

Leaving a Choice for Others: Children's Evaluations of Considerate, Socially-Mindful Actions

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People value those who act with others in mind even as they pursue their own goals. Across three studies ($N = 566$; 4- to 6-year-olds), we investigated children's developing understanding of such considerate, socially-mindful actions. By age 6, both U.S. and Chinese children positively evaluate a character who takes a snack for herself in a way that leaves a snack choice for others over a character who leaves no choice (Study 1), but only when the actors had alternative possible actions (Study 2) and when a clear beneficiary was present (Study 3). These results suggest an emerging ability to infer underlying social intentions from self-oriented actions, providing insights into the role of social-cognitive capacities versus culture-specific norms in children's moral evaluations.

Human societies value prosocial actions in which one forgoes one's own interests in the service of others. History remembers those who sacrificed themselves for others, and media highlights those who make selfless donations or put themselves at risk to save people. As individuals, we routinely praise those who act to benefit others.

A large body of research on early prosocial behaviors has focused on prosocial actions that are directly intended to benefit recipients, such as helping, sharing, or teaching (Bridgers, Jara-Ettinger, & Gweon, 2020; Chernyak & Kushnir, 2013; Dahl, 2015; Dunfield, Kuhlmeier, O'Connell, & Kelley, 2011; Liszkowski, Carpenter, & Tomasello, 2008; Svetlova, Nichols, & Brownell, 2010; Tomasello, 2009; Warneken & Tomasello, 2006). Such actions

usually involve purposeful transfer of physical aid, resources, or information intended to create direct, positive consequences for the recipient. Evaluations of such prosocial actions have also been shown to emerge early in life. For example, even infants favor someone who helps another person fulfill a goal over someone who hinders another person's goal completion (e.g., Hamlin, Wynn, & Bloom, 2007; Van de Vondervoort & Hamlin, 2017) and favor someone who shares with others over someone who does not (e.g., Burns & Sommerville, 2014).

Yet, not all prosocial actions manifest as personal sacrifices that prioritize others over the self (Batson & Shaw, 1991). Our focus in this paper is on indirect prosocial acts: those that intentionally create good outcomes for another person as a by-product of a self-oriented action. In particular, we focus here on one type of indirect prosociality: actions that simultaneously benefit the self and are considerate of another's freedom of choice. By way of example, consider a seemingly mundane scene at a reception event, where a young woman (call her Jenny) is waiting in line to get a dessert. When it is her turn to choose, there are only two fruit tarts and one chocolate mousse left, and there is one person waiting in line behind her. In this example, Jenny's

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action would fulfill her self-oriented desire to have a dessert. However, her decision would also create a foreseeable effect on the person behind her; depending on which dessert she chooses, the person behind her would either have only one option (tart) or two (tart vs. mousse). Unless Jenny knows what the next person likes or has a clear preference herself, taking a fruit tart and thereby leaving a choice for the next person seems more considerate. In prior work, this act of “being thoughtful of others in the present moment, and considering their needs and wishes before making a decision” has been termed *social mindfulness* (Van Lange & Van Doesum, 2015).

Unlike direct prosociality, the impact of social mindfulness is indirect in nature. As illustrated in the dessert scenario above, such actions are primarily intended to achieve the actor’s own goal. However, these actions can also have positive or negative downstream consequences for others; in such contexts, by intentionally deciding to act in a way that provides another person with options, the agent can convey an indirect yet meaningful prosocial intention (Van Doesum, Van Lange, & Van Lange, 2013). These considerate, socially-mindful actions can be taken even when the beneficiary’s goals or preferences are unknown or ambiguous; the actor can consider the hypothetical impact of her own actions under different scenarios (e.g., what if the next person prefers the chocolate mousse, or prefers the fruit tart?) and try to act in ways that benefit others and/or avoid unnecessary harm.

Given that a large portion of the human actions we observe in our daily life involves balancing our own needs and desires with those of others, the ability to evaluate actions in light of their indirect impact on others is critically important. However, despite abundant research on children’s social and moral evaluations, little is known about whether young children evaluate actions based on indirect social consequences, and how these evaluations change across ages and cultures. This study investigates the mentalistic nature, developmental trajectory, and cultural dependency of the capacity to recognize and infer indirect prosocial intent from another person’s self-oriented actions among 4- to 6-year-olds in the United States and China.

In what follows, we briefly review prior work on adults’ social evaluation of socially-mindful actions and discuss why these evaluations might be challenging for young children. We then motivate our developmental hypothesis by reviewing recent work that suggests that by early school years, children may already have the requisite cognitive

abilities for making these evaluations. Finally, we discuss the value of studying populations across two cultures—the United States and China—that differ in their cultural values with respect to individual choice and concern for others.

Recent research provides initial evidence that adults appreciate social mindfulness (Van Doesum et al., 2013). In their original study on social mindfulness in adults, Van Doesum et al. (2013) used a simple paradigm where two players took turns selecting one of three items (e.g., two green hats and one yellow hat). They found that adults not only act in ways that leave a choice for others but also favor those who act in ways that leave a choice for others, both as beneficiaries of the actions and as third-party observers. These studies provide an initial demonstration that adults understand and evaluate self-oriented actions with indirect prosocial intent.

Van Doesum et al. (2013) raise the possibility that prosocial (empathic) concerns and perspective taking (theory of mind) are foundations for such intuitions. While these qualities emerge relatively early in childhood, the indirectness of socially-mindful actions can make them rather challenging for young children to recognize and evaluate. Consider the example of Jenny’s action of taking one of the two fruit tarts. To see why Jenny’s action of taking one of two fruit tarts is prosocial, children must understand not only that this action allows the next person to choose whichever one she likes, but also that such choice would not be available if Jenny took the only chocolate mousse. In other words, children must understand what else Jenny could have done, compare the consequences for the next person under the two possible scenarios, and recognize that only one of the possible actions maximizes the next person’s ability to fulfill her own personal desires (her “expected utility,” e.g., Jara-Ettinger, Gweon, Schulz, & Tenenbaum, 2016) by enabling a free choice.

Importantly, such inferences are licensed only in contexts where Jenny’s action signals a social intention. Suppose that Jenny sees either three different varieties of desserts or three identical desserts left on the table. In the first scenario, any action she performs will always leave two varieties. In the second scenario, no action she performs will do so. Either way, the availability of alternative possible actions, and constraints on possible actions, are attributed to the situation rather than Jenny’s intention; her action is thus uninformative with respect to whether she intended to be considerate, and may not be deemed as praiseworthy.

Given these challenges, one may expect that children cannot make such sophisticated evaluations

until quite late in development. However, there are reasons to believe that the prerequisite inferential and evaluative capacities for such understanding are present in early childhood. First, even infants can infer others' intentions and preferences from their choices (Phillips & Wellman, 2005; Repacholi & Gopnik, 1997; Woodward, 2009); some studies suggest that these inferences are made in light of alternative actions that are available to the actor in the context (Gergely, Bekkering, & Király, 2002; Kushnir, 2018; Kushnir, Xu, & Wellman, 2010; Pesowski, Denison, & Friedman, 2016). Toddlers and preschoolers are more likely to interpret an agent's choice as an indicator of her underlying preferences when the agent foregoes more probable alternative options and chooses a less probable option instead (Kushnir et al., 2010; see also Gweon, Tenenbaum, & Schulz, 2010 for a similar sensitivity, but about inferring object properties). Furthermore, the ability to simultaneously represent multiple possibilities seems to be in place by 4 years of age (Leahy & Carey, 2020). Such reasoning becomes more explicit by late preschool years; children readily evaluate their own and other people's helpfulness depending on the available alternative actions the actor could have taken (Chernyak & Kushnir, 2013, 2018; Gweon & Asaba, 2018).

Second, recent work suggests that children reason about the expected rewards and costs of others' actions and expect others to act in ways that maximize expected utilities (Jara-Ettinger et al., 2016; Liu, Ullman, Tenenbaum, & Spelke, 2017). By late preschool years, children readily consider their own and others' expected utilities in their own prosocial decisions (Bridgers et al., 2020; Liu, Gonzalez, & Warneken, 2019). For example, Bridgers et al. (2020) shows that when children are asked to choose what to teach for a naïve learner, they consider the potential consequences of their decision to the learner's utilities and choose to teach what would be more rewarding and more costly for the learner to learn.

Finally, by late preschool years, children consistently consider the intention behind an action in addition to the outcome (e.g., attempted or innocent harm; see Cushman, Sheketoff, Wharton, & Carey, 2013). Prior work also suggests a link between the development of intent-based social evaluation and development of theory of mind abilities (Killen, Mulvey, Richardson, Jampol, & Woodward, 2011; Smetana, Jambon, Conry-Murray, & Sturge-Apple, 2012) in preschool years.

These prior studies raise the possibility that by late preschool or early school years children have the key prerequisite abilities for appreciating social

mindfulness; they already possess a sophisticated understanding of others' minds, including their expected rewards and the intentions behind actions, as well as the ability to selectively attribute intentionality to actions by considering available alternatives. These abilities are also consistent with a recent study showing that children prefer a varied set of items over a set of identical items both for themselves and for others (Echelbarger & Gelman, 2017). However, whether children can use these abilities to evaluate considerate, socially-mindful actions that are primarily self-oriented (rather than prosocial actions that are clearly other-oriented) remains an open question.

It is possible that the evaluation of considerate actions depends primarily on these social-cognitive capacities. However, as children's inferential and theory of mind abilities develop in early childhood, their sensitivity to norms and learning of norms also develops (e.g., Rakoczy & Schmidt, 2013). Thus, to understand how the ability to evaluate considerate, socially mindful actions develops over childhood, it is important to ask the degree to which such ability is modulated by cultural learning of the particular norms or values in children's social environments. Prior research with adults suggests that people growing up in the United States and East Asia differ in the relative importance they place on individuality versus interdependence and in concerns about being considerate of others (Markus & Kitayama, 1991; Yamagishi, Hashimoto, & Schug, 2008). A particularly relevant set of studies asked adults to choose one item from a set that contained four items of the same kind and one unique item and found that East Asian adults are more likely to take one of the four common items than U.S. adults (Kim & Markus, 1999; Yamagishi et al., 2008). This has been interpreted as evidence that East Asian cultures place a stronger emphasis on concerns about others' needs than do Western cultures (Yamagishi et al., 2008). Such emphasis on concern for others is also reflected in parents' socialization goals and strategies (e.g., Keller, 2012): While parents in the United States tend to emphasize individual needs, desires, and aspirations, parents in East Asian cultures tend to emphasize the development of relatedness, social responsibilities, and concerns for others (e.g., Wang, 2006). Despite these cultural differences, however, many aspects of children's social-cognitive abilities and their developmental trajectories—especially those relating to understanding others' preferences and intentions—seem relatively immune to cultural differences (though there are smaller variations in exact age

and ordering of questions, see Liu, Wellman, Tardif, & Sabbagh, 2008; Wellman, Fang, Liu, Zhu, & Liu, 2006). Thus, examining the developmental trajectory in both U.S. and Chinese populations might offer valuable insights into the degree to which culture might influence children's judgments. If children's ability to infer social mindfulness is significantly influenced by cultural learning of particular norms or values in children's social environments, then we may see earlier development in cultures where relatedness and considerateness is more explicitly emphasized; if these evaluations are primarily supported by early emerging social-cognitive capacities rather than shaped mainly by cultural input, then we may see similar developmental timetables in both cultures.

In the current studies, we investigate whether children understand and favorably evaluate intentional acts with indirect social consequences (i.e., "social mindfulness"). Although we recognize that social mindfulness is a broad concept and can have numerous manifestations, here we adapt the paradigm of Van Doesum et al. (2013) to focus on actions that intentionally leave a choice for others as a useful starting point. This allows us to systematically manipulate the intentions of the agent and the potential consequences for the next person, and also compare our findings to those from prior work with adults (Van Doesum et al., 2013).

In Study 1, we ask children to compare two characters who take the same item, but in so doing one character leaves a choice, whereas the other does not. This allows us to examine whether, and at what age, children can evaluate actors' self-oriented actions based on the options left for others even when the actions are identical. In Study 2, we investigate whether such evaluation reflects a genuine understanding of the actor's social intention. Specifically, we ask children to compare two characters who cause the same outcome (both leave a choice or both leave no choice), contrasting a scenario in which the agent could have done otherwise (could have been less or more considerate) with a scenario in which the agent was constrained by the situation to act as (s)he did (would have left a choice/not left a choice for the beneficiary regardless of what action (s)he chose). Thus, we investigate whether children's evaluations consider the agents' freedom (or lack thereof) to choose the considerate action. Finally, an important prerequisite for inferring prosocial intention behind an action is the presence of a beneficiary. If nobody was waiting behind Jenny, we would infer that her action does not involve a social intention. Thus, in Study

3, we investigate whether children make favorable evaluations only when there is a beneficiary waiting behind the actor but not when there is no obvious beneficiary of the action.

Given the development of evaluating helpfulness based on expected rewards for others (e.g., Bridgers et al., 2020) and intent-based social evaluations in late preschool years (e.g., Cushman et al., 2013), we tested children between ages 4 and 6. We also tested a group of adults and used their evaluations as a frame of reference for interpreting developmental data. We examine children from both the United States and China to examine the role of social-cognitive capacities versus culture-specific social norms in children's understanding of considerate, socially-mindful actions.

Study 1

Method

Participants

Informed by developmental studies on comparable topics (e.g., Olson & Spelke, 2008; Van de Vondervoort & Hamlin, 2017), we set our sample size at 24 for each age group. Seventy-two 4-, 5-, and 6-year-olds from the United States (4.01–6.98 years old, $M = 5.51$, $SD = 0.85$; 24 per age group, 58% girls) and seventy-two 4-, 5-, and 6-year-olds from China (4.13–6.96 years old, $M = 5.45$, $SD = 0.74$; 24 per age group, 53% girls) were included in our final analyses. The U.S. children were recruited from preschools, afterschool programs, or museums in a small university town. The U.S. participants predominantly came from White middle- to high-SES families and spoke English as their native language. The Chinese participants were recruited from preschools and after-school programs in Beijing, China. They predominantly came from middle- to high-SES families, spoke Chinese as their native language, and were of the Han ethnicity. Eight additional children participated but were replaced due to a missing recording file ($N = 1$ in the United States, $N = 3$ in China), voluntarily quitting the study ($N = 3$ in China), or providing incorrect answers on the attention check questions ($N = 1$ in China, see below).

For the adult comparison groups, we conducted an a priori power analysis (with an effect size of $w = .5$ based on pilot test results, an alpha level of .05, and a power of .80) and set our sample size as 32 per culture. Thus, the 34 U.S. residents ($M_{\text{age}} = 32.32$, $SD_{\text{age}} = 9.64$; 62% male, 38% female)

were recruited online through Amazon Mechanical Turk and 37 ($M_{\text{age}} = 28.75$, $SD_{\text{age}} = 11.28$; 35% male, 59% female, 6% other or unreported) Chinese residents were recruited online through social media. The procedures and the analysis plan for the adult study were preregistered on AsPredicted.

Materials

Child participants were shown three dolls and two boxes of plastic fruits (apples and bananas). Adult participants were presented with cartoon illustrations of the same scenarios, and the characters all possessed minimalist facial features (i.e., only eyes).

The English protocol for preschoolers was first translated into Mandarin Chinese by a Mandarin-English bilingual, and then back-translated into English by a different Mandarin-English bilingual. A native English speaker then compared the back translation with the original English protocol to check for accuracy, and discrepancies were then revised through group discussions. The task instructions for adult participants were then developed to closely resemble the English protocol for children. Three different native Mandarin speakers then translated the instructions into Chinese and resolved discrepancies in their translations.

Procedure

All child participants were tested individually in a quiet room in local museums, preschools, or elementary schools. Children in the United States were tested in English by a U.S. experimenter, whereas children in China were tested in Mandarin by a Chinese experimenter.

We set up our story as a story about friends at snack times, so that it would be familiar to children of this age range and easy for them to understand. In the story, the experimenter presented children with two scenarios in which the protagonist, Sophie, waited in line for a snack. In each scenario, she was behind one of her friends (Bella or Jenny). Each agent was allowed to choose one snack, and when it was Bella or Jenny's turn to choose, the options consisted of two identical fruits (e.g., two apples) and one unique fruit (e.g., a banana). One friend chose one of the two identical fruits (e.g., one apple among two apples and one banana), leaving Sophie with a choice between two different kinds of fruits (i.e., an apple and a banana). The other friend chose the unique fruit (e.g., the apple among one apple and two bananas), leaving Sophie with two fruits of

one kind (e.g., two bananas). See Figure 1 for an example of the story setup. The friend (Bella or Jenny) in each scenario and the type of choice left by the friend were counterbalanced across participants. The full protocol can be accessed at <http://tiny.cc/tbw9pz>.

After being presented with both scenarios, the experimenter asked four attention check questions to ensure that children had paid attention to and understood the story. The questions were about what fruit each friend chose (i.e., "What did Bella or Jenny choose?") and which fruits each friend left for Sophie (i.e., "What did Bella or Jenny leave for Sophie to choose from?"). If the children answered any of the four questions incorrectly, the experimenter would repeat the story and then ask the same question again. If they answered incorrectly a second time, their data were excluded from analysis ($N = 1$ in China). After that, the experimenter asked the main question: "Who do you think is a nicer friend to Sophie?" After they provided an answer, the experimenter asked "Why?" to prompt an explanation. After the main question, the experimenter also asked: "If you are going to choose one of Bella and Jenny to play with, *who would you prefer to play with?*" We included this question as an exploratory measure to examine whether children's social affiliation preference is influenced by their social evaluation. Given the potential influence of repeated questioning (Bonawitz, Shafto, Yu, Gonzalez, & Bridgers, 2020), we report the results in Supporting Information.

Adult participants read identical scenarios on Qualtrics and answered identical social judgment questions except that they were not asked the attention check questions before the dependent measures and were not asked to explain their forced-choice responses. The full protocol can be accessed at <http://tiny.cc/tbw9pz>.

Coding

Children's explanatory responses were coded as either referring to the concept of "leaving a choice for others" or not. For example, if a child mentioned "She left a choice" or "She left an apple and a banana" or "She left two kinds of fruits" in their explanation, then that explanation was coded as referring to the concept of "leaving a choice for others." The first author coded all of the explanations in both cultures. Two research assistants blind to the conditions, one a native English speaker and one a native Mandarin speaker, coded the explanations provided by the U.S. and Chinese

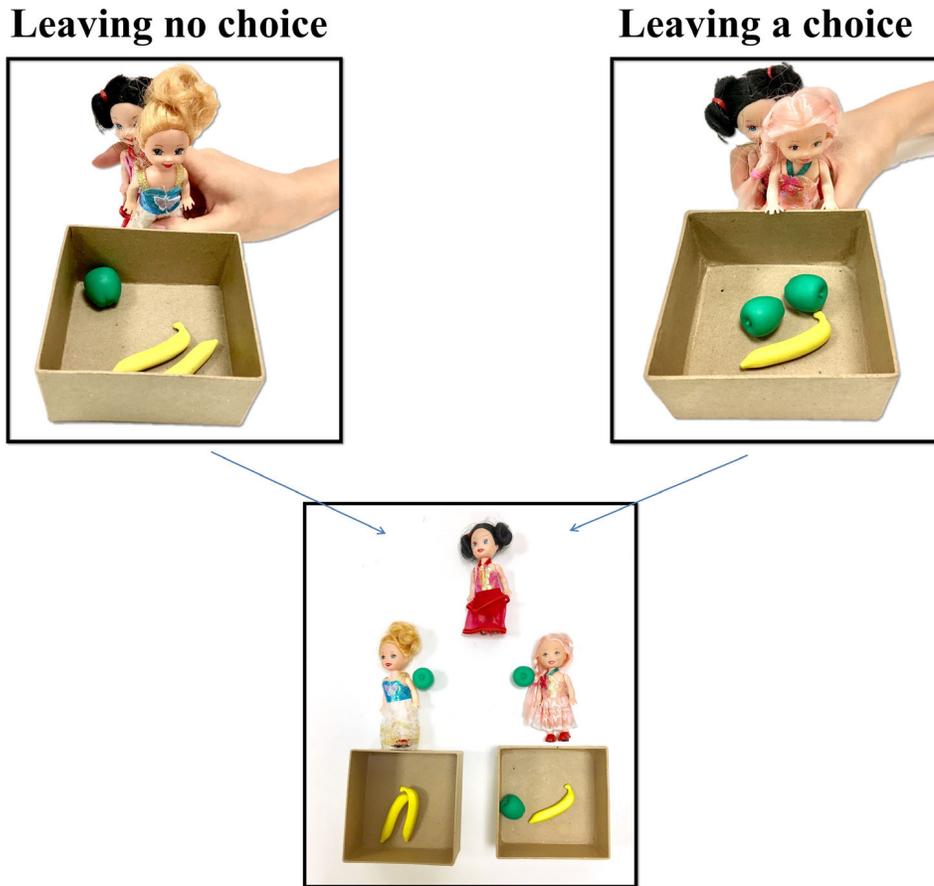


Figure 1. Examples of the story setup of Study 1. Children heard about Sophie (the character in red) waiting in a “snack line” twice to choose a fruit, each time behind one of her friends, Bella or Jenny. Each friend chose one fruit out of three fruits. One friend took an apple from one apple and two bananas, leaving Sophie with two bananas; the other friend took an apple from two apples and one banana, leaving Sophie with an apple and a banana.

children, respectively. The inter-coder reliabilities between the primary and secondary coders were 97.2% for U.S. children and 98.6% for Chinese children.

Results

First, we examined whether participants chose the friend who left a choice for Sophie as the “nicer” friend. We first looked at adults’ responses. As expected, adults in both cultures showed a robust tendency to choose the friend who left a choice for Sophie as nicer (United States: 97%, Binomial sign test, $p < .001$, $g = .47$, 95% CI [84%, 100%]; China: 92%, Binomial sign test, $p < .001$, $g = .42$, 95% CI [78%, 98%]).

We then examined children’s responses using a binary logistic regression, with friend choice (1 = the friend who left a choice, 0 = the friend

who left no choice) as the dependent variable and age (continuous), gender, culture, and presentation order as predictors. We found a significant effect of age (Wald $\chi^2(1, N = 144) = 7.68$, $p = .006$), but not culture ($p = .90$); no other effects were significant ($ps > .51$). Given the overall effect of age, we then examined children’s responses separately in each age group. See Figure 2 for the results. Four-year-olds’ and 5-year-olds’ responses in both cultures were not significantly different from chance (two-tailed binomial sign tests, $ps > .064$). In contrast, a significant majority of 6-year-olds in both cultures selected the friend who left a choice (United States: 79%, two-tailed binomial sign test, $p = .007$, $g = .29$, 95% CI [58%, 93%]; China: 83%, two-tailed binomial test, $p = .002$, $g = .33$, 95% CI [63%, 95%]). Thus, by age 6, both U.S. and Chinese children judged the friend who left a choice to be nicer than the friend who left no choice.

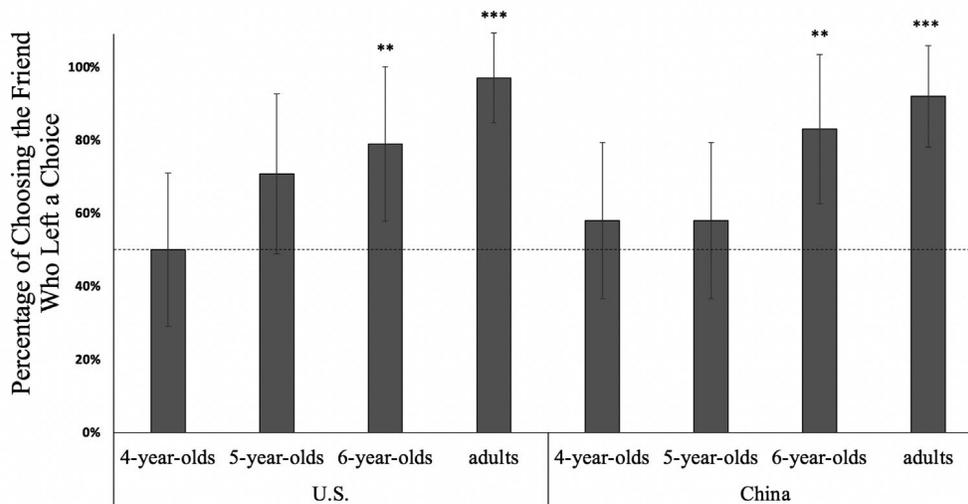


Figure 2. Percentages of participants choosing the friend who left a choice split by age group in the United States and China in Study 1. Error bars represent 95% CIs. Asterisks represent the significance of Binomial Sign tests.

** $p < .01$. *** $p < .001$.

We then examined children's qualitative explanations. In general, children's explanations were consistent with their evaluative judgments; children who evaluated the friend who left choice as "nicer" were also more likely to provide explanations referring to the concept of "leaving a choice for others," even after controlling for age (partial correlations, United States: $r = .33$, $p = .004$; China: $r = .65$, $p < .001$). Children's qualitative explanations also showed developmental changes. Overall, 23.6% of the U.S. children and 47.2% of the Chinese children provided explanations that refer to the concept of "leaving a choice for others" (see Table 1 for the percentage of explanations that refer to the concept of "leaving a choice for others" split by age group in each culture). According to a binary logistic regression with children's explanations (1 = refers to the concept of "leaving a choice for others", 0 = other explanations) as the dependent variable and age (continuous), gender, culture, and presentation order as predictors, we found a significant

effect of age (Wald $\chi^2(1, N = 144) = 18.62$, $p < .001$), with older children providing more explanations referring to the concept of "leaving a choice for others." We also found a significant main effect of culture ($\chi^2(1, N = 144) = 9.82$, $p = .002$), with Chinese children providing more explanations referring to "leaving a choice for others" than U.S. children. Follow-up exploratory analyses showed that this cultural difference was mostly driven by 6-year-olds (United States vs. China: 38% vs. 75%, $\chi^2(1) = 8.57$, $p = .003$). Neither gender nor presentation order had significant main effects ($ps > .20$). We then ran a similar binary logistic regression using explanation as the dependent variable specifically for those children who selected the character who left a choice as nicer in the main question and again found a significant effect of age (Wald $\chi^2(1, N = 96) = 12.88$, $p < .001$) and a significant main effect of culture ($\chi^2(1, N = 96) = 10.05$, $p = .002$). Also, we report details on other explanations children provided in Supporting Information.

Table 1
Percentages of Children's Explanations That Referred to the Concept of "Leaving Choice for Others" When Asked Who Was a Nicer Friend Split by Age and Culture in Study 1

	4-year-olds	5-year-olds	6-year-olds	Total
U.S.	8.3%	25%	37.5%	23.6%
China	25.0%	33%	79.2%	47.2%

Study 2

In Study 1, we found that by age 6, children in both cultures evaluate someone who leaves a choice for another person as "nicer" than someone who does not. A genuine understanding of considerateness in self-oriented actions also requires an understanding that the agent's action is motivated by social intention. In Study 2, we investigated whether children's

evaluations changed based on inferences about the agents' social intentions. We designed two between-subject conditions, each of which contrasted two friends who left identical outcomes for Sophie. In the Positive versus Neutral condition, the Positive friend *could* have left a *less diverse* set of options, whereas the Neutral friend had no alternative actions. In the Negative versus Neutral condition, the Negative friend *could* have left a *more diverse* set of options, whereas the Neutral friend had no alternative actions. If children's evaluations in Study 1 simply reflect a preference for variety, their evaluations in Study 2 should be at chance. However, if the results reflect genuine inferences about the agents' social intentions, then they should evaluate the agent that had the alternative action as being nicer (in the case of the Positive friend) or less nice (in the case of the Negative friend) than the agent who had no alternative action (the Neutral friend).

Method

Participants

Given that the final outcomes were identical between the two agents, we expected a somewhat smaller effect size than Study 1. Thus, we set our sample size as 30 per condition per each age group. One hundred and eighty 4-, 5-, and 6-year-olds from the United States (Positive vs. Neutral condition: 4.08–6.97 years old, $M = 5.41$, $SD = 0.88$; 30 per age group, 51% girls; Negative vs. Neutral condition: 3.97–6.98 years old, $M = 5.50$, $SD = 0.92$; 30 per age group, 47% girls) and one hundred and eighty 4-, 5-, and 6-year-olds from the China (Positive vs. Neutral condition: 4.02–6.93 years old, $M = 5.46$, $SD = 0.93$; 30 per age group, 55% girls; Negative versus Neutral condition: 3.98–6.98 years old, $M = 5.49$, $SD = 0.91$; 30 per age group, 51% girls) were included in our final analyses. Fourteen additional children participated but were replaced because of experimenter error ($N = 4$ in China), missing audio files ($N = 2$ in the United States, $N = 5$ in China), missing date of birth ($N = 1$ in China), or duplicated testing ($N = 2$ in the United States).

Sixty-seven U.S. adults ($M_{\text{age}} = 34.60$, $SD_{\text{age}} = 9.57$; 55% male, 45% female) and 84 Chinese adults ($M_{\text{age}} = 30.02$, $SD_{\text{age}} = 11.67$; 42% male, 58% female) were recruited online through Amazon Mechanical Turk and social media, respectively. The procedures and the analysis plan for the adult study were preregistered on AsPredicted.

Materials and Procedure

Participants were randomly assigned to one of two between-subjects conditions (the Positive vs. Neutral condition or the Negative vs. Neutral condition). The procedures were similar to those in Study 1 except for the comparisons participants made: In the Positive versus Neutral condition, children were asked to compare a friend who takes an apple from two apples and one banana (the Positive Friend) with a friend who takes an orange from one orange, one banana, and one apple (the Neutral Friend). In the Negative versus Neutral condition, children were asked to compare a friend who takes an apple from one apple and two bananas (the Negative Friend) with a friend who takes a banana from three bananas (the Neutral Friend). See Figure 3 for examples of the setup.

Coding

We coded for explanations that referred to the available options the friend had (e.g., "She picked an apple. She knows there are two apples.") or the fruits the friend left (e.g., "She left one apple and one banana.") as appealing to reasons related to leaving a choice for others. The first author coded all the explanations in both cultures. Two research assistants (a native English speaker and a native Mandarin speaker) coded the explanations provided by U.S. children and Chinese children, respectively. The intercoder reliabilities between the primary coder and the two other coders were 97.5% (for U.S. children) and 98.1% (for Chinese children).

Results

While Study 1 is a single-condition study, Study 2 features two conditions. Below we present results in each condition, followed by comparisons across conditions.

The Positive Versus Neutral Condition

Figure 4 shows the percentages of participants who chose the Positive friend over the Neutral friend when asked, "Who is a nicer friend?" split by age group in each culture. Adults' responses revealed a robust tendency to choose the Positive friend as nicer, and this held true for both the U.S. (88%, Binomial sign test, $p < .001$, $g = .38$, 95% CI [73%, 96%]) and Chinese adults (92%, Binomial sign test, $p < .001$, $g = .42$, 95% CI [80%, 97%]).

Study 2 (Positive vs. Neutral)



Study 2 (Negative vs. Neutral)



Figure 3. Examples of the story setup of Study 2. In the Positive versus Neutral condition, both friends left Sophie with one apple and one banana, but one friend took an apple from two apples and one banana (the Positive friend), whereas the other friend took an orange out of one apple, one banana, and one orange (the Neutral friend). In the Negative versus Neutral condition, both friends left two bananas, but one friend took an apple from one apple and two bananas (the Negative friend), whereas the other friend simply took one of the three bananas (the Neutral friend).

We then examined children's responses using a binary logistic regression, with friend choice (1 = the Positive friend, 0 = the Neutral friend) as the dependent variable and age (continuous), gender, culture, and presentation order as predictors. We found a significant positive effect of age (Wald $\chi^2(1, N = 179) = 10.99, p = .001$) and no other significant effects ($ps > .47$), including that of culture ($p = .47$). Given the overall effect of age, we then examined children's choices separately in each age group and culture. Similar to results in Study 1, 4-year-olds' and 5-year-olds' responses in both cultures were not significantly different from chance (two-tailed binomial sign tests, $ps > .36$). In contrast, 6-year-olds in both cultures selected the Positive friend significantly above chance (United States: 70%, two-tailed binomial sign test, $p = .043, g = .20, 95\% \text{ CI } [51\%, 85\%]$, China: 73%, two-tailed binomial sign test, $p = .016, g = .23, 95\% \text{ CI } [54\%, 88\%]$).

Similar to in Study 1, after controlling for age, those who selected the Positive friend were also more likely to provide explanations referring to her considerateness (partial correlations, United States: $r = .31, p = .003$; China: $r = .27, p = .011$). Children's qualitative explanations also showed developmental changes. Overall, 12.2% of the U.S. children and 14.6% of the Chinese children

provided explanations that appealed to the concept of "leaving a choice for others" (see Table 2 for the percentages of children providing explanations that appeal to the concept of "leaving a choice for others" split by age group in each culture). According to a binary logistic regression with children's explanations (1 = refers to the concept "leaving a choice for others", 0 = other explanations) as the dependent variable and age (continuous), gender, culture, and presentation order as predictors, we found a significant positive effect of age (Wald $\chi^2(1, N = 179) = 17.51, p < .001$), suggesting that older children were more inclined to provide explanations that appealed to the idea of leaving a choice for others. We did not find any other main effects (all $ps > .15$), including for culture ($p = .90$). We then ran a similar binary logistic regression specifically for those children who selected the Positive friend as nicer, and again found a significant effect of age (Wald $\chi^2(1, N = 99) = 11.76, p = .001$) and no other significant effects ($ps > .10$).

The Negative Versus Neutral Condition

Figure 4 shows the percentages of participants who chose the Neutral over the Negative friend when asked "who is a nicer friend?" in each age group split by culture. Adults' responses showed a

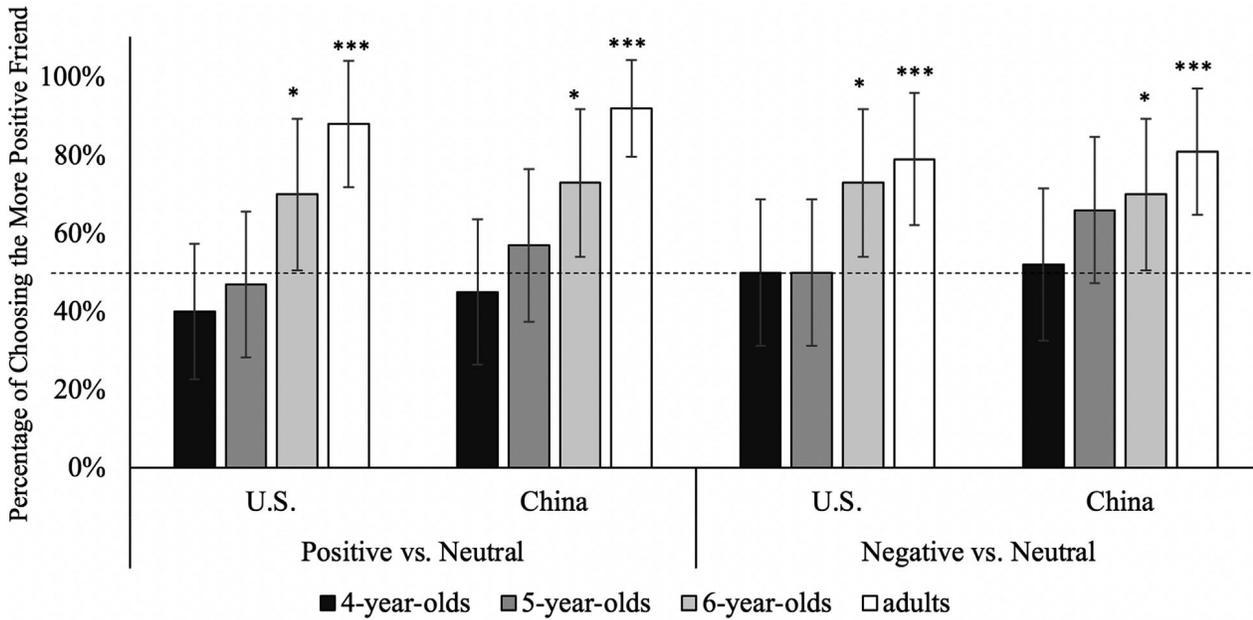


Figure 4. Percentages of participants choosing the Positive friend in the Positive versus Neutral condition and choosing the Neutral character in Negative versus Neutral condition in Study 2, split by age group and culture. Error bars represent 95% CI. Asterisks represent the significance of Binomial Sign tests. ** $p < .01$. *** $p < .001$.

robust tendency to choose the Neutral friend, and this held true for both the U.S. adults (79%, Binomial sign test, $p < .001$, Cohen’s $g = .29$, 95% CI [63%, 90%]) and Chinese adults (81%, Binomial sign test, $p < .001$, Cohen’s $g = .31$, 95% CI [65%, 91%]).

We then examined children’s responses using a binary logistic regression, with friend choice (1 = the Neutral friend, 0 = the Negative friend) as the dependent variable and age (continuous), gender, culture, and presentation order as predictors. Replicating our findings in the first condition, we again found a significant positive effect of age (Wald $\chi^2(1, N = 176) = 6.67, p = .010$), but no other significant effects ($ps > .28$), including for culture ($p = .51$). Given the overall effect of age, we then

examined children’s responses separately in each age group and culture. Four-year-olds’ and 5-year-olds’ responses in both cultures were not significantly different from chance (two-tailed binomial sign test, $ps > .37$). Importantly, 6-year-olds in both cultures selected the Neutral friend at a rate above chance (United States: 73%, two-tailed binomial sign test, $p = .016, g = .23$, 95% CI [54%, 88%]; China: 70%, two-tailed binomial sign test, $p = .043, g = .20$, 95% CI [51%, 85%]).

Controlling for age, those who selected the Neutral friend were also more likely to provide explanations explicitly referring to leaving a choice (partial correlations, United States: $r = .40, p < .001$; China: $r = .65, p < .001$). Children’s qualitative explanations also showed developmental patterns. Overall, 21.2% of the U.S. children and 23.5% of the Chinese children provided explanations that appealed to leaving a choice for others (see Table 2 for the percentages of children providing explanations that appeal to the concept of leaving a choice for others). We ran a binary logistic regression with children’s explanations (1 = refers to the concept of “leaving a choice for others”, 0 = other explanations) as the dependent variable and age (continuous), gender, culture, and presentation order as predictors. We found a significant positive effect of age (Wald $\chi^2(1, N = 180) = 18.82, p < .001$), with older children

Table 2
Percentages of Children’s Explanations That Referred to the Concept of “Leaving Choice for Others” Split by Age and Culture in Each Condition of Study 2

	4-year-olds	5-year-olds	6-year-olds	Total
Positive versus neutral				
United States	0%	13.3%	23.3%	12.2%
China	6.7%	0%	36.7%	14.6%
Negative versus neutral				
United States	10%	10%	43.3%	21.1%
China	13.3%	16.7%	40%	23.5%

providing more explanations referring to the idea of leaving a choice. No other effect was significant ($ps > .38$), including culture ($p = .67$). We then ran a similar binary logistic regression specifically for those children who selected the Neutral Friend as nicer, and again found a significant effect of age (Wald $\chi^2(1, N = 99) = 11.76, p = .001$) and no other significant effects ($ps > .10$).

Comparison Between Conditions

To explore whether participants' performance differed across two conditions (Positive vs. Neutral condition; Neutral vs. Negative condition), we fit binary logistic regression models (separately for children and adults) with friend choice (1 = the more positive character, 0 = the less positive character) as the dependent variable and condition, age (for children only), gender, culture, and presentation order as predictors. Among adults, we found no effect of condition ($p = .081$), culture ($p = .77$), or other factors ($ps > .15$). Among children, we found only a main effect of age (Wald $\chi^2(1, N = 355) = 17.05, p < .001$), but no effect of condition ($p = .41$), culture ($p = .35$), or other factors ($ps > .11$). The lack of difference between two conditions among both adult and child participants thus suggests that people exhibited similar preferences for the more socially-mindful character in each comparison.

Study 3

In Study 2, we found that by age 6, children in both cultures considered whether there was an alternative action available to the agent who left (or did not leave) a choice, suggesting that children account for the social intentions of the actor in their evaluations. In Study 3, we investigated whether children consider the social nature of the action; we examined whether children's inferring prosocial intention behind an action depended on the presence of a beneficiary. We used scenarios identical to those in Study 1 but with one critical difference: In Study 3, the protagonist was the last in line, and no beneficiary was behind her.

Method

Participants

Since 4-year-olds in both cultures did not make differentiated evaluations between the two protagonists in Study 1, we focused on only 5- and 6-year-

olds. We determined our sample size of 30 children per age group per culture based on an a priori power analysis with an alpha level of .05 and a power of .80, using the effect size of U.S. 5- and 6-year-olds in Study 1 ($g = .25$). Thirty-two U.S. children (5.10–6.92 years old, $M = 5.90, SD = 0.59$, 14 girls) and 30 Chinese children (5.10–6.99 years old, $M = 6.10, SD = 0.61$, 19 girls) were included in the final analyses. Nine additional children participated but were replaced because of experimenter error ($N = 4$ in the United States, $N = 2$ in China), lost audio files ($N = 1$ in the United States), or duplicated testing ($N = 2$ in the United States). The procedures and the analysis plan for this study were preregistered on AsPredicted.

Materials and Procedure

The procedure was similar to that of Study 1, except that each scenario featured only one character (either Bella or Jenny) without a second person waiting behind (i.e., Sophie). Children were presented with two scenarios: in one, the character took an apple from two apples and one banana; in the other, the character took an apple from one apple and two bananas. The critical-dependent measure was "Who is a nicer friend?"

Results

We first examined children's responses to "Who is a nicer friend?" We conducted binomial tests to compare children's choices to chance level. In both cultures, around half of the children chose the character that left a choice (U.S.: 50%, China: 48%, two-tailed binomial sign tests, $ps = 1.00$). We also ran chi-square tests to compare the responses of children in this study and those from 5- and 6-year-olds in Study 1. In both cultures, children were more likely to favor the character who left a choice when there was someone waiting behind them (Study 1) than when there was nobody waiting behind them (Study 3; United States: $\chi^2(1, N = 80) = 5.28, p = .022$; China: $\chi^2(1, N = 75) = 3.80, p = .051$).

We then examined children's qualitative explanations and found that very few children (United States: 6.3%, China: 0) provided explanations with reference to the concept of "leaving a choice for others." Also, children were more likely to provide explanations that referred to "leaving a choice for others" in Study 1 than in Study 3 (United States: $\chi^2(1, N = 80) = 7.17, p = .007$; China: $\chi^2(1, N = 78) = 25.81, p < .001$).

These results suggest that the presence of a beneficiary is necessary for children in both cultures to evaluate the character who left a choice as nicer; when the self-oriented action incurred no foreseeable effects on other people, children did not show any systematic preference for any character.

General Discussion

Across three studies, we investigated the mentalistic nature, developmental trajectory, and cultural dependency of children's capacity to recognize and evaluate intentional prosociality from observing agents' self-oriented actions with indirect benefits to (or consequences for) another agent. Collectively, our results show that by age 6, children in both the United States and China positively evaluate the socially-mindful, considerate act of leaving the choice for others. In Study 1, 6-year-olds in both cultures evaluated a character who left a choice as "nicer" than one who left no choice. Critically, children in our studies made these evaluations based on an understanding of both the intention behind the action and the social nature of the action: In Study 2, 6-year-old children, like adults, considered the availability of alternative possible actions in inferring both positive and negative social intent; and in Study 3, children did *not* make a value judgment when there was no obvious beneficiary of what would otherwise have been a prosocial action.

Across two cultural contexts, we found age-related changes in children's evaluations of actions and qualitative explanations. These patterns might reflect developments in children's understanding of the mental causes of action (i.e., desire-based reasoning) as well as the social consequences of action (i.e., moral evaluation). Together, our findings suggest that by age 6 children understand that one can act prosocially toward others despite being uncertain about others' desires. Furthermore, 6-year-olds use their ability to think about alternative possible actions and constraints on action (e.g., Study 2) to infer underlying prosocial intent, and their explanations reveal an emerging ability to appreciate and value socially-mindful acts.

What underlies the development that occurs between ages 4 and 6? Prior research allows us to rule out at least a few possibilities. First, there is a wealth of evidence that even infants appreciate the value of being directly prosocial (e.g., Hamlin et al., 2007), thus our results do not reflect an inability to evaluate prosociality, *per se*. Second, recent evidence suggests that 4-year-olds already understand

that people prefer possessing two different items to possessing two identical ones (Echelbarger & Gelman, 2017), and thus it is unlikely that younger children in our study simply failed to appreciate the value of having a choice between two diverse items. Third, it is also unlikely that 4-year-olds are generally incapable of reasoning about alternative possible actions and constraints on action (i.e., freedom of choice), as there is evidence that they can do so appropriately when choices are clearly articulated (Chernyak, Kang, & Kushnir, 2019; Chernyak, Kushnir, Sullivan, & Wang, 2013; Kushnir, Gopnik, Chernyak, Seiver, & Wellman, 2015). Notably, what distinguishes our study from this prior work is that the actions themselves were self-oriented, and the prosocial motives were indirect; it is possible that evaluation of indirect prosocial consequences of actions (i.e., "social mindfulness") is a later-developing understanding that requires, but is not reducible to, these earlier-emerging social-cognitive skills. However, the current work does not fully address exactly what is driving the developmental change in children's responses, and the question remains open for future research.

Comparison between two cultures provides insights into the role of cultural values and norms in children's evaluation of considerate, socially-mindful actions. In all three studies, we observed similar developmental trajectories in judgments among children in the United States and China. This suggests that some culturally independent social-cognitive processes underlie the change. It also suggests that socialization practices themselves—such as explicit tuition in specific cultural norms of politeness/considerateness—are not sufficient to explain the pattern of results. In our study, Chinese children were more likely to refer explicitly to "leaving a choice for others" in their explanations (Study 1). One possibility is that the frequent exposure to considerateness as an explicit cultural norm leads Chinese children to be better at clearly articulating the rationale for their judgments. For instance, an allegory widely taught to Chinese preschoolers describes a 4-year-old boy named Kong Rong choosing a smaller pear for himself while giving away a bigger pear to other people, not only highlighting the value of being considerate of other people's needs but also making it an explicit moral imperative.

Based on our analysis above, we favor the idea of further exploring developmental changes that broaden social attention: in particular we suggest that, with age, children are more likely to consider consequences to the agent (or the self) in the

context of indirect consequences to others in the surrounding social environment. Social attention may be facilitated by a variety of socialization practices, including explicit norms around politeness, but also including other ways of highlighting the social consequences of one's own actions for specific individuals or in specific cases. Our research leaves open the question of how these cognitions are transmitted to children in different cultural contexts.

Relatedly, our findings are consistent with recent work showing that children's beliefs about autonomy and freedom of choice emerge in childhood across cultures (Chernyak et al., 2013, 2019; Kushnir et al., 2015; Wentz et al., 2016). Our work adds to this line of work by showing that, at least by age 6, children not only understand that one has autonomy and has the free will to choose for oneself, but also understand that granting others the same autonomy is valuable. Our findings are particularly noteworthy given a large literature documenting cultural variation in how much people's choices reflect their own personal preference (Savani, Markus, Naidu, Kumar, & Berlia, 2010), how much personal choice enhances intrinsic motivation (Iyengar & Lepper, 1999), and how much people view actions as free choices (Miller, Bersoff, & Harwood, 1990). The current findings suggest that despite the potential individual differences in the subjective value of choice, children and adults in both the United States and China overall consider having a choice as something desirable for others. Certainly, even in societies that value choice, having too many choices can become a burden and induce cognitive overload (Botti & Iyengar, 2006; Schwartz, 2004). Whether, and in what contexts, children understand the *cost* of having *too many* choices remains an interesting question for future work.

The task structure in the current work is similar to a previous study with adults (Van Doesum et al., 2013). This allowed us to conceptually replicate their results with adults and address our main question about its development across two cultures. To this end, rather than adopting the task in that prior study that provided minimal context, we designed our task to follow a story about two friends at snack time, providing a familiar context that is easy to understand even for young children. Note that the characters' preferences (both the actor and the beneficiary) were left unknown or ambiguous; this was a deliberate design decision for setting up a situation quite distinct from a typical prosocial context. Indeed, children's evaluations might change depending on the available information

about the characters' preference or the relationship between the characters. Below we provide some speculations.

First, children may readily take into account the beneficiary's preferences. If Jenny knows that the next person dislikes chocolate mousse for sure, then it seems just fine for Jenny to take the only chocolate mousse; but if Jenny knows that the next person really wants a chocolate mousse or is allergic to an ingredient in the fruit tart, then taking the only chocolate mousse away seems even less considerate than had she taken the mousse without that knowledge. Second, children might also consider information about the actor's preferences. For instance, if Jenny really likes chocolate mousse but still takes one of the two fruit tarts and leaves the only chocolate mousse for the next person, her choice might be considered even more praiseworthy. Alternatively, if Jenny loves chocolate mousse and thus takes it for herself, her choice may be considered more appropriate than had she taken it without a clear reason. Finally, our social expectations about how we should behave toward friends might be different than those about how we should behave toward people who are not our friends. Thus, the evaluations might change as the relationship between the actor and the beneficiary changes. Future work can extend our paradigm to further investigate the interactions between the act of leaving choice and other aspects of children's mental state understanding and understanding of peer relationships.

In our study, we used a dichotomous-choice design where children were asked to decide who of the two main characters was a nicer friend. This was designed to create the strongest case to test whether children can distinguish someone who acts considerately from someone who does not. However, a remaining question is whether children also infer prosocial intention from the act of leaving a choice for others even without direct comparison to an inconsiderate act. One way to address this question is to modify the current paradigm to present only one main character (e.g., Jenny) and ask children to explain why Jenny took one of the apples.

Another remaining question is whether, or to what extent, children and adults view social mindfulness as normative and obligatory. In Western cultures (e.g., the United States and the Netherlands), adults' tendency to leave a choice for others is correlated with personality factors that are geared toward prosociality (e.g., honesty, agreeableness, and a prosocial value) but not correlated with following social norms (e.g., conscientiousness; see

Van Doesum et al., 2013, Study 4). Also, adults in Western cultures seem more lenient toward and forgiving of other people's inconsiderate actions than toward their harmful or noncooperative actions (Van Lange & Van Doesum, 2015). These findings tentatively suggest that at least in Western cultures, though most adults would positively evaluate social mindfulness, even adults do not consider social mindfulness an obligation. However, whether this varies across a wider range of cultures is still an open question. Our developmental findings might speak to this issue; if the explicit norms articulated by Chinese children lead to a sense of obligation to act accordingly, that could suggest a mechanism by which implicit social evaluations become explicit obligations or norms.

Lastly, since our findings pertain to children's third-person evaluations, questions remain about whether children are equally socially mindful when they are making their *own* decisions. Decision making presents its own difficulties for children, as there may be competition between their own self-interested preferences and their desire to be prosocial. It is possible that in first-person contexts, children who can explicitly articulate norms to be mindful of others, and/or explicitly articulate the value of choice, would be more considerate in leaving options for others even when their own needs conflicted with doing so. Future work can explore this possibility using a modified version of our research paradigm that is shifted to a first-person context.

Prior work in social psychology proposes that prosocial (empathic) concerns and perspective taking (theory of mind) underlies our appreciation of considerate, socially-mindful actions (Van Doesum et al., 2013); from this perspective, 6-year-old children's success in our study is not inconsistent with this proposal. However, our work also points out that recognizing and evaluating considerate actions may pose a nontrivial inference problem. Even though young children are highly attuned to others' behaviors and intentions, recognizing the considerateness of others' actions by reasoning about their potential consequences may be a hard-won feat. Our work provides a first step toward understanding the social-cognitive capacities underlying these sophisticated intuitions as well as how they develop in childhood.

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Supporting Information

Additional supporting information may be found in the online version of this article at the publisher's website:

Appendix S1. Supplementary Materials