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The Cultural Roots of Free Will Beliefs: How Singaporean and U.S. Children Judge and Explain Possibilities for Action in Interpersonal Contexts

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Making sense of human actions involves thinking about both *endogenous* influences (the internal mental states of agents) and *exogenous* influences (social, moral, and interpersonal constraints). Culture impacts how we weight the relative causal influence of these two influences. To examine these cultural influences in depth, we asked 147 4–11-year-olds in 3 cultural groups (Singaporean Chinese, Singaporean Malay, and U.S. Americans) about the possibility of acting on desires that go against social, moral, and interpersonal norms (i.e., "free will," defined as the ability to do otherwise). By age 4, U.S. children were more likely to endorse the freedom to act against norms than Singaporean children, and these cultural differences were more prevalent at older ages. Children's explanations mirrored between- and within-culture differences in causal beliefs about action: Both groups of Singaporean children referenced interdependent causes/consequences in their explanations than U.S. children, and Singaporean Malay children referenced more interdependent causes/consequences than Singaporean Chinese children. Singaporean children were more likely to elaborate on lack of free will by referencing punishment and/or having to seek permission from authorities, revealing a local cultural influence of growing up in an authoritarian society. These results underscore the critical role of culture in shaping how children understand mind, self, and action.

Keywords: social cognition, free will, agency, norms, cross-cultural psychology

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There is an apparent tension in the way humans think about the causes of action. On one hand, humans have an automatic tendency, from early in development, to view actions as *endogenously* caused by an individual's personal, subjective mental states (Perner & Roessler, 2012; Wellman, 1990; Woodward, 2009). On the other hand, just as automatically, and from early in development, humans have a tendency to infer *exogenous causes*: in particular, interpersonal considerations such as social and moral norms (Kalish & Shiverick, 2004; Killen, Mulvey, & Hitti, 2013; Lagattuta & Weller, 2014; Powell & Spelke, 2013; Rhodes, 2012; Rhodes & Wellman, 2017). These two types of causal understandings depend on each other (Killen, Lynn Mulvey, Richardson, Jampol, & Woodward, 2011; Wellman & Miller, 2008; Knobe, 2003) but also act independently (Nucci & Weber, 1995; Spelke & Kinzler, 2007). Moreover, there is substantial cultural variation in how we think about and explain our own and others' actions (Miller, 1984).

At the intersection between reasoning about personal and interpersonal causes of action is a set of beliefs that we term "free will": most simply, these are the beliefs that people hold about which actions are intentional and which are not, what possibilities exist for action, and what the limits of possibility are (that is, when and how we can "do otherwise"). For adults, believing in free will is central to the attribution of intentions, desires, and other mental states; free will beliefs are also central to beliefs about moral responsibility (Baer, Kaufman, & Baumeister, 2008; Feldman, Wong, & Baumeister, 2016; Nichols & Knobe, 2007; Pizarro & Helzer, 2010). In this paper, we explore the emergence of the tension between reasoning about the personal and the interpersonal in early development by examining how children across cultural contexts judge, predict, and explain human actions, their possibilities, and their limitations.

The foundation of free will beliefs emerges early. Even infants distinguish between freedom and constraint - that is, between

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actions that can "be otherwise" and actions that cannot (Gergely & Csibra, 2003; Gergely, Bekkering, & Király, 2002). Infants and toddlers also understand that free actions can be diagnostic of an agent's personal preferences (Kushnir, Xu, & Wellman, 2010; Ma & Xu, 2011; Wellman, Kushnir, Xu, & Brink, 2016; Woodward & Sommerville, 2000), and, conversely, that actions constrained by situational forces cannot (Eason, Doctor, Chang, Kushnir, & Sommerville, 2018; Luo & Baillargeon, 2007). By preschool, children can reason explicitly about which actions are possible and impossible (Kushnir, Gopnik, Chernyak, Seiver, & Wellman, 2015; Nichols, 2004) as part of their emerging ability to think about possibility more generally (Lane, Ronfard, Francioli, & Harris, 2016; Shtulman & Carey, 2007).

These early foundations suggest that some aspects of our belief in free will are potentially culturally universal. Indeed, a majority of adults across cultures endorse the belief that human actions are not predetermined by physical laws (Sarkissian et al., 2010). Moreover, the general idea of personal choice is understood and valued by children and adults across cultures (e.g., Miller, Bersoff, & Harwood, 1990; Nucci, 1994; Savani, Markus, Naidu, Kumar, & Berlia, 2010). But there are also developmental changes, in how children understand personal and interpersonal influences on action. For example, 4-year-olds across cultures say that "wanting" (especially *really*, *really* wanting) means "having to" act—that is, that desires are constraints on one's freedom of choice. It is not until later in development (around age 6) that children understand that one can have conflicting desires (Atance & Meltzoff, 2006; Lagattuta, 2005; Lee & Atance, 2016) and one can inhibit strong desires (Kushnir et al., 2015; Wente, Bridgers, Zhao, Seiver, Zhu, & Gopnik, 2016). Similarly, preschool-aged children also tend to say that one "has to" act in accordance with social and moral norms. With age, children begin to endorse the possibility of acting against social constraints, by stating, for example, that someone had the freedom to break stated rules or conventions, to act unfairly, or to harm others (even if doing so would be wrong; Chernyak, Kushnir, Sullivan, & Wang, 2013; see also Lagattuta, Nucci, & Bosacki, 2010).

An important question is whether these developmental changes are also subject to cultural variation: due to cultural differences in philosophies of self, mind, and action (Markus & Kitayama, 1991; Peng & Nisbett, 1999) which in turn shape how we weigh personal as opposed to moral and social factors as causal influences on action, and how strong we believe those influences to be (Lu, Su, & Wang, 2008; Miller & Bersoff, 1998; Savani et al., 2010). Explaining even the simplest decisions both personal (such as why you might choose to wear nice clothing) and interpersonal (why you might hold the door open for a friend to come in from the cold) can reveal cultural biases. For example, one could imagine explaining the former in terms of both one's personal rights to choose what to wear, as well as one's interpersonal obligation to conform to conventional standards of dress. Similarly, one could imagine explaining the latter by appeal to a personal disposition to be "nice" or "kind" or to an interpersonal obligation for politeness in order to attain social order. These explanations are equally consistent with, and underspecified by, the behaviors themselves.

These examples suggest testable predictions about free will beliefs, namely that differences emerge most strongly when children have to think about possible actions in interpersonal contexts. In a recent study, Chernyak et al. (2013) charted universal similarities and developmentally emerging cultural differences in free will beliefs between U.S. and Nepalese children aged 4 to 11. Across ages and cultures, children endorsed the possibility of performing simple acts (e.g., wearing sandals instead of shoes), but also stated that actions that violated physical and mental laws were impossible (e.g., walking through a brick wall, or fixing a bicycle despite not knowing how to). The possibility of performing actions that go against rules, social norms, and moral principles differed across cultures, and these cultural differences emerged with age. Older children (beginning around at 7) in the United States were more likely to say that it was possible to act contrary to these rules and norms compared to their younger counterparts. Contrary to this, Nepalese children across the age range surveyed were equally likely to state that one "cannot" act contrary to interpersonal considerations. When comparing cultures, young children's responses were more similar and older children's responses were more divergent.

This prior work supports the idea that cultural differences in free will beliefs emerge in middle childhood. However, this work leaves open questions about why these cultural differences emerge. One deflationary possibility is that subtle linguistic differences between English and Nepali may explain cultural differences in American and Nepalese children's answers about freedom of choice. In Chernyak et al.'s (2013) study, Nepalese children were interviewed in Nepali while the U.S. children were interviewed in English. Both groups were asked whether characters "can" act against social and moral constraints. Thus, cultural differences could be partly attributed to subtle linguistic differences in the meaning of the modal verb "can" in different languages. In American English, the word "can" is most often used to denote ability; secondarily, "can" may also denote permissibility. In some East Asian cultures, possibility is actually synonymous with permissibility.

Several pieces of evidence speak against this deflationary account: First, Nepali has a "can/may" distinction that is commonly used, and the Nepali version of the questions was written using "can" specifically. Second, children across cultures responded similarly to control questions about simple possible and impossible actions, indicating that they understood the language of the task. Finally, the pattern of responses was the same whether the question was "*can* he/she do" or "*will* he/she do," suggesting that predictions about future actions are not necessarily dissociable from concepts of choice and agency. In fact, recent work that developmental changes in reasoning about possibility and permissibility emerge even when avoiding the use of the word "can" altogether (Shtulman & Phillips, 2018). Though this suggests that these effects reflect cultural rather than purely linguistic differences between the two languages, finding a way to make cultural comparisons in a common language is critical.

Another concern with any cultural comparison is that cultures differ on many dimensions. In particular, regional, socioeconomic, and educational differences between Nepal and the United States may have been driving the effects more than global Eastern versus Western cultural values. Children's local cultures may serve to reinforce beliefs about free will - children whose early lives are dominated by social obligations may not conceptualize choice to the same degree or in the same manner as children who attend schools that provide structured free choice time and emphasize the importance of individual decision-making.

In the current study, we sought a clearer answer to the question of how culture shapes the development of children's free will beliefs. We first replicated Chernyak et al.'s (2013) findings with a new cultural comparison that involved comparing cultures sharing a common language and comparable socioeconomic and educational characteristics. We also extended these findings by soliciting children's explanations for their free will beliefs. We reasoned that explanations can reveal much about children's intuitive theories across conceptual domains (Gopnik, 1998; Hickling & Wellman, 2001; Lombrozo, 2011) including their intuitive theories of psychological and social phenomena (Rhodes, 2014). Thus, an analysis of explanations would reveal both cultural similarities and cultural differences in children's beliefs about free will. Below we detail our four research foci:

Cultural and Subcultural Comparisons

In the present study, we chose both a within- and between-cultural comparison. We thus focused on U.S. children and two cultural groups within Singapore, an English speaking, wealthy, urban society with an educated population. Singapore has a unique, multicultural cultural profile (comprising of Chinese, Malays, Indians, and Eurasians) that makes it an interesting area for studying the development of folk-psychological beliefs. Although Singapore is characterized by its shared core Asian values among its ethnic communities (Quah, 1990), it also has its Western influences given its colonial history and English-mediated education. While it bears important similarities with Western, urban culture, it also has important differences. First, as in other East Asian cultures, "collectivist" values of family ties are fundamental; the group, rather than the individual, is prioritized (Kau & Yang, 1991). Additionally, Singapore, compared with other East Asian cultures, places a strong emphasis on authoritarian values; respect, formality, and deference toward one's superiors are the norm. It is rare for subordinates to question authority because the culture emphasizes hierarchies and status differences (Connor, 1996). Singapore has a reputation for being tough on crime (Shanmugam, 2012), and consequences for various transgressions are, by U.S. standards, severe (Bahrampour, 1995).

Since Singapore's independence, the government has encouraged each ethnic group to maintain their own distinct culture (Jung & Kau, 2004). Thus, we were also able to make a *within*-cultural comparison by sampling from two different subcultural groups, specifically the two largest ones—Chinese (76.2%) and Malays (15.0%; National Population and Talent Division, 2015). Singaporean Chinese are more influenced by Western values than the Malays. For example, Malays are more religious, and derive their collective identity from Islam (Jung & Kau, 2004). In general, the Malays, compared to the Chinese, place greater emphasis on the need to maintain the traditional family structure (Suratman, 2003). Based on these cultural profiles and prior work (Chernyak et al., 2013), we predicted that the two groups would show cultural divergence with age—U.S. children would show an increased tendency to endorse choice in the face of sociomoral obligations as they grew older, and Singaporean children would continue to endorse constraint across all ages.

Explaining Free Will by Appeal to Alternative Possibilities

Prior work finds that counterfactual thinking serves as a basis of free will beliefs (Baumeister, 2010; Kushnir et al., 2015; Nichols, 2004; Seligman, Railton, Baumeister, & Sripada, 2013). Additionally, prior work shows cultural similarities between U.S. and Chinese children: When children endorse the freedom to choose, they describe alternative possibilities that would lead to free choice (Wente et al., 2016), suggesting that explaining freedom of choice by appealing to alternative actions is both early developing and culturally universal. We hypothesized a similar cross-cultural similarity in the current study. To the extent that children think that acting against social and moral norms is possible, they will explain doing so by imagining alternative possible actions, intentions, or external conditions.

Explaining Interpersonal Actions by Appeal to Cultural Worldviews

We also examined whether the content of children's explanations contained evidence of cultural differences in emphasis on independent/interdependent causal influences on action (Markus & Kitayama, 1991; Savani, Wadhwa, Uchida, Ding, & Naidu, 2015). Explanatory content that contains references to desires (and other personal motivations), rights, and personal freedom suggest independent construals of actions. Conversely, content that contains references to social obligations (obligations to parents, peers, or authority figures), group norms, and preserving relationships, would suggest interdependent construals. Since all of the scenarios we presented are inherently social, they should lend themselves to the latter type of explanation (see Rhodes & Chalik, 2013). However, we expected to find more interdependent explanatory content in Singaporean compared to U.S. children. Moreover, for reasons discussed above, we expected to find more interdependent explanations from Malay compared to Chinese children. For all cultures, we expected the opposite pattern for independent explanatory content.

Critically, our aim was to explore whether these cultural worldviews would be revealed in the content of children's explanations, while at the same time being careful to avoid dichotomizing groups of children based on their culture at the outset. We therefore developed a culture-, condition-, and age-blind rating system: we a gave a small group of coders training on definitions of "independent" and "interdependent" self-construals and asked them to evaluate each blinded explanation with reference to those definitions.

Local Influences on Children's Explanations

Our final treatment of the explanations considers unique local cultural conditions in Singapore, namely the emphasis on authoritarian values and consequences of social transgressions. Thus, we looked for references to consequences (such as punishment) and permission from authority. We expected these types of references to emerge to a greater extent in Singapore than in U.S. children.

Method

Participants

This study was approved by the Cornell University IRB (Protocol Number: 0908000541, Title of Study: Causal Learning in Young Children). One-hundred 47 4–11-year-old children were recruited for this study.[1] Of these, 42 children were from the United States ($M = 6.50$, $SD = 2.11$; 18 female) and were recruited from a small university town in the Northeast. Children were recruited from and tested at a local elementary school or a local science museum that generally served mid- to upper-middle class families. Additionally, we recruited two subsamples from Singapore. Our first Singaporean subsample consisted of 47 Singaporean English-Chinese bilinguals ($M = 7.0$ years old, $SD = 2.50$; 26 females) from various locations within Singapore (recruited through school centers). School centers generally served middle to upper-middle class families. The other subsample comprised 58 Singaporean English-Malay bilinguals ($M = 6.19$ years old, $SD = 2.37$; 27 female), who were recruited primarily from a preschool and a primary school which served middle-class families (see Table 1).

Procedure

All children were interviewed individually in English by the same native English speaker in a session that lasted approximately 10–15 min.

Questionnaire

The full set of questions comprised a total of 27 scenarios. All questions/scenarios followed the same general form: In each question/scenario, we introduced children to a character who wished to act on a desire. Each child received 9 questions. We created two orders (forward and backward) of the 9 questions that were counterbalanced across participants (see Appendix).

In 6 of the questions, the characters' desires always violated some type of social and/or moral constraint.[2] Items were adapted from Chernyak et al. (2013) and included violations of *Social Norms* (not greeting guests, not eat with family, not wearing gender appropriate clothing), *Uncommon Artifact Use* (using a bucket as umbrella, carrying groceries in a fishnet, eating dinner with feet), *Harm* (hitting, making someone cry, stealing), *Prudential Rules* (lifting something heavy, playing in the dark, going outside without a hat), *Arbitrary Rules* (choosing against others wishes where to sit, what to play with, what to wear), and *Helping/Sharing* (not helping mom, not helping friends, not sharing toys).

Table 1
Number of Children Interviewed Within Each Culture and Age Group

Age groups	Singaporean Chinese	Singaporean Malay	U.S.
Ages 3–5	16	35	16
Ages 6–8	16	11	15
Ages 9–12	15	12	11

To ensure that children across ages and cultures could establish basic competency with the modal word "can," we also included 3 control category questions, which introduced characters whose desires did not violate any known social or moral constraints (e.g., labeled *Simple Free Choices;* drinking milk instead of juice), or desires that were impossible because they violated physical or mental constraints (e.g., a desire to walk through a brick wall; a desire to fix a bicycle without knowing how to do so; labeled *Physical Constraints* and *Mental Constraints*, respectively). We expected that children would be able to endorse choice in the first of these and endorse a lack of choice in the second two. Results of the three control categories replicate prior work and show no culture or age-related changes (see Supplementary Analyses). Control questions were always asked first to ensure children could establish basic competency in answering these questions and to establish that the questionnaire was about ability, not permissibility.

Dependent Measures: Choice Judgments and Action Predictions

After each scenario, participants were asked to respond to two questions asked in the following order: a *Free Choice Judgment* – whether the character has the ability to act according to his or her desire (e.g., "Can David eat dinner alone today: yes or no?") and an *Action Prediction*—whether the character will act according to that desire (e.g., "What do you think David will do today: eat dinner with his parents or eat dinner alone?"). Following the Free Choice Judgment, participants were asked to provide an *Explanation* (e.g., "Why do you think David can/cannot eat dinner alone?"). We included Free Choice Judgments and Action Predictions in order to check whether we would replicate prior work (Chernyak et al., 2013) which finds a high degree of correspondence between these two concepts.

Dependent Measures: Explanation Categories

Of critical interest were children's explanations for the Free Choice Judgment to the 6 Socio-Moral Categories. After each child's response to the Free Choice Judgment questions (e.g., "Can the character do that?"), the experimenter prompted for an explanation by asking, "Why can/can't the character do that?" Restatements or repetitions of the story were not further coded or analyzed. We coded the remaining explanations along three dimensions.

Counterfactual explanations. Prior work has found strong links between counterfactual reasoning and freedom of choice (Alquist, Ainsworth, Baumeister, Daly, & Stillman, 2015; Kushnir et al., 2015; Nichols, 2004). Thus, we examined whether explanations referenced alternative possibilities for the character's actions (i.e., if the character could have done otherwise). As a representative example, one child's response to being queried about

[1] One child who was 3 and one child who was 12 were included.
[2] We make no claims as to whether each item constitutes a moral or conventional violation nor about the severity of each transgression. Prior work suggests that the moral/conventional distinction may differ across cultures, and thus particular items in our sets may count as one or the other depending on culture.

whether she could fail to share candy with her friends ("yes, she can but she'd have to be sneaky about it. Because maybe if she says we don't get any candy today, she can just take it all for herself") would be considered a counterfactual because it referenced (a) an *if . . . then* statement, and (b) described the alternative hypothetical of lying to her peers.

One coder coded for references where children mentioned *alternative possibilities* for the character's actions (i.e., if the character could have done otherwise). A second coder, blind to hypotheses and participant demographics, coded for a subset of these explanations (270/771; 35%). Interrater agreement = 92%.

Interdependence versus independence. For the second dimension, we examined children's descriptions of the character's actions—in particular, whether they emphasized the "interdependence" or "independence" of the story character to his or her social world. A wealth of prior work finds that differences in Eastern versus Western philosophies of self, mind, and action (Markus & Kitayama, 1991; Peng & Nisbett, 1999) may be thought of in terms of Eastern cultures' relative emphasis on interdependence and Westerners' emphasis on independence.

At the same time, prior work suggests that independence and interdependence dimensions are not binary, and we thus reasoned that explanations may contain elements of both. To capture these potential nuances and avoid forcing explanations into binary categories, we asked 6 raters blind to the purpose of the study, culture and ages of participants, and the questions asked, to code children's explanations. Coders were provided with a description of Independent and Interdependent worldviews (see Table 2). After reading these worldviews, they could classify each explanation as (a) "Interdependent," (b) "Independent," (c) "Both," (d) "Neither/None," or (e) "I don't know." Explanations were coded as Interdependent if the child referred to the story characters' social roles, group memberships, or significant others and relationships. See Table 2.

Once again, we removed restatements of stories or uninformative responses in order to avoid biasing our results toward finding age-related changes (since younger children would be most likely to provide verbally unsophisticated responses) and coded the remaining explanations (n = 771). Overall, the majority of the explanations were identified as falling into one of the two main categories—"Interdependent" (65.43%) and "Independent" (20.69%). The remaining statements (a small minority) were coded as "Both" (7.44%), "Neither/None" (6.16%) and "I don't know" (0.28%). We assigned each explanation an Interdependent and Independent "score" based on the number of judges who identified the statement according to each classification. Thus, a score of 6 would indicate that all judges were in agreement in classifying the explanation as belonging to a particular category, and a score of 0 would indicate that all judges were in agreement that the explanation did not belong to the category. We note that our rating system did not force the two categories to be mutually exclusive, since raters could choose both "Neither" or "I don't know" responses. Thus, if six raters coded the explanation as belonging to "Both," that child would score a 6 in the category "Both," but 0's in the "Independence" and "Interdependence" categories. This coding scheme allowed us to consider the categories in a nondichotomous manner.

To examine agreement among the six raters, we looked at the percentage of statements that were ambiguous—that is, those that had only half of the raters agreeing on their rating. Overall, across three cultures, there was only 12.8% of the time in which Interdependent score was 3, and 13.5% of the time in which the Independent score was 3 (see Supplemental Analyses). This corresponded to a kalpha value of 0.24 ("slight agreement"; Hayes & Krippendorff, 2007).

Punishment and permission. Finally, because Singapore places a strong cultural emphasis on punishment and permission, our third explanation dimension investigated children's references to Punishment and Permission. For this, two coders coded for references to (a) Punishment by authority (b) Interpersonal peer consequences, and (c) Permission from authority. One coder coded for all the references. A second coder, blind to hypotheses and participant demographics then coded a subset of the explanations (35%). Interrater agreement = 96–97%.

Results

Results for the 3 control categories replicated prior work (Chernyak et al., 2013) and showed the predicted universalities in children's beliefs about free choice and constraint: Children across ages and cultures endorsed free choice to follow simple desires and lack of free choice (constraint) to act on desires that violate physical or mental constraints. Thus, children across all cultural contexts were able to appropriately respond to unambiguous and uncontroversial scenarios regarding free choice and constraint. See Supplemental Analyses.

Free Choice Judgments

As in prior work, we averaged children's responses to the 6 Socio-Moral categories to create two scores: Free Choice Judgment Score (0–1) and Action Prediction Score (0–1), each corresponding to the proportion of trials on which children stated that violating sociomoral actions was a choice and would be done (respectively).

For our regression analyses, we used Singaporean Chinese as the reference groups. To investigate children's Free Choice Judgments, we first ran a linear regression using Age, Malay, U.S., Malay × Age and U.S. × Age as predictors, and Socio-Moral Free Choice Judgment score as response. There was a significant main effect of Age, B = 0.034, $SE(B)$ = 0.011, p = .003, and a significant U.S. × Age interaction. B = 0.045, $SE(B)$ = 0.018, p = .012. See Figure 1.

We followed up on the interaction by running three separate regressions for each culture, with Socio-Moral Free Choice Judgment Score as the response and Age as the predictor. For all three cultures, age positively predicted Free Choice Judgments (Chinese: B = 0.034, $SE(B)$ = 0.010, p = .002; Malays: B = 0.018, $SE(B)$ = 0.006, p = .002; U.S.: B = .079, $SE(B)$ = .020, $p < .001$). Chance comparisons of each age group (3–5-year-olds; 6–7-year-olds; 8–11-year-olds) within each culture showed that all age groups were below chance in their responses (one sampled t's to midpoint of 0.50 all < -4.0, all p's $< .001$), with the exception of 6–7-year-olds as well as 8–11-year-olds in the United States whose responses did not differ from chance (both p's $> .25$).[3]

[3] We note that these chance comparisons should be interpreted carefully since in these analyses, each group has small sample sizes ($N < 20$).

Table 2
Coding Categories for Children's Explanations

General categories	Description	Examples
1. Counterfactual explanations		
Alternative Possibilities	• Include alternative possibilities/come up with alternative scenarios for character's actions	(Yes) She can but she'd have to sneaky about it. Because maybe if she says we don't get any candy today she can just take it all for herself. (Yes) If he has a table in his room, he can take his dinner up there and eat by himself.
2. Cultural Worldviews: Interdependent vs. Independent		
a) Interdependent	• Oriented toward social goals, subjective/societal norms (e.g., having to abide by rules), and context-specific normative information	(No) It hurts his friend's feelings. (Yes) He can do it if his parents are okay with that.
b) Independent	• Personal preferences, personality traits, internal psychological states, beliefs. Emphasize individuality and self-sufficiency	(No) He's going to get soaking wet. (Yes) He's allowed to do anything he wants.
3. References to Punishment and Permission		
a) Punishment by Authority	• Direct or indirect punishment from an authority figure	(No) He will get into trouble with his parents. (No) Mummy will scold him.
b) Interpersonal Peer Consequences	• How the character's peers might directly or indirectly "punish" the character	(No) His friends won't want to be his friends anymore. (No) Everyone will laugh at him.
c) Permission from Authority	• Obtaining permission from authority figure	(No) If the town sets the law, it is a rule and you cannot break it. (Yes) If she asks her mum and she says yes.

Note. The three coding schemes were handled separately, and therefore not mutually exclusive.

Action Predictions: Six Socio-Moral Categories

Next, we looked at Action Prediction scores (i.e., what children thought the characters *would* do). This question was not subject to the same linguistic ambiguity that might be present in the use of the word "can". Overall, the relation between average Free Choice and average Action Prediction scores was high, $r(147) = .770$, $p < .001$. We ran a linear regression using Age, Malay, U.S., Malay × Age and U.S. × Age as predictors, and averaged Socio-Moral Action Prediction scores as the response. There was a significant main effect of Age, $B = 0.026$, $SE(B) = 0.013$, $p = .044$, and a significant U.S. × Age interaction, $B = .058$, $SE(B) = .020$, $p = .005$ (see Figure 2 for results). We then followed up on the main effect of Age by running three separate regressions for each culture, with Socio-Moral Action Prediction Score as the response and Age as the predictor. For all three cultures, age positively predicted Action Predictions (Chinese: $B = 0.026$, $SE[B] = 0.013$, $p = .048$; Malays: $B = 0.020$, $SE[B] = 0.007$, $p = .007$; U.S.: $B = .083$, $SE[B] = .022$, $p < .001$). Formal comparisons of each age group (3–5-year-olds; 6–7-year-olds; 8–11-year-olds) within each culture to chance levels showed that all age groups were below chance in their responses (one sampled t's to midpoint of 0.50 all < -3.0, all p's $< .006$), with the exception of 6–7-year-olds as well as 8–11-year-olds in the United States whose responses did not differ from chance (both p's $> .05$).

Analysis of Explanations

Counterfactual explanations. We examined the proportion of trials on which children provided counterfactual explanations. We ran a linear regression with Culture (Chinese was used as the reference group), Age, and the interaction as predictors and average number of counterfactual references as a response. We found an effect of Age, $B = 0.029$, $SE(B) = 0.009$, $t(141) = 3.393$, $p < .001$, and no other significant effects (all p's $> .05$). The proportion of trials on which children referenced counterfactuals was

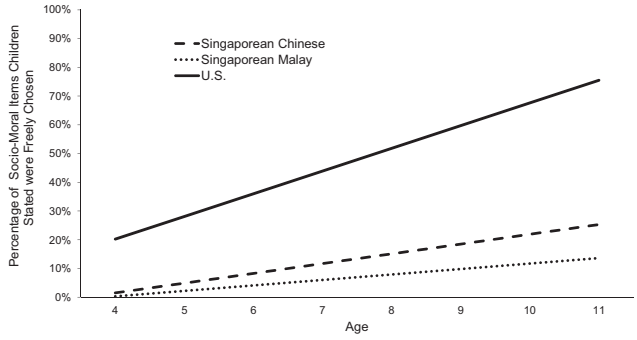

Figure 1. Regression lines for free choice judgment means (0–1) of the six socio-moral categories versus age.

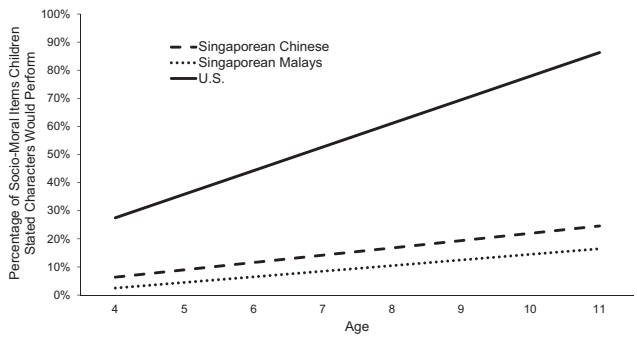

Figure 2. Regression lines for action prediction means (0–1) of the six socio-moral categories versus age.

significantly correlated with the proportion of trials on which they provided "yes" responses (endorsed choice), $r(147) = 0.748$, $p < .001$, and this correlation held for all three cultural groups (r's 0.645–0.845, all p's $< .001$).

Cultural worldviews: Interdependent versus independent. We next looked at the degree to which explanations referred to the characters in an independent (focused on self and mental states) or interdependent (focused on others or social norms) way. A minority of explanations were coded as "both," "neither," or "I don't know," so these categories are not further considered in our analyses. Please see coding section for further details on the coding scheme.

To investigate how scores varied by culture, we ran two linear regressions using Culture and Age as predictors and average Independent and Interdependent scores (for each regression) as the response. Initial analyses showed nonsignificant interactions and thus interactions between age and culture were not further considered. For average Interdependent scores, there was a significant effect of Culture, with U.S. children's explanations judged as less interdependent than Singaporean Chinese children's (see Figure 3), $B = -0.756$, $SE(B) = 0.165$, $p < .001$ and Singaporean Chinese children's explanations judged as less interdependent than Singaporean Malay children's, $B = 0.437$, $SE(B) = 0.154$, $p = .005$. There was no significant effect of Age ($p = .099$). For Independent scores, there was a significant effect of Culture, with U.S. children providing explanations that were judged as more independent than explanations provided by Singapore Chinese children, $B = 0.761$, $SE(B) = 0.145$, $p < .001$, and Singaporean Chinese children providing explanations that were judged as more independent than Singaporean Malay children's, $B = -0.333$, $SE(B) = 0.135$, $p = .015$. Again, there was no effect of Age ($p = .558$).

References to punishment and permission. To test for any potential cultural differences in general references to punishment, permission, and interpersonal peer consequences, as well as any potential explanation × culture interactions, we ran a Repeated Measures ANOVA using Average Score as the response, Classification Type (Punishment by Authority, Interpersonal Peer Consequences, Permission from Authority) as the within-subjects predictor, and Age and Culture as between-subjects predictors. We found a main effect of Culture, $F(2, 143) = 4.897$, $p = .009$, and no other significant effects. See Figure 4 for mean proportions of each explanation type across cultures. Follow-up tests on the estimated marginal means showed that U.S. children differed significantly from both Singaporean Chinese children, $t(87) = 2.371$, $p = .020$, and Singaporean Malay children, $t(98) = 3.045$, $p = .003$, though the latter two did not differ from one another ($p > .25$). Therefore, although references to each of these types of explanations were relatively rare, Singaporean children made nearly twice as many references as U.S. children about punishment, permission, and consequences, suggesting an influence of local culture on children's internalization of punishment.

Discussion

A growing number of findings now show cultural influences on the development of a range of social cognitions: namely, free will and agency (Chernyak et al., 2013; Miller, 1984; Srinivasan, Dunham, Hicks, & Barner, 2016), moral cognition (Yau & Smetana, 2003), self-concept (Wang, 2004) and emotion understanding (Wang, 2001). We add to this work by probing children's beliefs about free will in interpersonal contexts and find that cultural worldviews influence how even very young children reason about and explain personal and interpersonal causes of action.

Already by preschool age, there were notable cultural differences across our three cultural contexts: younger children in the United States were more likely to view social and moral actions as choices than young Singaporean children. These cultural differences were more pronounced for older children. This last finding mirrors other developmental changes in children's conceptual de-

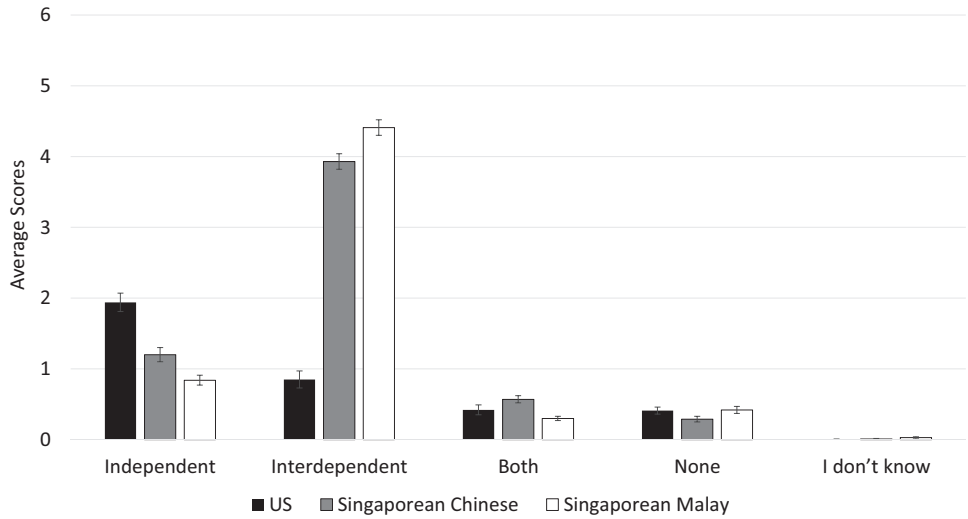

Figure 3. Average scores (bars represent standard errors) for the Independent/Interdependent coding dimension across cultures.

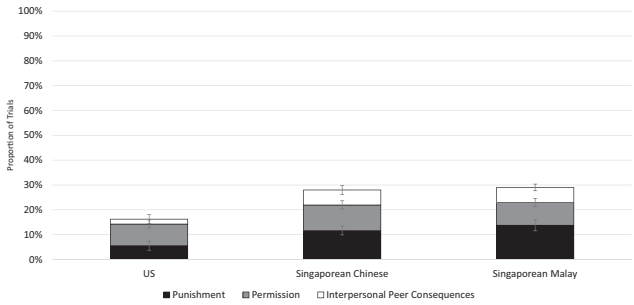

Figure 4. Average percentage of trials (bars represent standard errors) on which each type of explanation was provided (Permission from Authority, Interpersonal Peer Consequences, and Punishment by Authority) across culture.

velopment: as children grow older, they grow to have a deeper appreciation of how conflicting desires and rules interact to jointly predict action (Kalish & Shiverick, 2004; Kushnir et al., 2015; Lagattuta et al., 2010) and emotion (Lagattuta, 2005).

Our analysis of explanatory content revealed three main findings: First, there were no cultural differences in children's tendency to reason about free will with respect to alternative possible actions, intentions, or external conditions. This result is aligned with work showing that belief in free will is linked with counterfactual thinking in early development (Kushnir et al., 2015; Nichols, 2004) as well as adulthood (Alquist et al., 2015; Phillips & Knobe, 2009; Seligman et al., 2013; Sripada, 2016). We note, however, that as in prior work, we also find that counterfactual thinking undergoes a protracted developmental timeline (see Beck, Robinson, Carroll, & Apperly, 2006; Kushnir et al., 2015; Rafetseder, Cristi-Vargas, & Perner, 2010; see also Harris, German, & Mills, 1996). In particular, we found that younger children provided almost no counterfactual explanations, and that counterfactuals were difficult to generate even among our older age group (as noted by the low proportion of counterfactual explanations overall).

We propose that children use their existing knowledge to imagine alternatives to actions, and their imagination thus contributes to the sense that they (and others) are free agents. Reasoning about events that are unlikely (i.e., not "normal," Bear & Knobe, 2017), either because that are morally impermissible (Shtulman & Phillips, 2018), or simply improbable (Lane et al., 2016; Nolan-Reyes, Callanan, & Haigh, 2016; Shtulman, 2009; Shtulman & Carey, 2007; Weisberg & Sobel, 2012) activate children's imaginative cognition and, consequently, their emerging sense of free will. By extension, this account suggests that the link between agency and alternative possibility is a cultural universal, but the extent to which children endorse alternative possibilities and the types of counterfactual possibilities that children are willing to engage with varies across cultures.

Second, we find important cultural similarities along several dimensions. Children across all cultures talked about choices in terms of both interdependence and independence, with an overall greater focus on interdependence when discussing sociomoral content. What differed across cultures was the *degree* to which explanations contained interdependent versus independent content. In particular, all types of interdependent considerations dominated Singaporean children's explanations: they discussed relatedness goals and norms (e.g., " If you are born there, you have to obey the rules") and consistently situated the story characters in relation to others. We also saw within-culture variability in the extent to which this cultural orientation was stressed, with Singaporean Malay children being more likely to stress interdependence than the Singaporean Chinese. This within culture difference is consistent with religious, linguistic, and family structure differences between the two subcultures.

Finally, we note at least two limitations of our study: First, it is important to investigate younger children's inter/independent conceptualizations, given the sizable number of explanatory responses that, by necessity, were excluded from these analyses. Second, it is important for future work to look at constructs beyond independence and interdependence, and recent work has been critical of making such dichotomizations (Harb & Smith, 2008; Miller, 2002; see also Matsumoto & Yoo, 2006; Oyserman, Coon, & Kemmelmeier, 2002). Our method of coding independence and interdependence continuously was one such attempt to meet this concern, but future work should also delineate other constructs that may be relevant.

We also find cultural similarities in the extent to which children's explanations contain references to punishment and to permission, suggesting that consequences, as well as sociomoral and conventional concerns are present in children's conceptualization of transgressive events (Smetana, Killen, & Turiel, 1991; Yau & Smetana, 2003). Our results point to the difference in the salience of consequences of norm violations across cultures. References to punishment and permission occurred during the rare occasions in which children stated that they believed the character had the freedom of choice to do otherwise (e.g., "He would have to get permission, but he could probably still do it"). Although these references were rare, the fact that none of our stories mention these constructs suggests either that children internalized and generalized their beliefs about punishment and moral transgressions to novel, hypothetical contexts or that children's answers reflected an awareness of the potential punishments that *do* occur in response to these transgressions. Both Singaporean subgroups referenced punishment to the same degree, and there were no cultural differences between these two groups, suggesting that the global culture to which children are exposed (namely, the punitive nature of Singapore wholesale) plays an important role, above and beyond, local influences of children's familial and ethnic social contexts.

We note that future work should carefully delineate the distinctions between the types of transgressions that children are faced with, as well as how those transgressions may be differently perceived across cultures. Here, we make no assumptions about the severity of the transgression within or across cultures, nor the social domain (i.e., moral or conventional) to which that transgression belongs. However, given work suggesting that the same transgressions may be differently categorized and differently conceptualized across cultures (Turiel, 1983; Yau & Smetana, 2003; see also Miller et al., 1990; Schweder, Mahapatra, & Miller, 1987), it is critical to conduct cultural investigations across our sociomoral subcategories.

Together with prior work, our findings also help shed light on the interplay between linguistic and conceptual understanding. As noted in our introduction, the word "can" may be interpreted in English to denote both permissibility and ability, raising questions about the relative contribution of semantic knowledge to children's ability to differentiate the two concepts. Our findings can be used to argue against this deflationary possibility. In the current study,

we observed cultural differences in spite of interviewing children in a common language using the exact same modal word "can". Moreover, children's action predictions, which relied on the verb "will" rather than "can," mirrored their responses to the "can" question.[4] This convergence is consistent with prior work that concepts of permissibility, predictions about future actions, and beliefs about choice are not separable constructs for young children (Phillips & Cushman, 2017). Indeed, under cognitive load, they seem to be related in adults as well (Phillips & Cushman, 2017).

However, our work on its own does not address the issue of what the word "can" means in different English-speaking cultures; English is one language (there are others) in which "can" may either demarcate the distinction between permission and ability ("You can do that but it won't be very nice") or confound it ("You can't do that to your friend"). Therefore, it is important to consider the specific meaning that this word has for our separate cultural groups. Socialization practices, including conversations parents have with children about permission and ability, may contain different amounts of emphasis on either resolving or embracing the ambiguity. To our knowledge, no work has directly examined the modal content of parents' speech to children in interpersonal contexts. Cross-cultural work of this kind might reveal important divergent patterns that track cultural differences in the extent to which permission dominates modal verb use.

Our findings suggest that the availability of choice, importance of norms, and severity of punishment in children's lives might influence the availability of alternatives in children's imaginations. One consequence may be a relative difference in imaginative *availability*: Since norms are more ubiquitous and more salient in Singapore, Singaporean children's experiences may make imagining concrete alternatives to following norms difficult (see Lane et al., 2016 for a similar argument about nonmoral scenarios). Another consequence may be active *suppression*: alternatives are equally available to the imaginations of children across both cultures, but Singaporean children may be more motivated than U.S. children to inhibit or suppress thinking about immoral alternatives.

More generally, we hope our findings point to the importance of further investigating conceptual development across cultures. In particular, we believe they are important in two respects: First, investigating how concepts develop across cultures helps point to universalities in conceptual development. Second, cultural comparisons, especially when cultures differ along social context, but are similar across language, help shed light on disambiguating between cultural and linguistic influences. Finally, cultural divergences help point to critical ages during which concepts diverge along cultural lines, and thus have the potential to explain cultural variation in adults' sociomoral and conceptual reasoning. Our study is one small step toward revealing how social concepts of agency, choice, and sociomoral considerations that we observe in adulthood may originate in early childhood cultural experiences.

[4] See Supplementary Analyses for an additional data on this point.

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