castes, and the more important they think caste is to their identity and in making decisions such as who to marry, the more likely they are to endorse deterministic views, as measured by the intuitive theories survey. However, although this relationship held across multiple domains for adults, for older children it held most strongly for beliefs regarding personal freedom. We return to and discuss this pattern of findings in the Discussion.

Finally, to explore whether children's own caste moderated the effects described above, we conducted an additional analysis on the subset of Hindu children for which we had caste information ($n = 70$). In addition to the predictors used in the previous analysis, we entered in children's caste status, and a term for the interaction between caste status and domain (we removed terms for age, gender, and school, as they were

Table 5 *Summary of effects from mixed-model regression analysis for factors predicting older childrens' responses on the intuitive theories survey (N = 392)*

Factor	DF (numerator)	DF (denominator)	*F* Ratio	*p*
Domain	3	279	46.02	< .001***
Factor 1: 'Play/eat with higher caste'	1	90	0.29	.589
Factor 2: 'Eat with lower caste'	1	90	1.15	.287
Factor 3: 'Marry higher caste'	1	90	5.77	.018*
Factor 4: 'Caste importance'	1	90	0.06	.815
Domain * 'Play/eat with higher caste'	3	279	0.60	.612
Domain * 'Eat with lower caste'	3	201	0.87	.457
Domain * 'Marry higher caste'	3	201	2.04	.109
Domain * 'Caste importance'	3	201	4.29	.006**
Age	1	90	1.09	.300
Gender	1	90	0.43	.514
School	1	90	1.01	.318

Note: Adjusted $R2 = 0.45$; *$p < .05$; **$p < .01$; ***$p < .001$.

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non-significant in the previous analysis), again treating responses on the intuitive theories survey as the dependent measure. The main effect of caste status approached significance ($F(1, 58) = 3.56$, $p = .064$), and this factor did not interact with domain ($p = .992$). This trend suggests that children who belong to lower castes may adopt more entity/deterministic beliefs than do children of higher castes. However, further research is necessary to explore whether this relationship is robust.

Results from younger children

Thus far, we have presented analyses showing that for both adults and older children, attitudes toward caste are related to intuitive theories. Specifically, these analyses indicate that the more important that older children and adults feel that caste is to their identity and in organizing social interactions like marriage and food sharing, the more deterministic their beliefs are.

To explore whether qualitatively similar relations were also present in our youngest age group, we first extracted four factors to characterize younger children's responses on the caste attitudes survey. These factors are described in Table 6, and for the current discussion are labeled as: 'Marry lower caste', 'Caste importance', 'Interact with higher caste', and 'Play/eat with lower caste'. We entered these factors as fixed effects into a mixed model regression, along with domain of response on the intuitive theories survey, interactions between each of the factors and domain, and age, gender, and school, treating responses on the intuitive theories survey as the dependent measure. We also accounted for variability across children by entering participant as a random effect.

Table 7 summarizes the findings of this analysis. The analysis indicated that domain was a reliable predictor of responses on the intuitive theories survey ($F(2, 206) = 39.54$, $p < .001$), suggesting that younger children differentially endorsed incremental views, depending on the domain of attribute in question (as reported in the 'Results from intuitive theories survey' section). However, we did not find significant effects of any of the four factors extracted from the caste attitudes survey (all ps > .31), suggesting that attitudes toward caste may not be related to young children's intuitive theories. These results are qualitatively different from those of adults, for whom we found a reliable relationship between caste attitudes and intuitive theories, even when personal freedom items – which younger children did not receive – were removed (see above). However, this pattern of results does not differ from that found for older children, who only showed a relationship between caste attitudes and intuitive theories when personal freedom items were included. We return to and discuss this pattern of findings in the Discussion.

Although attitudes toward caste weren't strong predictors of responses on the intuitive theories survey for our youngest age group, age ($F(1, 100) = 17.30$, $p < .001$), school ($F(1, 100) = 18.78$, $p < .001$), and gender ($F(1, 100) = 6.82$, $p = .010$) each reached significance. Specifically, older children within the group of younger children adopted more incremental views than younger children in the group, girls ($M = 4.35$, $SE = .10$) were more incremental than boys ($M = 4.09$, $SE = .10$), and children at the higher SES school ($M = 4.35$, $SE = .10$) were more incremental than children at the lower SES school ($M = 4.02$, $SE = .10$). These results stand in contrast to those from the group of older children, for whom age, gender, and school were not significant predictors of responses on the intuitive theories survey. To explore whether effects of these factors on younger children's responses depended on the domain of intuitive theory in question, we conducted a follow-up analysis entering domain, age, gender, school, and terms for the interactions between age, gender, and school with domain. Age significantly interacted with domain ($F(2, 222) = 5.07$, $p = .007$), as children appeared to adopt more incremental views of the ability of members of different castes and of personal intellectual ability as they aged, compared to their views of personality traits. However, the interactions between gender and domain

Table 6 *Rotated factor loadings for younger children's responses to the caste attitudes survey*

Item	Factor loadings			
	Factor 1 'Marry lower caste'	Factor 2 'Caste importance'	Factor 3 'Interact with higher caste'	Factor 4 'Play/eat with lower caste'
Willingness of non-Dalit to marry Dalit	**0.97**	0.00	0.00	0.24
Importance of caste to who you are	−0.02	**0.99**	−0.16	−0.03
Willingness of non-Brahmin to play with Brahmin	0.01	−0.09	**0.57**	0.09
Willingness of non-Brahmin to marry Brahmin	0.36	−0.13	**0.53**	−0.10
Willingness of non-Brahmin to eat with Brahmin	−0.06	−0.01	**0.41**	0.14
Willingness of non-Dalit to play with Dalit	0.03	0.11	0.21	**0.53**
Willingness of non-Dalit to eat with Dalit	0.11	−0.10	0.00	**0.47**

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Table 7 *Summary of effects from mixed-model regression analysis for factors predicting younger childrens' responses on the intuitive theories survey (N = 324)*

Factor	DF (numerator)	DF (denominator)	*F* Ratio	*p*
Domain	2	206	39.54	< .001**
Factor 1: 'Marry lower caste'	1	100	0.22	.641
Factor 2: 'Caste importance'	1	100	1.00	.320
Factor 3: 'Interact with higher caste'	1	100	0.03	.871
Factor 4: 'Play/eat with lower caste'	1	100	0.05	.822
Domain * 'Marry lower caste'	2	206	0.80	.453
Domain * 'Caste importance'	2	206	2.40	.094
Domain * 'Interact with higher caste'	2	206	1.33	.267
Domain * 'Play/eat with lower caste'	2	206	0.55	.577
Age	1	100	17.30	< .001**
Gender	1	100	6.82	.010*
School	1	100	18.78	< .001**

Note: Adjusted $R2 = 0.44$; *$p < .05$; **$p < .001$.

and between school and domain were not significant (both *p*s > .15). Together, these analyses suggest that in early childhood, intuitive theories across different domains undergo significant changes, and that the trajectory of these changes may depend on demographic variables including children's age, gender and socioeconomic status.

In a final analysis, we explored whether children's own caste moderated the effects described above. As before, this analysis was restricted to Hindu participants for whom we had caste information ($n = 69$). In addition to the predictors used in the previous analysis, which included domain, factors from the caste attitudes survey, interactions of these factors with domain, and age, gender, and school, we also entered in children's caste status, and a term for the interaction between caste status and domain, again treating responses on the intuitive theories survey as the dependent measure. Neither the main effect of caste status nor the interaction between caste status and domain reached significance (both *p*s > .54).

Discussion

In this study, we sought to address how the societal structure in which a person is raised may relate to their intuitive theories regarding personal freedom and the malleability of social and intellectual traits. To address this, we tested children and adults in India, and asked whether individual differences in their attitudes toward the Hindu caste system were related to differences in their intuitive theories. Specifically, we hypothesized that, because of the deterministic worldview embodied by the caste system, individuals who place more importance on caste might also be more likely to adopt deterministic intuitive theories, not only with respect to the potential achievement of members of different castes, but also with respect to their own intelligence, personality, and personal freedom.

In support of this hypothesis, we found evidence that attitudes toward caste are related to intuitive theories both in late childhood and in adulthood. Specifically, adults were more likely to endorse deterministic views when they indicated that caste was important to their identity and life decisions (including who to marry), and in organizing social interactions such as sharing food. Similarly, older children were more likely to endorse deterministic views regarding their personal freedom if they thought that caste was important to their identity, and if they thought that members of lower castes would be less willing to marry members of higher castes. To our knowledge, these results are the first to directly show that an individual's attitudes toward the social structure in which they are raised – in this case, the Indian caste system – can be linked to their intuitive theories regarding personal freedom and the malleability of intelligence and personality.

Our results also provide some of the first evidence that attitudes toward systems of social organization are predictive of intuitive theories spanning a broad range of domains. Specifically, in adults, attitudes toward caste were related not only to beliefs about the ability of members of different castes, but also to beliefs about the malleability of personal intelligence and personality attributes, and even to broader philosophical stances regarding personal freedom. Related to this, we found evidence that by adulthood, the more incremental an individual's beliefs are in one domain, the more incremental their beliefs are in other domains. Even the beliefs of children (across both age groups) were reliably intercorrelated across domains, though not as strongly as those of adults. These findings contribute to the existing literature on intuitive theories, both by providing direct

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evidence that intuitive theories of personal intelligence and personality are related at the individual level, and by showing that these theories are also related to broader beliefs about free will: Individuals who believe that their life outcomes are controlled by fixed aspects of their intelligence or personality also subscribe to the idea that their life is constrained by factors they cannot control (see Dweck & Molden, 2008).

Interestingly, although we found evidence that caste attitudes are related to a broad range of intuitive theories in adults, we observed a qualitatively different pattern of results in children, suggesting a potential developmental change. Specifically, we found no evidence that caste attitudes are related to beliefs regarding the potential achievement of members of different castes, or of personal intelligence or personality, in either group of children. Instead, we found evidence that caste attitudes are linked only to beliefs about personal freedom in older children (and this domain was not evaluated in younger children). Although it is conceivable that this difference between adults and children was due to the fact that children received simplified versions of the measures given to adults, we find this explanation unlikely. Despite receiving simplified measures, children's responses to the intuitive theories and caste attitudes surveys were qualitatively similar to those of adults at the group level. For example, all groups of participants judged that low castes would be more willing to interact with high castes than the reverse, indicating an understanding of the asymmetric nature of the caste hierarchy. Furthermore, each age group gave more incremental responses to statements about personal intelligence than to statements about personality or the achievement of members of different castes. Critically then, the only difference between children and adults was whether, at the individual level, caste attitudes were related not just to broad stances toward personal freedom (which was true of both adults and children), but also to more specific intuitive theories regarding personal attributes (which was true only of adults). We find it unlikely that differences in the measures given to our different age groups could have created differences only in the scope of the relation between responses to the caste attitudes and intuitive theories surveys, without altering responses to these surveys more globally.

Instead, our data support the conclusion that there is a developmental change, such that caste attitudes are initially linked to broad beliefs about personal freedom, and only later in life to specific beliefs regarding the potential achievement of different castes, personal intellectual ability, and personality attributes. One possible reason for such a developmental trajectory is that the deterministic worldview of the caste system is abstract, and does not speak directly to the malleability of specific traits like intelligence or personality. Because of this, children may initially relate their understanding of caste to only broad and abstract beliefs about the possibilities of change in life, such as their view of personal freedom. As children get older, however, their abstract beliefs about free will versus determinism (which have previously been characterized as generalized forms of entity vs. incremental beliefs; Dweck & Molden, 2008) may be applied to specific, concrete attitudes – e.g. toward personal intelligence, personality, and other traits.

One potential mechanism for such change might involve learning about the real-life implications of caste status. Recall that while marriage across castes stood out as the least likely form of inter-caste interaction for adults – e.g. relative to eating with or playing with members of other castes – this was not true for children. One possibility, then, is that by learning about specific cases, like marriage, children who believe that caste is important may become increasingly deterministic across a range of beliefs. Consistent with this, we found that beliefs regarding inter-caste marriage were reliable predictors of a broad range of intuitive theories for adults.

While our results provide evidence that attitudes toward caste are related to beliefs about personal freedom in late childhood, and to a broader range of intuitive theories by adulthood, they are correlational, and cannot speak to causality. A first possibility – which we have suggested throughout this paper – is that children's developing attitudes toward caste cause changes in their beliefs about free will and about their own achievement and personality. However, it is also possible that the causal relationship is in the opposite direction, such that developing attitudes about personal freedom, intelligence, and/or personality shape attitudes toward caste. Finally, the relationship between caste attitudes and intuitive theories might also be driven by a third variable – e.g. the development of a general tendency toward essentialist reasoning – that independently determines both attitudes toward caste and intuitive theories.

At present, it is impossible to decide between these different accounts, but we believe that the causal arrow most likely goes from caste attitudes to intuitive theories. The caste system is explicitly deterministic and thus bears on beliefs about free will and achievement; that is, it speaks to the possibilities of change in life. By contrast, beliefs about free will and achievement do not explicitly speak to whether caste should be viewed as important, or how members of different castes should interact. Thus, while caste beliefs might be extended to other domains via generalization or transfer, it is less obvious how the converse might be true. Our data also provide indirect

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evidence that the relationship between caste attitudes and intuitive theories is not mediated by a third variable like general essentialist reasoning. Recall that in older children, caste attitudes were related only to beliefs about free will, but were related more broadly to multiple domains of intuitive theories in adults. Critically, a third variable influencing *both* caste attitudes and intuitive theories is unable to explain why the scope of the relation between caste attitudes and intuitive theories might change over time. By contrast, this pattern is readily explained by our preferred causal hypothesis: that caste attitudes exert a gradually widening influence on intuitive theories. Still, the above considerations aside, future studies should directly explore the nature of the causal relationship between caste attitudes and intuitive theories. For instance, a longitudinal study that independently measured children's caste attitudes, intuitive theories, and general tendencies toward essentialism could explore whether changes in one of these three areas precede and predict changes in the other areas.

Finally, while previous studies have reported cross-cultural differences in intuitive theories, our study provides an important contribution by empirically linking differences in cultural beliefs to differences in intuitive theories at the individual level. A number of past studies have reported that individuals raised in East Asian cultures adopt more incremental beliefs than do individuals raised in Western cultures, and have argued that this difference is related to the relatively more collectivist nature of East Asian societies (Chen & Stevenson, 1995; Heine *et al.*, 2001; Stevenson & Stigler, 1992). However, because previous studies did not directly relate cross-cultural differences in collectivism to differences in intuitive theories, they did not provide strong evidence for the hypothesized link. We believe that the approach adopted here, to directly link individual differences in cultural beliefs (e.g. toward the caste system) with individual differences in outcomes of interest (e.g. like intuitive theories; Matsumoto & Yoo, 2006), will be fruitful in developing psychological models of how cultural factors shape social psychological phenomena.

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Supporting Information

Additional Supporting Information may be found in the online version of this article:

Figure S1. Adult participants' perceived importance of different attributes to their personal identity.

Figure S2. Adult participants' judgments of how likely they would be to mention a particular attribute when telling others about themselves.

Figure S3. Adult participants' perceived importance of different attributes when choosing friends.

Figure S4. Adult participants' perceived importance of different attributes when choosing marriage partners.

Figure S5. Older and younger children's perceived importance of different attributes to their personal identity (younger children were not asked about surname or skin color).

Figure S6. Adults' and older and younger children's judgments of what factor is most responsible for an individual's caste membership.

Table S1. Critical statements from the Intuitive Theories survey given to adults and older children.

Table S2. Critical statements from the Intuitive Theories survey given to younger children.

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