

Choosing among undesirable options: Children consider desirability of available choices in
evaluation of socially mindful actions

Sixian Li¹, Xin Zhao²

¹ School of Psychology and Cognitive Science, East China Normal University

² Department of Educational Psychology, East China Normal University

Author Note

Correspondence concerning this article should be addressed to Xin Zhao, Department of Educational Psychology, East China Normal University, Shanghai, China.; email: xzhao@dep.ecnu.edu.cn. All data have been made publicly available at the Open Science Framework (OSF) and can be accessed at https://osf.io/p6ef9/?view_only=9c790a4bed604ec39dcbf61f6e10e2fa. This study was not preregistered.

Acknowledgment

Research was funded by National Natural Science Foundation of China (32100865) and Chenguang Program of Shanghai Education Development Foundation and Shanghai Municipal Education Commission (22CGA28) awarded to X. Z. The authors would like to thank Hanlin Chen, Xinyi Chang, and other research assistants at the Culture and Child Development Lab for assistance with data collection and coding.

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Abstract

Previous studies show that adults and children evaluate the act of leaving a choice for others as prosocial, and have termed such actions as socially mindful actions. The current study investigates how the desirability of the available options (i.e., whether the available options are desirable or not) may influence adults' and children's evaluation of socially mindful actions. Children ($N = 120$, 4- to 6-year-olds) and adults ($N = 124$) were asked to evaluate characters selecting items for themselves from a set of three items – two identical items and one unique item – in a way that either leaves a choice (two diverse items) or leaves no choice (two identical items) for the next person (i.e., the beneficiary). We manipulated whether the available options were either desirable or undesirable (i.e., damaged). We found that adults' and 6-year-olds' evaluation of socially mindful actions is moderated by desirability of the options. Although they evaluate the act of leaving a choice for others as nicer than the act of leaving no choice both when the choosing options are desirable and when they are undesirable, the discrepancy in the evaluation becomes significantly smaller when the choosing options are undesirable. We also found that inference of the beneficiary's feeling underlies social evaluation of the actor leaving a choice (or not). These findings suggest that children consider both the diversity of options left and the desirability of the available options in understanding and evaluating socially mindful acts.

Keywords: social mindfulness, freedom to choose, social evaluation, choice

1. Introduction

Human beings value the freedom to choose. Decades of research has shown that the freedom to choose for oneself enhances one's self-efficacy and performance, and improves one's psychological wellbeing (Botti & Iyengar, 2004; Burger, 1989; Cordova & Lepper, 1996; Deci & Ryan, 1985; Leotti et al., 2010; Ryan & Deci, 2006; Zuckerman et al., 1978). This has been found for both important life-determining choices such as which job offer to take and less important everyday choices such as what to eat for breakfast (Bown et al., 2003; Leotti et al., 2010; Suzuki, 1997).

The freedom to choose for oneself is valued so much that people also make social evaluations depending on whether one grants others the opportunity to choose or deprives others of such opportunity. Consider a scenario where people wait in line to get fruit snacks at a party. Cindy is waiting in line to get a fruit with just one other person waiting behind her. When it is Cindy's turn to choose, there are only two apples and one pear left. If Cindy takes the only pear, leaving two identical options (i.e., two apples), then the person waiting behind her will not have the opportunity to choose and will have to take one apple. However, if Cindy takes one of the two apples, leaving two different options (i.e., one apple and one pear), then the person waiting behind her will be able to choose their preferred type of fruit. Recent studies have termed such actions that leave a choice for others as "socially mindful actions," and shown that adults and children by age 5 to 6 evaluate someone leaving a choice for others as "nicer" than someone leaving no choice for others (Van Doesum et al., 2013; Van Lange & Van Doesum, 2015; Zhao, et al., 2021; Sierksma et al., 2022).

Despite the important value placed on freedom of choice, there may be situations where choices are not so valuable and desirable, for example when the choice is too complex (Greifeneder et al., 2010; Iyengar & Lepper, 2000; Schwartz, 2000, 2004) or too difficult (Anderson, 2003), or when the choice may bring about burden and regret (Beattie et al., 1994; Botti & McGill, 2006; Steffel & Williams, 2018; Steffel et al., 2016). In the current study, we focus on one particular case where the freedom to choose may not be so valued: when the options available to choose from are aversive (or at least not so desirable). People frequently encounter choices among undesirable options in real life. For instance, one may need to choose between two less-preferred job offers or two pizza flavors that are not their top choices. These scenarios raise important questions regarding the extent to which the

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value of choice is susceptible to factors such as the desirability of the choosing options, and whether the act of leaving a choice can still be perceived as “nice” when the available options are less desirable. We think investigating these questions pertains to our understanding of choice and agency, decision making, and social and moral judgment. We are interested not only in adults’ reasoning, but also in children’s. Below we review previous work and motivate the current hypotheses.

A recent study (Botti & Iyengar, 2004) examined adults’ predictions and experience when asked to choose from less preferred options, for example choosing among less preferred yogurt flavors. Botti & Iyengar (2004) found that, though people predict that they would prefer choosing for themselves over relinquishing choice to others no matter whether the choosing options are preferred or less preferred, their actual experience differs by the desirability of the choosing options. Specifically, people feel more satisfied having the opportunity to choose for themselves than having others choose for them only when choosing from more preferred options, while they instead feel more satisfied having others choose for them when the available options are less preferred. In explaining these findings, the authors argue that when choosing among options that are less preferred, one may focus more on the undesirable features of the options and experience more distress. In contrast, when others choose for them, the engagement in decision making process becomes less salient, which provides the opportunity to escape from such negative affect (Botti & Iyengar, 2004).

Returning to the snack example mentioned above, what if the fruits available for Cindy to choose were undesirable? For example, what if the fruits were all damaged? Would adults and children still evaluate the act of leaving a choice as socially mindful? We think this may largely depend on how adults and children make inferences of the feelings of the beneficiary (i.e., the person waiting behind). Would the beneficiary feel better having a choice no matter whether the choosing options are desirable or not? Or perhaps the experience of choosing from undesirable options would make her feel worse? Previous studies on social mindfulness have only investigated cases where the choice sets include only desirable or neutral options. In this study, we investigate whether and how the desirability of the available options may influence adults’ and children’s inferences of the feelings of the beneficiary being left with a choice (or no choice) and their evaluations of the act of leaving a choice (or no choice) for others.

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One possibility is that adults and children may evaluate the act of leaving a choice for others as nicer than the act of leaving no choice to the same degree regardless of whether the available options are desirable or not. Children and adults may think that leaving a choice would ensure the person waiting behind (i.e., the beneficiary) can autonomously select the better option (or the less bad option) no matter whether the available options are desirable or not. This possibility is particularly likely given previous work showing that adults predict that they would prefer choosing by themselves over having others choose for them both when the choosing options are desirable and undesirable to similar degrees (Botti & Iyengar, 2004, Study 1a). This possibility is also consistent with classic theories and research on cognitive dissonance, which indicate that individuals tend to highly evaluate outcomes of personal choices (compared to others' dictations) even when those outcomes conflict with their previously stated preferences (e.g., Cooper & Fazio, 1984; Langer, 1975; Festinger, 1957). Thus, it is possible that, people may view the freedom to make a choice for oneself as valuable regardless of the desirability of the choosing options, and thus evaluate the act of leaving a choice for others as similarly nice when the options are desirable or not.

A second possibility is that people may evaluate the act of leaving a choice as nicer when the choosing options are desirable, but instead, evaluate the act of leaving no choice as nicer when the choosing options are not desirable. This possibility is likely considering previous work showing that, when the choosing options are less preferred, people experience more dissatisfaction and distress when choosing for themselves than when others choose for them (Botti & Iyengar, 2004; Botti & Iyengar, 2006; Douneva et al., 2019; Peters et al., 2013; Suzuki, 1997). People may evaluate the act of relieving others the burden of choosing from two undesirable items as nicer than the act of leaving others with such an annoying choice. Thus, it is possible that the value placed on choice may be contingent on the desirability of the choosing options: When the options are undesirable, people may instead infer strong feelings of distress associated with the choosing process, and evaluate the act of leaving such an unpleasant choice as *less* nice than sparing others from it.

A third possibility is that people may evaluate leaving a choice as nicer than leaving no choice both when the available options are desirable and when they are undesirable, but the discrepancy in evaluations may become smaller (or even disappear) when the choosing options are undesirable. That

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is, when the items are less desirable, people may still recognize the niceness of leaving others the freedom to choose, but the perceived niceness may be attenuated in at least two ways. Firstly, people may infer different feelings for the beneficiary when making a choice depending on the desirability of the items. When the available options are desirable, individuals may infer more pleasant feelings when contemplating the choice, while they may infer *less* pleasant feeling when the beneficiary needs to contemplate the disadvantages of each undesirable option (Botti & Iyengar, 2004). Secondly, people may also infer different levels of sacrifice for the actor depending on the desirability of the items. When the items are desirable, people may infer that there is a chance that the actor may like the unique item, thus the act of leaving a choice may entail some sacrifice for the actor, which, in turn, would make the action appear particularly nice. However, when the options are undesirable, it is less likely that the actor would prefer any item, resulting in less perceived sacrifice. This is supported by recent evidence showing that adults and older children consider costly actions as more praiseworthy than non-costly actions (Kraft-Todd & Rand, 2019; Zhao & Kushnir, 2023). In light of these considerations, people may still evaluate the act of leaving a choice as nicer, but the positive effect may be weakened when the options are undesirable.

All these possibilities seem plausible among adults. In the current study, we also aim to examine these questions among children. Do children consider the desirability of available options in their inferences and evaluations of the act of leaving a choice (or no choice) for others? And do these understandings vary by age? Taking a developmental lens in this investigation is particularly important. We believe that children's evaluations and understandings may rely on social cognitive capacities involving the ability to understand the importance of choice and agency, and to infer the actor and the beneficiary's mental states. This developmental investigation can thus reveal how early and how flexibly children may incorporate their understandings of choice, feelings, and intentions into their complex social reasoning. This also provides an opportunity for us to examine the potential role of theory of mind, a rapidly developing social-cognitive capacity in early childhood (Wellman et al., 2006), in these inferences and evaluations. Below, we review prior work on the development of these inferential and evaluative capacities.

There is a growing body of work showing that children's understanding of the value of choice

undergoes important development in early and middle childhood. Children as young as 4 years old can recognize that one can choose to act “otherwise” when there are no physical or epistemic constraints (Kushnir et al., 2015). As they get older, they also increasingly believe in the free will to choose to act against psychological or social constraints (Chernyak et al., 2013, 2019; Kushnir et al., 2015; Wente et al., 2016; Zhao, Wente, et al., 2021). For example, children aged 6 in both the US and China believe that one can choose to eat something one doesn’t like (Wente et al., 2016; Zhao, Wente, et al., 2021), and children aged 7 in the US believe that one can choose to violate a social or moral norm (Chernyak et al., 2013).

There is also increasing evidence that a sense of agency plays a significant role in influencing children’s and adults’ decisions and experiences of resource allocation (e.g., Chernyak & Kushnir, 2013; Gordon-Hecker et al., 2022). For example, both children and adults tend to be more satisfied with disadvantageous inequality (i.e., one receiving less than their partner) when they themselves have control over the outcome (high agency), compared to when they lack control (low agency) (Choshen-Hillel & Yaniv, 2011; Choshen-Hillel et al., 2018; Gordon-Hecker et al., 2022). Similarly, agency or the freedom to choose can increase young children’s prosocial decisions and associated happiness (Aknin et al., 2012; Chernyak & Kushnir, 2013; Rapp et al., 2017).

These pieces of evidence together suggest children’s increasingly mature understanding of one’s autonomy to choose for oneself, as well as the important role of choice and agency in children’s decision making. Most relevant to the current investigation, between ages 4 and 6, children in both the U.S. and China increasingly evaluate the act of leaving others the freedom to choose as prosocial when the choosing options are desirable (Zhao, Zhao, et al., 2021). However, to the best of our knowledge, it remains an open question whether and how children may consider the desirability of the available options in their evaluation of the act of leaving a choice (vs. no choice) for others, which is the focus question of the current study.

We think that children’s social evaluation may largely depend on how they infer the beneficiary’s mental states. Consider the snack example mentioned earlier, a positive social evaluation of the actor leaving a choice likely depends on inferring the beneficiary’s positive feelings when given the opportunity to choose. Conversely, if one believes that the beneficiary feels dissatisfied when faced

with a choice between two undesirable options, they are likely to evaluate the actor leaving the choice as less nice. Abundant research on theory of mind has shown that, from quite young, children can make inferences about others' mental states (including desires, preferences, emotions), and this ability develops with age (e.g., Wellman, 2014). A recent growing body of work shows that young children can reason about the expected benefits for others and expect others to act in a way that maximizes their expected benefits (Jara-Ettinger et al., 2016; Liu et al., 2017), and expect one to be happy when achieving goals (Skerry & Spelke, 2014). Particularly regarding prosocial behaviors and relevant social evaluations, increasing evidence shows that children by late preschool years consider expected benefits for others when deciding how to help others (Bridgers et al. 2020), and also infer social affiliation from the degree one acts to maximize others' benefits (Powell, 2022).

In the specific contexts of undesirable choices, the central question is whether and how children consider the desirability of the choosing options into inferences of the beneficiary's feeling. There is a growing body of evidence indicating that young children are sensitive to others' preference and the value of objects when making social judgments. For example, children demonstrate sensitivity to object value in resource allocation (Chernyak & Sobel, 2016; Choshen-Hillel et al., 2020), and they are less likely to reject unequal distribution when the value is high. Research on children's utility calculus also demonstrates their ability to make nuanced inferences about others' preferences and values based on their choices (Davis et al., 2023; Jara-Ettinger et al., 2017). Of particular relevance to our current investigation, a recent study indicates that children increasingly consider the beneficiary's preference when evaluating the act of leaving a choice (Zang et al., 2023). When the beneficiary prefers the unique item, even 4-year-olds understand that it is nicer not to take away the only thing she prefers; while when the beneficiary prefers the identical item, children older than 6 (but not younger) and adults believe it is nicer to leave two identical but preferred items.

The development of these aspects suggests that, by the late preschool years, children may already possess the prerequisite social-cognitive capacities to understand the value of choice and agency, make inferences about others' mental states, and reason about preferences and values. However, it remains an open question how children may incorporate these understandings into their evaluations of the act of leaving a choice, and particularly whether these evaluations may vary by the desirability of

options.

We also try to investigate the underlying psychological mechanism of children's social evaluations of the act of leaving a choice. First, as mentioned above, we propose that the influence of choice desirability on children's social evaluations of leaving a choice (vs. not leaving a choice) would primarily rely on how they infer the beneficiary's feelings. We predict that if we observe that children's social evaluations of leaving a choice (compared to not leaving a choice) vary by choice desirability, the inferences about the beneficiary's feelings may help explain this effect. To test this hypothesis, we conducted mediation analyses to determine whether the effect of choice desirability on social evaluations of leaving a choice (vs. not leaving a choice) may be mediated by inferences about the beneficiary's feelings.

Second, we investigate whether children's theory of mind (ToM) may play a role in these inferences and evaluations. Previous research has suggested that theory of mind or related abilities such as perspective taking, may be important capacities involved in both performing in a way that leaves a choice for others (Van Doesum et al, 2013) and recognizing the prosociality of leaving a choice for others (Zhao, Zhao, et al., 2021; Zhao et al., 2022). We consider the possibility that the role of ToM may be different depending on whether the options are desirable. When the options are desirable, children with better ToM may be better at recognizing that a choice could maximize the beneficiary's expected benefits, thus inferring that the beneficiary feels more positive when left a choice compared to when left with no choice. However, when the options are undesirable, it became more complicated. On one hand, children with better ToM may better recognize that a choice could maximize the beneficiary's expected benefits. On the other hand, children with relatively high ToM abilities may also better understand the distress feeling of choosing among undesirable options, thus inferring little discrepancy between feelings of the character being left with a choice versus the character being left with no choice. Therefore, in the current study, we provide an empirical investigation on the relationship between children's theory of mind abilities and their inferences and evaluations of the act of leaving a choice (or no choice), and we also investigate this relationship separately for desirable options and undesirable options.

The present study investigates whether and how children and adults consider the desirability of

options in understandings and evaluations of the act of leaving a choice (or no choice) for others. We test children between ages 4 and 6, as this is the age range previous studies have shown development in understanding of socially mindful actions (Zhao, Zhao, et al., 2021). We show children and adults characters either leaving a choice or no choice for others, and we manipulate the desirability of the choosing options (desirable or undesirable). Our first goal is to examine how children evaluate the actors leaving a choice (or not) and whether these evaluations vary by desirability. Second, we investigate the underlying mechanisms of evaluation by investigating how children make inferences on the beneficiary's feelings and whether these inferences underlie social evaluation. Furthermore, we also examine whether children's theory of mind capacity may correlate with these evaluations and inferences. We decided to use two false belief tasks to measure theory of mind, as these two tasks have been validated among Chinese preschoolers in previous studies (Wellman et al., 2006) and have been used to examine relationship between theory of mind and prosocial behaviors and social evaluation (e.g., Wu & Su, 2014; Zhao et al., 2022). Finally, we investigate how children predict people's preferences regarding choosing from two diverse items vs. two identical items, and whether such preference differ by the desirability of the items. We also test a group of adults as comparison baseline.

2. Method

2.1. Participants

A hundred and twenty 4- to 6-year-olds (4.05- 6.99, $M = 5.45$, $SD = .84$) from China were recruited for this study with their parents' consent. Following the procedure in Zhao et al. (2021), we divided the children into three age groups: 4-year-olds, 5-year-olds, and 6-year-olds. Specifically, 40 4-year-olds (4.05- 4.96, $M = 4.43$, $SD = .27$, 18 boys), 40 5-year-olds (5.02- 5.96, $M = 5.56$, $SD = .29$, 16 boys), and 40 6-year-olds (6.04- 6.99, $M = 6.36$, $SD = .23$, 20 boys) were included in the analysis. Children were randomly assigned to the desirable choice condition or the undesirable choice condition, resulting in 60 children in each condition. In the desirable choice condition (4.05- 6.99, $M = 5.44$, $SD = .88$, 27 boys), there were 20 4-year-olds (4.04- 4.87, $M = 4.39$, $SD = .27$, 8 boys), 20 5-year-olds (5.12- 5.96, $M = 5.54$, $SD = .31$, 9 boys), and 20 6-year-olds (6.04- 6.99, $M = 6.40$, $SD = .28$, 10 boys). In the undesirable choice condition (4.05- 6.73 years old, $M = 5.45$, $SD = .80$, 27

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boys), there were 20 4-year-olds (4.05- 4.96, $M = 4.47$, $SD = .26$, 10 boys), 20 5-year-olds (5.02- 5.93, $M = 5.56$, $SD = .27$, 7 boys), and 20 6-year-olds (6.07- 6.73, $M = 6.31$, $SD = .19$, 10 boys).

In addition, 124 adults, who were parents from China, were recruited through lab database, and were randomly assigned to the desirable choice condition or the undesirable choice condition.

According to another study sampling from a similar population, these adults were primarily females aged 30 to 40 years old, and came from middle to high socio-economic backgrounds. The study was approved by University Committee on Human Research Protection at East China Normal University.

2.2. Materials and Procedures

Eighty-eight child participants were tested individually in a quiet room in local preschools, and 32 children were tested online (due to the outbreak of COVID-19). All of them were tested by trained experimenters. Children first participated in the social mindfulness task, followed by two theory of mind tasks. The detailed protocol and materials can be seen at

https://osf.io/p6ef9/?view_only=9c790a4bed604ec39dcbf61f6e10e2fa.

2.2.1. Social Mindfulness Task

The social mindfulness task was adapted from Zhao et al (2021). Participants were randomly assigned to either the *desirable choice* condition or the *undesirable choice* condition, which differed in the desirability of the available options. Each child was shown two trials (one trial regarding selecting a fruit snack and the other trial regarding selecting a toy; both were familiar and easy to understand for children of the targeted age range). The order of presentation of the two trials was counterbalanced across participants.

In the desirable choice condition, in each trial, the experimenter presented children with two scenarios of snack time at school, sequentially. In each scenario, one child character waited in line to select a fruit snack (or a toy) with just one other character waiting behind. Each character was allowed to select one item. When it was the first character's turn, the options consisted of two identical items and one unique item (e.g., two apples and one pear in the fruit trial, two books and one puzzle in the toy trial). In one scenario, the protagonist (e.g., Character A as shown in Figure 1) selected one of the two identical items (e.g., one apple among two apples and one pear), leaving the beneficiary (e.g., Character B as shown in Figure 1) with a choice of two different kinds of items (e.g., an apple and a

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pear). In the other scenario, the protagonist (e.g., Character C, as shown in Figure 1) selected the unique item (e.g., the apple among one apple and two pears), leaving the beneficiary (e.g., Character D, as shown in Figure 1) with two identical items (e.g., two pears). The order of presentation of the two scenarios was counterbalanced across participants. The undesirable choice condition closely resembled the desirable choice condition except that the available fruits (or toys) were damaged accidentally by the teacher. This was indicated by a statement before presenting the two scenarios (e.g., “At snack time, the teacher accidentally dropped the fruits on the ground, the fruits are all damaged. The apples and pears are all damaged.”) and by dark spots on the fruits or toys (shown in Figure 2). It should be noted that we made it clear that the damage was caused by the teacher to ensure that the child characters were not to be blamed for the damage.

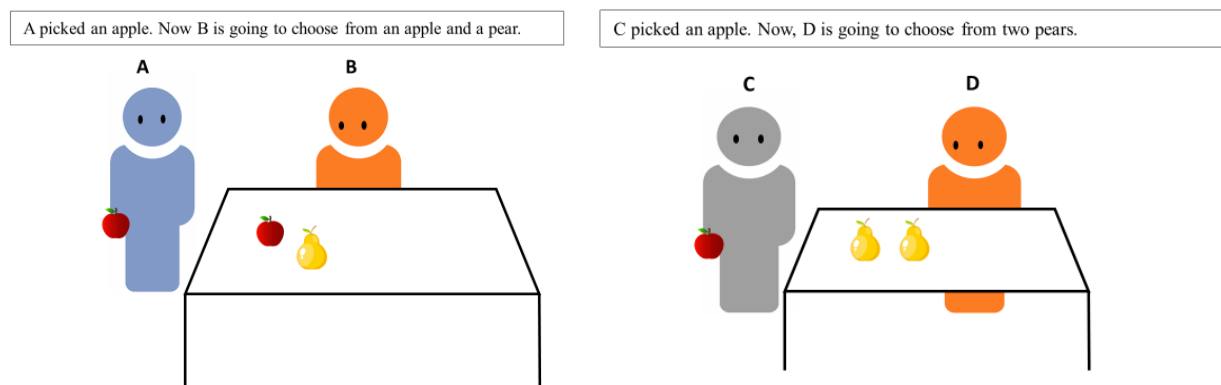


Figure 1. Example of the story set-up in the desirable choice condition (fruit trial). Children heard about two scenarios where child characters waited in line to select a fruit snack. Both characters A and C selected one fruit from two identical items and one unique item. Character A selected one of the two identical fruits (i.e., one of the two apples), leaving Character B with two diverse options, while Character C selected the unique item (i.e., the only apple), leaving Character D with two identical items.

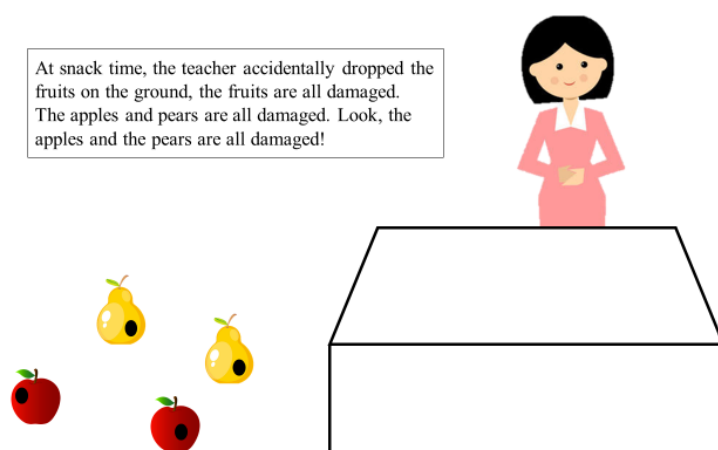


Figure 2. Manipulation of the undesirable choice condition (fruit trial). In the undesirable choice condition, children heard that the teacher accidentally dropped all the fruits on the ground, and the fruits were all damaged. The damage was also indicated by the dark spots on the fruits.

After being shown each scenario, the children were asked two or three attention check questions to ensure that they had paid attention and understood the story. The questions were about what fruit (toy) the first character chose (i.e., “What did A (C) choose?”) and what fruits (toys) were left for the next character (i.e., “What did A (C) leave for B (D) to choose from?”). A third attention check question was also included in the undesirable choice condition to ensure that they paid attention to the desirability of the items: “What happened to the fruits (or toys)?” The answer to the last attention check question was counted as correct as long as children mentioned that the fruits (or toys) were dropped on the ground, were dirty, or were damaged. If children answered any of the attention check questions incorrectly, the experimenter repeated the story and then asked the same question again. All children answered the attention check questions correctly within two attempts. After that, children were asked three critical questions. Children were first asked to rate the niceness of the protagonists (*niceness measure*): “How nice do you think A (C) is to B (D)?” Children were instructed to answer by using a 20-point scale (1 = very not nice, 20 = very nice, as shown in Figure 3), which was adapted from Bass et al. (2022), and children were trained on how to use the scale at the beginning of the study (see details of the protocol on https://osf.io/p6ef9/?view_only=9c790a4bed604ec39dcbf61f6e10e2fa). Children were then asked to infer the feeling of the beneficiary (*feeling measure*): “How do you think B (D) is feeling right now,

happy or unhappy?” followed by “a little [un]happy, or very [un]happy?” This resulted in a 1 to 4 scale (1 for very unhappy, 4 for very happy). After being presented with the two scenarios in each trial, children were asked to predict comparative preference of diverse options versus unified options (*diversity preference measure*): “Which one would a child of your age want to choose from, two apples, or one apple and one pear?” to measure children’s prediction of people’s preference for diverse versus unified options.

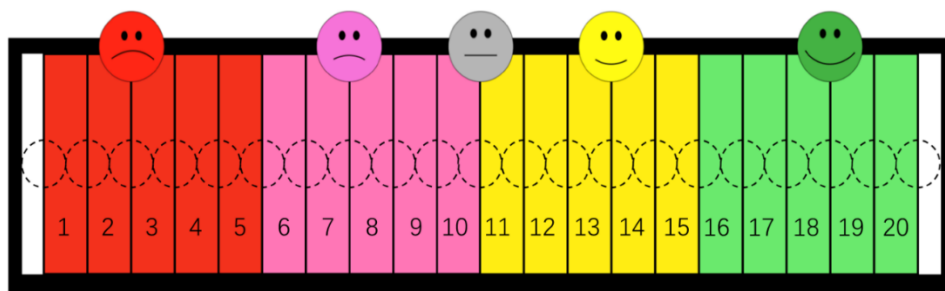


Figure 3. The 1-20 scale measures children’s evaluations of the niceness of the protagonist.

2.2.2. Theory of Mind Tasks

Children were then administered two theory of mind tasks adapted from Wellman et al (2006): one content false belief task and one location false belief task. In the content false belief task, children were presented with a familiar nontransparent cookie jar that could not be seen through and were asked what was in the jar. All children answered cookies. It was then revealed that two erasers were actually inside the jar. Then, the experimenter put the erasers back and confirmed that the children knew two erasers were in the jar. Children were then introduced to a new character (i.e., Pipi) who had never seen inside the cookie jar and asked what Pipi would think was in the jar, erasers or cookies (cookies: scored as 1, erasers: scored as 0). A follow-up memory check question was asked (i.e., “Has Pipi ever seen what was inside the box?”). Eighty-nine percent of the children passed this memory check question. Data from those who did not pass the memory check question was excluded from analyses involving theory of mind tasks.

In the location false belief task, children were shown a picture with a cat in grass, and a picture of garage, and were told that Linlin’s cat was hiding in the grass, but Linlin thought her cat was hiding in the garage, and were asked where Linlin would look for her cat, in the grass or the garage (garage:

scored as 1, grass: scored as 0). A follow-up memory check question was asked (i.e., “Where was the cat hiding actually?”). Eighty-six percent of the children passed the memory check question. Data of those who did not pass the memory check question were excluded from analyses involving theory of mind tasks.

Adult participants read the identical scenarios on Sojump (a Chinese counterpart of Qualtrics) and answered identical questions except that they were not asked the attention check questions before the dependent measures and were not administered the theory of mind tasks.

3. Results

3.1. Social Mindfulness Task

3.1.1. Niceness Measure

See Figure 4 for children’s and adults’ responses to the niceness measure (i.e., “How nice do you think A (C) is to B (D)?”). For the child participants, we ran a repeated-measures ANOVA on the niceness measure (1-20) with choice left (leaving a choice, leaving no choice) as a within-subject factor, and with desirability of choice (desirable choice, undesirable choice) and age group (4-year-olds, 5-year-olds, 6-year-olds) as between-subject factors. We also included trial (fruit, toy) in the model to control for potential effect of trial. We found a significant main effect of choice left, $F(1, 114) = 30.71, p < .001, \eta_p^2 = .21$, that across conditions, children evaluated the character leaving a choice ($M = 16.03, SD = 4.20$) as nicer than the character leaving no choice ($M = 13.49, SD = 5.58$). We also found a significant interaction between choice left and age group, $F(2, 114) = 9.43, p < .001, \eta_p^2 = .14$, and a significant three-way interaction among choice left, desirability of choice, and age group, $F(2, 114) = 3.51, p = .033, \eta_p^2 = .06$. We found no other significant effects ($ps > .066$).

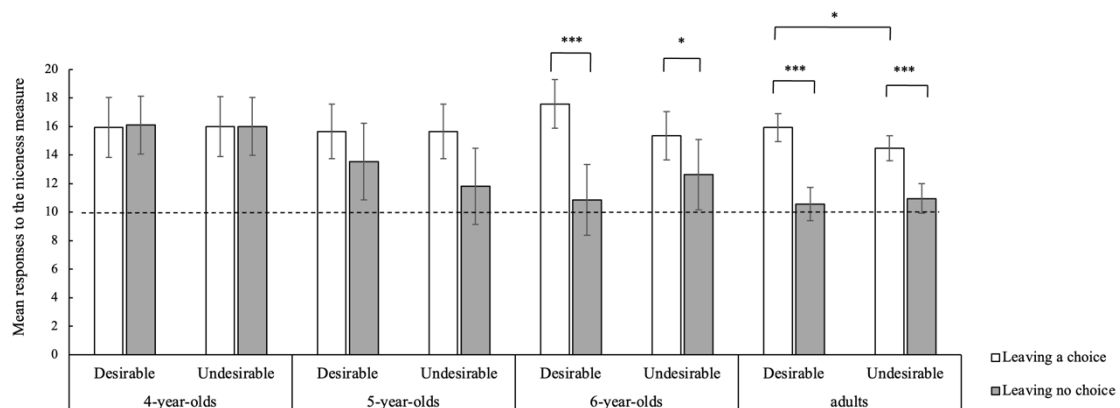


Figure 4. Mean responses to the niceness measure varying by choice left (leave a choice, leave no choice) and desirability of choice (desirable, undesirable), split by age group (4-year-olds, 5-year-olds, 6-year-olds, adults). Error bars represent 95% CI. * $p < .05$, *** $p < .001$.

To further explore the three-way interaction, we then ran a repeated-measures ANOVA on the niceness measure with choice left, desirability of choice, and trial as factors for each age group separately. For 4-year-olds, we did not find any significant main effects or interactions ($ps > .114$). For 5-year-olds, we found a significant main effect of choice left, $F(1, 38) = 10.19, p = .003, \eta_p^2 = .21$, that, across conditions, 5-year-olds evaluated the character leaving a choice ($M = 15.65, SD = 4.17$) as nicer than the character leaving no choice ($M = 12.68, SD = 5.92$). No other main effect or interaction effect were found ($ps > .189$). For 6-year-olds, we also found a significant main effect of choice left, $F(1, 38) = 33.77, p < .001, \eta_p^2 = .47$, that, across conditions, 6-year-old children evaluated the character leaving a choice ($M = 16.46, SD = 3.88$) as nicer than the character leaving no choice ($M = 11.74, SD = 5.47$). We did not find a significant main effect of desirability of choice, $p = .857$. More importantly, for 6-year-olds we found a significant interaction between choice left and desirability of choice, $F(1, 38) = 6.05, p = .019, \eta_p^2 = .14$. Post-hoc pairwise comparisons using Bonferroni adjustment revealed that, although 6-year-olds evaluated the character leaving a choice as nicer than the character leaving no choice in both the desirable choice condition (leaving a choice: $M = 17.58, SD = 2.79$; leaving no choice: $M = 10.85, SD = 5.71; p < .001$) and the undesirable choice condition (leaving a choice: $M = 15.35, SD = 4.53$; leaving no choice: $M = 12.63, SD = 5.21; p = .023$), the effect in the undesirable choice condition ($d = .56$) was significantly smaller than that in the desirable choice condition ($d = 1.50$). Looking at the interaction from the other perspective, we did not find a significant difference between the two conditions for the act of leaving a choice ($p = .069$) nor the act of leaving no choice ($p = .311$).

For the adult participants, we ran a repeated-measures ANOVA on the niceness measure (1-20) with choice left (leaving a choice, leaving no choice) as a within-subject factor and desirability of choice (desirable choice, undesirable choice) as a between-subject factor. We also included trial (fruit, toy) in the model to control for potential effect of trial. We found a significant main effect of choice

left, $F(1, 122) = 120.75, p < .001, \eta_p^2 = .50$, that across conditions, adults evaluated the protagonist leaving a choice ($M = 15.11, SD = 3.72$) as nicer than the one leaving no choice ($M = 10.78, SD = 4.36$). We also found a significant interaction between choice left and desirability of choice, $F(1, 122) = 5.24, p = .024, \eta_p^2 = .04$. Post-hoc pairwise comparisons using Bonferroni adjustment revealed that, although adults evaluated the character leaving a choice as nicer than the character leaving no choice in both the desirable choice condition (leaving a choice: $M = 15.93, SD = 3.71$; leaving no choice: $M = 10.56, SD = 4.20; p < .001$) and the undesirable choice condition (leaving a choice: $M = 14.46, SD = 3.63$; leaving no choice: $M = 10.95, SD = 4.51; p < .001$), the effect in the undesirable choice condition ($d = .86$) was significantly smaller than that in the desirable choice condition ($d = 1.36$). Looking at the interaction from another perspective, adults evaluated the character leaving a choice as significantly nicer when the choosing options were desirable ($M = 15.93, SD = 3.71$) than when the choosing options were undesirable ($M = 14.46, SD = 3.63; p = .029$), but their evaluation of the character leaving no choice did not differ between the two conditions ($p = .627$). We found no significant main effect of desirability of choice ($p = .376$) or trial ($p = .277$).

3.1.2. *Feeling Measure*

See Figure 5 for children's and adults' responses to the feeling measure (i.e., How do you think B (D) is feeling right now, happy or unhappy?" followed by "a little [un]happy, or very [un]happy?"). For the child participants, we ran a repeated-measures ANOVA on the feeling measure (1-4) with the choice left (leaving a choice, leaving no choice) as a within-subject factor, and with desirability of choice (desirable choice, undesirable choice) and age group (4-year-olds, 5-year-olds, 6-year-olds) as between-subject factors. We also included trial (fruit, toy) in the model to control for potential effect of trial. We found a significant main effect of choice left, $F(1, 114) = 9.55, p = .003, \eta_p^2 = .08$, that across conditions, children inferred the character being left a choice ($M = 2.96, SD = .86$) feeling happier than the character being left with no choice ($M = 2.72, SD = .95$). We also found a significant main effect of desirability of choice, $F(1, 114) = 20.53, p < .001, \eta_p^2 = .15$, that children inferred the character being left with desirable items ($M = 3.14, SD = .67$) feeling better than the character being left with undesirable items ($M = 2.54, SD = .80$). More importantly, we also found a significant interaction between choice left and age group, $F(2, 114) = 5.51, p = .005, \eta_p^2 = .09$, and a significant

three-way interaction among choice left, desirability of choice and age group, $F(2, 114) = 3.39$, $p = .037$, $\eta_p^2 = .06$. We did not find a main effect of age group ($p = .064$) or trial ($p = .425$).

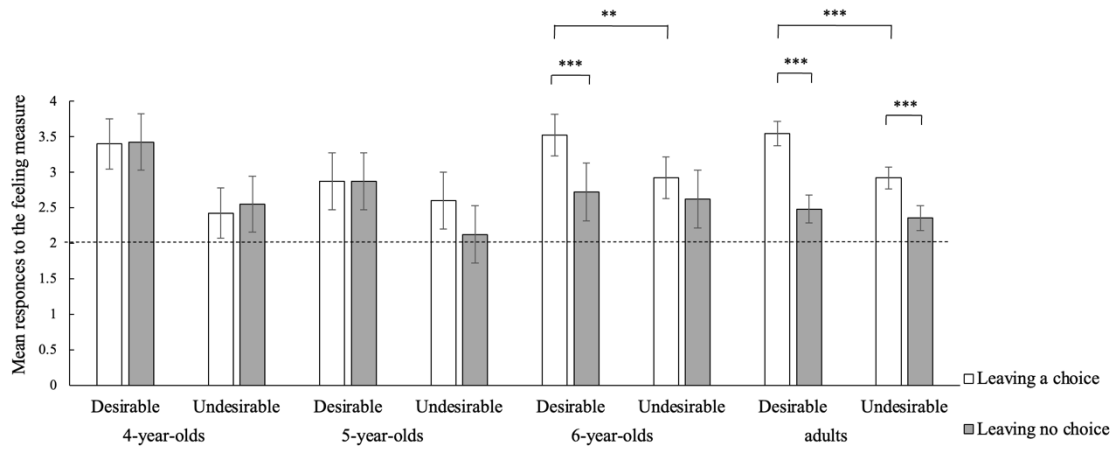


Figure 5. Mean responses to the feeling measure varying by choice left (leave a choice, leave no choice) and desirability of choice (desirable, undesirable), split by age group (4-year-olds, 5-year-olds, 6-year-olds, adults). Error bars represent 95% CI. *** $p < .001$.

To further explore the three-way interaction, we then ran a repeated-measures ANOVA on the feeling measure with choice left, desirability of choice and trial as factors for each age group separately. For 4-year-olds and 5-year-olds, we only found significant main effects of desirability of choice (4-year-olds: $F(1, 38) = 13.85$, $p = .001$, $\eta_p^2 = .27$, 5-year-olds: $F(1, 38) = 5.32$, $p = .027$, $\eta_p^2 = .12$), that 4-year-olds and 5-year-olds inferred the character being left with desirable items (4-year-olds: $M = 3.41$, $SD = .62$; 5-year-olds: $M = 2.88$, $SD = .71$) feeling happier than the character being left with undesirable items (4-year-olds: $M = 2.49$, $SD = .92$; 5-year-olds: $M = 2.36$, $SD = .70$). For 6-year-olds, we found a significant main effect of choice left, $F(1, 38) = 18.10$, $p < .001$, $\eta_p^2 = .32$, that 6-year-olds inferred the character being left with a choice ($M = 3.23$, $SD = .71$) feeling happier than the character being left with no choice ($M = 2.68$, $SD = .89$). We did not find a main effect of desirability of choice ($p = .105$). We also did not find a significant interaction effect between choice left and desirability of choice, $F(1, 38) = 3.74$, $p = .061$, $\eta_p^2 = .09$. As we aimed to investigate whether there are different patterns between the desirable choice condition and undesirable choice condition, we still ran pairwise comparisons for each condition. Six-year-olds inferred that the character being left with a choice ($M = 3.53$, $SD = .53$) felt happier than the character being left with no choice ($M =$

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2.73, $SD = .94$) only in the desirable choice condition ($p < .001$), but not in the undesirable choice condition ($p = .109$). Thus, the pattern of the feeling measure was consistent with the pattern of the niceness measure. Looking at the interaction from the other perspective, for those who were left with a choice, 6-year-olds inferred the character being left with a desirable choice feeling happier ($M = 3.53$, $SD = .53$) than the character being left with an undesirable choice ($M = 2.93$, $SD = .75$, $p = .006$). However, for those who were left with no choice, 6-year-olds' inferences of feelings did not differ between the two conditions ($p = .727$).

For the adult participants, we ran a repeated-measures ANOVA on the feeling measure (1-4) with choice left (leaving a choice, leaving no choice) as a within-subject factor and desirability of choice (desirable choice, undesirable choice) as a between-subject factor. We also included trial (fruit, toy) in the model to control for potential effect of trial. We found a significant main effect of choice left, $F(1, 122) = 144.65$, $p < .001$, $\eta_p^2 = .54$, that across conditions, adults inferred the character being left with a choice ($M = 3.20$, $SD = .71$) feeling happier than the character being left with no choice ($M = 2.41$, $SD = .74$). We also found a significant main effect of desirability of choice, $F(1, 122) = 12.83$, $p < .001$, $\eta_p^2 = .10$, that adults inferred the character being left with desirable items ($M = 3.01$, $SD = .45$) feeling happier than the character being left with undesirable items ($M = 2.64$, $SD = .66$). We also found a main effect of trial, $F(1, 122) = 4.08$, $p = .046$, $\eta_p^2 = .03$. Analyses split by trial revealed similar patterns to the overall results, so we included details on effects of trial in the Supplementary Materials. Importantly, we found a significant interaction between choice left and desirability of choice, $F(1, 122) = 13.54$, $p < .001$, $\eta_p^2 = .10$. Post-hoc pairwise comparisons using Bonferroni adjustment revealed that, although adults inferred that the character being left a choice felt happier than the character being left no choice in both the desirable choice condition (leaving a choice: $M = 3.55$, $SD = .52$, leaving no choice: $M = 2.48$, $SD = .69$; $p < .001$) and the undesirable choice condition (leaving a choice: $M = 2.92$, $SD = .72$, leaving no choice: $M = 2.36$, $SD = .77$; $p < .001$), the effect in the undesirable choice condition ($d = .75$) was significantly smaller than that in the desirable choice condition ($d = 1.75$). Looking at the interaction from the other perspective, for those who were left with a choice, adults inferred the character being left with a desirable choice feeling happier ($M = 3.55$, $SD = .52$) than the character being left with an undesirable choice ($M = 2.92$, $SD = .72$, p

< .001). However, for those who were left with no choice, adults' inferences of feelings did not differ between the two conditions ($p = .344$).

3.1.3. Mediation Analysis

We examine our hypothesis that the inference of the beneficiary's feeling may explain the effect of desirability on the differentiated social evaluation of the protagonist leaving a choice (vs. not leaving a choice) – that is, whether the feeling measure explains the interactive effect of choice left and desirability on the social evaluation measure (i.e., the niceness measure). Since we found an interaction effect only for 6-year-olds and adults, we focused our analyses on these two age groups. For each age group, we first conducted correlational analyses to examine whether the feeling measure and the niceness measure significantly correlate with each other, overall and for each condition. We then conducted mediation analyses to examine whether the feeling measure mediates the interaction effect between choice left and desirability of choice on the niceness measure. See figure 6 for the mediation model. To simplify the analyses, for each participant, we averaged their responses to the niceness measure across two trials (fruit, toy) to form a *niceness score*, and averaged their responses to the feeling measure across two trials (fruit, toy) to form a *feeling score*.

For the 6-year-olds, partial correlation analyses (controlling for age and gender) showed a significant positive correlation between the feeling score and the niceness score overall ($r = .50, p < .001$) and within each condition (desirable: $r = .52, p = .001$; undesirable: $r = .48, p = .002$). We then ran mediation analyses. First, a linear mixed effects model predicting the feeling score with choice left, desirability of choice and their interaction as predictors, while controlling for gender and age, revealed no significant interaction between choice left and desirability of choice ($B = .50, SE = .26, 95\% \text{ CI } [-.01, 1.01], p = .061$). Second, a linear regression model predicting niceness score with feeling score revealed a significant effect of feeling score ($B = 3.48, SE = .63, 95\% \text{ CI } [2.24, 4.71], p < .001$). Then a linear mixed effects model predicting the niceness score with choice left, desirability of choice, and their interaction as predictors revealed a significant interaction effect ($B = 4.00, SE = 1.63, 95\% \text{ CI } [.81, 7.19], p = .019$). Importantly, after including the feeling score as a predictor in this model, the interaction between choice left and desirability of choice became non-significant ($p = .078$), while the feeling score still significantly predicted the niceness score ($B = 2.44, SE = .66,$

95%CI [1.15, 3.74], $p < .001$). Therefore, the feeling measure mediated the interaction effect between choice left and desirability of choice on the niceness measure among 6-year-olds.

For adults, bivariate correlational analyses showed a significant positive correlation between the feeling score and the niceness score overall ($r = .63, p < .001$), and for each condition (desirable: $r = .66, p < .001$; undesirable: $r = .62, p < .001$). We then ran mediation analyses. First, a linear mixed effects model predicting the feeling score with choice left, desirability of choice, and their interaction as predictors revealed a significant interaction between choice left and desirability of choice ($B = .50, SE = .14, 95\% \text{ CI } [.23, .76], p < .001$). Second, a linear regression model predicting niceness score with feeling score revealed a significant effect of feeling score ($B = 4.37, SE = .23, 95\% \text{ CI } [3.92, 4.81], p < .001$). Then a linear mixed effects model predicting the niceness score on choice left, desirability of choice, and their interaction revealed a significant interaction between choice left and desirability of choice ($B = 1.85, SE = .81, 95\% \text{ CI } [.27, 3.43], p = .024$). Importantly, after including the feeling score as a predictor in this model, the interaction effect became nonsignificant ($p = .98$), while the feeling score still significantly predicted the niceness score ($B = 3.68, SE = .30, 95\% \text{ CI } [3.10, 4.26], p < .001$). Thus, the feeling measure also mediated the interaction effect between choice left and desirability of choice on the niceness measure among adults.

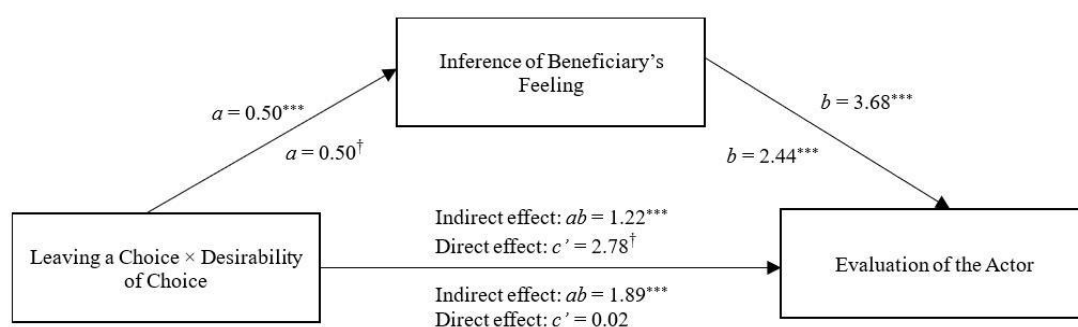


Figure 6. The interaction effect of leaving a choice and desirability of choice on evaluation of the actor (i.e., the niceness measure) is mediated by inference of beneficiary's feeling (i.e., the feeling measure). Unstandardized coefficients of 6-year-old children are depicted inside the triangle. Unstandardized coefficients of adults are depicted outside the triangle. $^{\dagger} p < .10$, $^{***} p < .001$.

3.1.4. Diversity Preference Measure

See Figure 7 for adults' and children's responses to the diversity preference measure (e.g.,

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“Which one would a child [of your age] want to choose from, two apples, or one apple and one pear?”). For the child participants, we conducted a logistic GEE on children’s responses to the diversity preference measure (0 = preferring unified options, 1 = preferring diverse options) with age group and desirability of choice as between-subject factors and trial as a within-subject factor. We found a significant main effect of age group (Wald χ^2 (2, $N=120$) = 13.92, $p = .001$) that older children were more likely to answer that one would prefer to choose from two diverse options than younger children. Specifically, both 5-year-olds and 6-year-olds were more likely to answer that one would prefer to choose from two diverse options than 4-year-olds (5-year-olds vs. 4-year-olds: Wald χ^2 (1, $N = 80$) = 7.09, $p = .008$; 6-year-olds vs. 4-year-olds: Wald χ^2 (1, $N = 80$) = 12.05, $p = .001$). There was no significant difference between 5-year-olds and 6-year-olds ($p = .551$). We also found an unexpectedly significant main effect of desirability of choice (Wald χ^2 (1, $N = 120$) = 4.42, $p = .036$), in that children were slightly more likely to answer that one would prefer to choose from diverse options in the undesirable choice condition than in the desirable choice condition.

To further investigate the main effect of age group, for each participant, we averaged the responses of diversity preference measure of two trials to form a diversity preference score (0-1), and ran one-sample t-tests comparing to chance level for each age group. We found that in both desirable choice and undesirable choice condition, 4-year-olds’ responses did not differ from chance (desirable condition: $t(19) = .57$, $p = .577$; undesirable condition: $t(19) = 1.83$, $p = .083$). By contrast, both 5-year-olds (desirable condition: $t(19) = 2.18$, $p = .042$, 95% CI [.01, .39], $d = .49$; undesirable condition: $t(19) = 13.08$, $p < .001$, 95% CI [.38, .52], $d = 2.92$) and 6-year-olds (desirable condition: $t(19) = 5.48$, $p < .001$, 95% CI [.22, .48], $d = 1.23$; undesirable condition: $t(19) = 7.55$, $p < .001$, 95% CI [.27, .48], $d = 1.69$) answered that one would prefer to choose from two diverse items significantly above chance in both conditions. Thus, children by age 5 and adults think that one would have a preference for diverse rather than identical options.

Adults answered that one would prefer to choose from two diverse options over two unified options significantly above chance in both the desirable choice condition (one sample t-test, $t(54) = 13.27$, $p < .001$, 95% CI [.34, .46], $d = 1.79$) and the undesirable choice condition (one sample t-test, $t(68) = 14.75$, $p < .001$, 95% CI [.36, .48], $d = 1.78$). A logistic GEE on adults’ responses on the

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diversity preference measure (1 = preferring diverse options, 0 = preferring unified options) with desirability of choice as a between-subject factor and trial as a within-subject factor revealed no significant effects of desirability of choice or trial ($ps > .593$).

We also examined whether adults' and children's responses to the diversity preference measure correlate with their responses to the niceness measure and/or the feeling measure. For each participant, we calculated a *niceness difference score* between the niceness measure for the character who left a choice and the niceness measure for the character who left no choice, which indicated how much nicer the participant rated the character leaving a choice compared to the character leaving no choice. Similarly, we calculated a *feeling difference score* between the feeling measure for the character who was left a choice and the feeling measure for the character who was left no choice, which indicated how much happier the participant inferred the character who was left a choice feeling compared to the character who was left no choice. We then ran bivariate correlation among diversity preference score, niceness difference score, and feeling difference score for adults, and ran partial correlation controlling for age for children. We found that, for adults, diversity preference score was positively correlated with the niceness difference score ($r = .23, p = .009$) and the feeling difference score ($r = .27, p = .003$). For children, partial correlation controlling for age revealed that diversity preference score was positively correlated with the feeling difference score ($r = .24, p = .010$), but not significantly correlated with the niceness difference score ($r = .11, p = .248$).

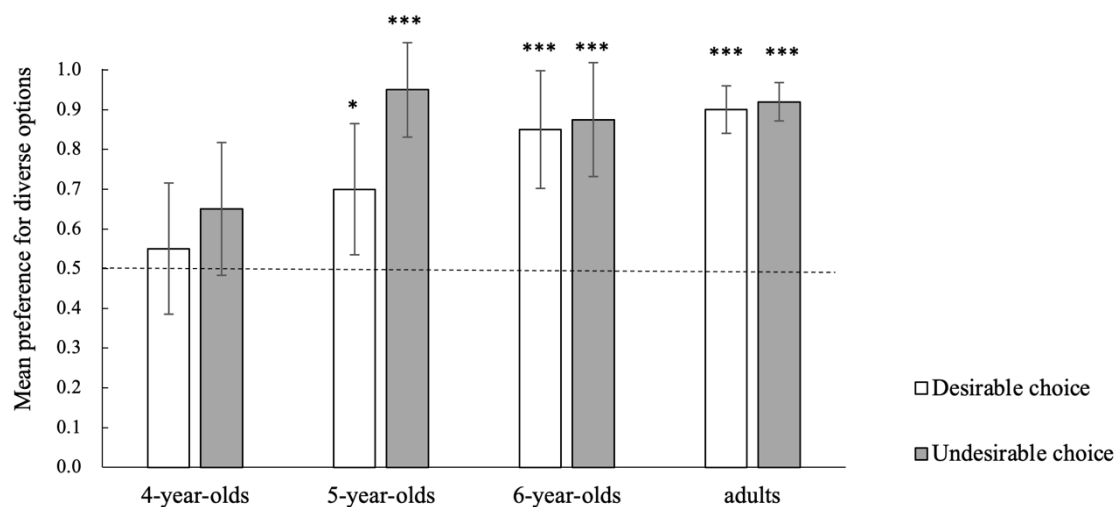


Figure 7. Mean preference for diverse options split by desirability of choice (desirable, undesirable) and age group (4-year-olds, 5-year-olds, 6-year-olds, adults). Error bars represent 95% CI. * $p < .05$, *** $p < .001$.

3.2. Theory of Mind and Social Mindfulness

The scores of two theory of mind tasks were significantly correlated with each other ($r = .35$, $p < .001$), so we averaged the score of the two theory of mind tasks to form a theory of mind score ($M = .66$, $SD = .39$). Correlation analyses with age revealed significant age effect on theory of mind score ($r = .31$, $p = .002$). To examine the relationship between children's performance on the theory of mind task and their responses on the social mindfulness task, we first conducted partial correlation analyses among niceness difference score, feeling difference score, diversity preference score, and theory of mind score (controlling for age), collapsing across the two conditions. See Table 1 for correlations. We found an overall significant positive correlation between theory of mind score and the feeling difference score ($r = .27$, $p = .009$, controlling for age), and no other significant correlations ($ps > .135$). Collapsing across conditions, children who scored higher on the theory of mind tasks were more likely to infer that the beneficiary who was left with a choice felt better than the beneficiary who was left with no choice.

As we had hypothesized that the correlation might vary by desirability of the choice, we then examined correlation for each condition (desirable choice, undesirable choice). In the desirable choice condition, we found a significant positive correlation between theory of mind score and the feeling difference score when age was controlled ($r = .31$, $p = .050$). In the undesirable choice condition, the partial correlation between the theory of mind score and the feeling difference score was also positive but did not reach statistical significance ($r = .25$, $p = .077$). We did not find any significant correlations between the theory of mind score and other measures in the social mindfulness task ($ps > .244$).

Table 1

Partial correlations between theory of mind and main measures in the social mindfulness task (controlling for age) collapsing across conditions, and in each condition.

	Correlation with theory of mind score (controlling for age)		
	Across conditions	Desirable choice condition	Undesirable choice condition
Niceness difference score	.16	.19	.13
Feeling difference score	.27**	.31*	.25
Diversity preference	.01	.02	.08

Note. * $p < .05$. ** $p < .01$.

4. General Discussion

Recent studies on social mindfulness have shown that children by age 6 and adults evaluate others depending on whether they leave a choice for others or not (Van Doesum et al., 2013; Zhao, Zhao, et al., 2021). However, these studies have only investigated cases where the items available to choose from are desirable (or at least neutral). The current study advanced this literature by investigating how the desirability of the choosing options may influence adults' and children's evaluation of the acts of leaving a choice (or no choice) for others and their inferences of the feelings of the beneficiary being left with a choice (or not).

We found that adults' and 6-year-olds' evaluation of the act of leaving a choice for others is moderated by the desirability of items. Specifically, although children by age 6 and adults evaluate the act of leaving a choice as nicer than leaving no choice both when the choosing options are desirable or undesirable, the discrepancy of the evaluation becomes significantly smaller when the choosing options are undesirable. To our knowledge, we provide the first evidence that both the value of the freedom to choose and the desirability of the choosing options matter in children's and adults' evaluation of the act of leaving a choice for others.

The inference of the beneficiary's feeling also shows a similar pattern. Six-year-olds and adults infer that the beneficiary feels better when being left with a choice than when being left with no choice both when the choosing options are desirable or undesirable, but the discrepancy significantly narrows when the choosing options are undesirable. Importantly, we also found that inference of the beneficiary's feeling mediates the interaction effect of whether a choice is left and the desirability of options on social evaluation of the protagonist, suggesting that inference of beneficiary's feeling may underlie social evaluation of the protagonist. We also found evidence that children's theory of mind

abilities relate to their inference of the beneficiary's feeling. These results provide some preliminary evidence on the psychological mechanisms underlying children's and adults' social evaluations of socially mindful actions.

Consistent with previous work (Zhao, Zhao, et al., 2021), we also found developmental changes between 4 to 6 years old. Our findings shed further light on the details of the developmental changes. Four-year-olds do *not* yet show a preference for diverse options or a favorable evaluation of the act of leaving a choice. But 4-year-olds do demonstrate some understanding of the desirability of available options – they are able to infer that the beneficiary being left with undesirable items would feel worse than the beneficiary being left with desirable items. Five-year-olds understand that people prefer diverse options, and also demonstrate some favorable evaluation towards the person leaving a choice (though less robust than 6-year-olds). By age 6, children develop an adult-like understanding, combining both understanding of the value of choice and understanding of the desirability of the options in their evaluation of socially mindful actions.

Why are the positive evaluations of leaving a choice (vs. leaving no choice) attenuated when the choices are undesirable? We speculate on several possibilities. One possibility is that the 6-year-olds and the adults may reason that, regardless of the desirability of the options, leaving a choice can ensure that the beneficiary obtains whichever they prefer (or dislikes less), thus maximizing their benefits compared to leaving no choice. However, 6-year-olds and adults may also infer that the experience of making a choice can vary based on the desirability of the options. In situations with desirable options, they may assume the beneficiary experiences pleasure from contemplating the advantages of the options, resulting in a very positive feeling. Conversely, when the options are undesirable, the beneficiary may dislike or even feel aversion towards the items, experiencing distress when considering the disadvantages of these undesirable options. This distress may reduce the positive feelings associated with making an autonomous choice. This possibility is supported by the finding that inference of the beneficiary's feelings correlates with social evaluation of the protagonist in each condition, and that inference of the beneficiary's feelings mediates the interaction effect of whether a choice is left and the desirability of available options on social evaluation of the protagonist.

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Another possible explanation, which is not mutually exclusive with the first possibility, is that children and adults may infer a stronger sacrifice by the actor when the options are desirable compared to when they are undesirable. When the items are undesirable, 6-year-olds and adults may think it is less likely that the actor would like any item, thus they may not have sacrificed anything. In line with this explanation, recent research has shown that children by around age 6 consider what the actor could have done and what costs are incurred in their actions when evaluating their actual behavior, for example recognizing someone incurring a higher cost to perform a prosocial action as particularly nice (e.g., Gautam et al., 2023; Wong et al., 2023; Zhao & Kushnir, 2023). We think that both inferences about the actor's sacrifice and inferences about the beneficiary's feelings (pleasure or distress) when facing desirable or undesirable choices may underlie the evaluation.

An alternative explanation for our findings could be that the results are simply messier when it comes to undesirable options, as people may be less likely to attribute high evaluations when the options are undesirable. However, we do not find evidence supporting this explanation. Specifically, we did not observe a main effect of desirability on the niceness measure, but only an interaction between desirability and choice left. Nevertheless, we did find a main effect of desirability on the feeling measure, with both children and adults inferring that the beneficiary felt better when faced with desirable options than when faced with undesirable options. Combining these two measures, it appears that children and adults do consider desirability (as a main effect) when inferring the beneficiary's feelings. However, when evaluating the niceness of the actors, they do not necessarily judge leaving undesirable options as "less nice" overall.

It is noteworthy that the desirability of the options one has to choose from seems to matter more in the evaluations and inferences of the act of leaving a choice than those of the act of leaving no choice. Why is that so? Our speculation is that, when evaluating a relatively positive action (leaving a choice), people would further consider *how* good it is, and would think the beneficiary is likely to feel even better when the options are appealing than when they are unappealing. However, when evaluating a relatively negative action (i.e., leaving no choice), people may not delve into the details of *how* bad it is, but simply perceive it as relatively negative. This finding is generally consistent with prior work that has shown asymmetry between judgments of moral actions and immoral actions

(Berman et al., 2015; Dunk et al., 2021; Newman & Cain, 2014). Previous work has found that factors such as intentionality seem to carry more weight in judgments of prosocial actions but less so in judgments of immoral actions (Berman et al., 2015; Newman & Cain, 2014). Here we observe a similar asymmetry, wherein the desirability of choosing options matters in judgments of actions of leaving a choice, but not in judgments of actions of leaving no choice.

The current findings add to a growing body of work showing that people do not value choice blindly, but instead consider multiple factors including the difficulty of choice, the burden of choice, the cognitive load of choice, and so on (Anderson, 2003; Beattie et al., 1994; Botti & McGill, 2006; Chernev., 2003; Greifeneder et al., 2010; Iyengar & Lepper, 2000; Schwartz, 2000, 2004; Steffel & Williams, 2018; Steffel et al., 2016). Most relevant to the current investigation, Botti & Iyengar (2004) examined adults' actual experience when facing a choice among desirable alternatives or undesirable alternatives, and found that adults *only* experience more satisfaction when choosing from desirable options, and actually experience less satisfaction (compared with having others choose for them) when choosing from undesirable options. The current study adds to this work by showing that, as third-person observers, children and adults think someone having a choice would feel better than someone having no choice, even when the choosing options are undesirable. They also evaluate someone leaving a choice for others as nicer than someone leaving no choice for others even when the choosing options are undesirable. These pieces of evidence together suggest a notable discrepancy between actual subjective feeling of choosing among undesirable options and third-person inference of the person being left with a choice among undesirable options as well as evaluation of the person leaving such a choice. That is, third-person observers' inference and evaluation can go wrong. When the choosing options are undesirable, the socially mindful act of leaving a choice may not necessarily bring about subjective satisfaction for the beneficiary. Future studies can systematically investigate how the desirability of options may influence people's first-person experience of choosing vs. third-person inference of others' choosing experience.

Our findings also align with recent research on decision delegation, which indicates that allowing others to make choices may sometimes have downsides (e.g., Blunden & Steffel, 2023). For instance, in situations like deciding what to have for dinner, when someone simply says "I don't care," their

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opting out can be viewed as irresponsible or even mean. This may be particularly true when the choices involve undesirable outcomes. Previous studies have shown that individuals who deliberately delegate choices to others often expect to benefit from transferring responsibility (Steffel et al., 2016) or to avoid the burden of making a choice (Steffel & Williams, 2018). However, such delegation of choice can be perceived as unfair and may even reduce others' willingness to help (Blunden & Steffel, 2023). This research and the current research together suggest that the opportunity to choose or decide may not always be valued and appreciated. The underlying intention behind giving others the chance to choose, whether it is to respect their freedom of choice or to shift the burden of responsibility, appears to be a crucial factor.

Children's responses to the diversity preference measures showed that both adults and children aged 5 and older believe that people prefer to choose from two diverse items rather than two identical items, regardless of whether the items are desirable or undesirable. This finding aligns with previous research showing that children tend to prefer varied options over unified options (Echelbarger & Gelman, 2017). We also found some evidence that children's preferences for diversity correlated with their more positive inferences about the beneficiary's feelings when left with a choice compared to when not left with a choice. These findings suggest that the understanding of the value of choice plays a role, at least partially, in the inferences of the act of leaving a choice for others. However, this explanation does not seem to account for the interactive effect of choice left and desirability on inferences and evaluations.

At first glance, the unexpected finding that children were slightly more inclined to prefer choosing from diverse options in the undesirable choice condition, as compared to the desirable choice condition, might seem contradictory to the less pronounced differentiation in social evaluations within the undesirable choice condition. However, we posit that this might be due to the forced-choice nature of the diverse preference measure. In the undesirable condition, when faced with a forced choice between diverse and unified options, children may lean towards desiring some diversity, particularly when the options are already disappointing. Conversely, in the desirable condition, diversity in choice may appear less needed because the options themselves are desirable. In this scenario, children may factor in additional considerations beyond the mere presence or absence of

choice diversity. For example, they might infer that someone prefers apples and, as a result, would want to choose from two apples. Taken together, our findings suggest that, while older children, as well as adults, appreciate the value of choice, as indicated by the diversity preference measure, they also consider the desirability of the available options when evaluating the act of leaving a choice for others.

We found evidence supporting a positive relationship between theory of mind abilities and the inference of the beneficiary's feelings across different conditions. This relationship was statistically significant when the choices were desirable and was also positive (though statistically insignificant) when the choices were undesirable. This provides empirical support for the notion that social cognitive skills, such as theory of mind (or perspective taking), may be important in understanding socially mindful actions (Van Doesum et al., 2013; Zhao, Zhao, et al., 2021). We believe that theory of mind may be particularly important in understanding that when the beneficiary's preference is ambiguous (e.g., she may like an apple or a pear), leaving her a choice can maximize her benefits compared to leaving no choice. It is worth noting that our study employed two false belief tasks that have been validated for Chinese preschoolers (Wellman et al., 2006) and have been used in previous research examining the relationship between Theory of Mind and social and moral cognition (e.g., Wu & Su, 2014; Zhao et al., 2022). However, we acknowledge that these two tasks primarily focus on understanding of others' beliefs, and there may be other theory of mind tasks related to references, emotion, or social perspective-taking that may better predict children's evaluations of socially mindful actions.

The current study only investigates one particular case where the choosing options are undesirable because the fruits or toys were damaged. We chose to study these scenarios because these mirrored the everyday choices normal people would encounter. However, results may change depending on the types and degree of the negativity of the options, and on how "bad" the options are perceived to be. There are certainly cases where the options are even worse and more consequentially so. An extremely aversive and consequential case would be Sophie's choice, when a mother must choose which of her two children will be killed (Styron, 1979). It is possible that when facing with such devastating and consequential decisions, the expected distress associated with making such

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choice may overturn the value of freedom to choose. Thus, future studies can adapt the current paradigm to investigate how the inference and evaluation may change in choosing situations that are worse and more consequential.

In addition to the desirability of the choosing options, various other factors can also impact how individuals evaluate the act of leaving a choice. One such factor is the asymmetry in the value of the options. To illustrate this, consider a scenario where a person must choose among two carrots and one piece of cake, assuming that a piece of cake holds more value than a carrot. In such cases, even younger children, around 4 years old, might perceive it as nicer not to deprive the other person of one piece of cake. Previous research has shown that children exhibit sensitivity to the value of items when making decisions regarding resource allocation (Chernyak & Sobel, 2016). By the age of 6, children across cultures even flexibly balance the value of resources and the principle of equity in resource allocation (Choshen-Hillel et al., 2020). It is thus an intriguing empirical question to explore how children incorporate the concept of value into their evaluations of the act of leaving a choice. Moreover, recent research has revealed that children flexibly consider others' subjective preferences when evaluating the act of leaving a choice for them (Zang et al., 2023). Future research can delve further into how children integrate their social-cognitive understandings of desirability, value, preference, aversion, and various other factors when evaluating the act of leaving a choice for others.

Though the value of choice is widely recognized by human beings, previous research has also revealed variation across socio-economic backgrounds and cultural contexts. Individuals from different socio-economic backgrounds vary in how much they perceive choice as reflecting personal preferences (Snibbe & Markus, 2005; Stephens et al., 2007). For example, compared to those from middle-class backgrounds, individuals from working-class backgrounds are more likely to choose items that are similar to, rather than different from, others (Stephens et al., 2007). Similarly, there is cultural variation in how much people construe actions as choices (Savani et al., 2010), view actions as free choices as opposed to obligations (Miller et al., 1990), and perceive personal choice as enhancing intrinsic motivation (Iyengar & Lepper, 1999; Wu et al., 2024). We encourage future research to use the current paradigm to examine people from various cultural contexts and socio-economic statuses.

In sum, the current study reveals developmental changes in how children incorporate the value of freedom of choice and desirability of options in their social evaluation. By age 6, children evaluate the act of leaving a choice for others as socially mindful even when the choosing options are not desirable, but the effect becomes smaller compared with when the choosing options are desirable. We also reveal that these evaluations rely on understanding of others' feelings, which in turn rely on theory of mind abilities. This work demonstrates an increasingly sophisticated understanding of choice and social evaluation with age.

Open Science Practice

The study materials and data that support the findings of this study are available in the Open Science Framework at https://osf.io/p6ef9/?view_only=9c790a4bed604ec39dcbf61f6e10e2fa.

Acknowledgements

Research was funded by National Natural Science Foundation of China (32100865) and Chenguang Program of Shanghai Education Development Foundation and Shanghai Municipal Education Commission (22CGA28) awarded to X. Z. The authors would like to thank Hanlin Chen, Xinyi Chang, and other research assistants at the Culture and Child Development Lab for assistance with data collection and coding.

References

- Aknin, L. B., Hamlin, J. K., & Dunn, E. W. (2012). Giving leads to happiness in young children. *PLoS One*, 7(6), e39211.
- Anderson, C. J. (2003). The psychology of doing nothing: Forms of decision avoidance result from reason and emotion. *Psychological Bulletin*, 129(1), 139-167.
- Bass, I., Bonawitz, E., Hawthorne-Madell, D., Vong, W. K., Goodman, N. D., & Gweon, H. (2022). The effects of information utility and teachers' knowledge on evaluations of under-

- informative pedagogy across development. *Cognition*, 222, 104999.
- Beattie, J., Baron, J., Hershey, J. C., & Spranca, M. D. (1994). Psychological determinants of decision attitude. *Journal of Behavioral Decision Making*, 7(2), 129-144.
- Berman, J. Z., Levine, E. E., Barasch, A., & Small, D. A. (2015). The Braggart's dilemma: On the social rewards and penalties of advertising prosocial behavior. *Journal of Marketing Research*, 52(1), 90-104.
- Blunden, H., & Steffel, M. (2023). The downside of decision delegation: When transferring decision responsibility incurs interpersonal costs. *Organizational Behavior and Human Decision Process*, 176, 104251.
- Botti, S., & Iyengar, S. S. (2006). The dark side of choice: When choice impairs social welfare. *Journal of Public Policy & Marketing*, 25(1), 24-38.
- Botti, S., & Iyengar, S. S. (2004). The psychological pleasure and pain of choosing: When people prefer choosing at the cost of subsequent outcome satisfaction. *Journal of Personality and Social Psychology*, 87(3), 312-326.
- Botti, S., & McGill, A. L. (2006). When choosing is not deciding: The effect of perceived responsibility on satisfaction. *Journal of Consumer Research*, 33(2), 211-219.
- Bown, N. J., Read, D., & Summers, B. (2003). The lure of choice. *Journal of Behavioral Decision Making*, 16(4), 297-308.
- Bridgers, S., Jara-Ettinger, J., & Gweon, H. (2020). Young children consider the expected utility of others' learning to decide what to teach. *Nature Human Behaviour*, 4(2), 144-152.
- Burger, J. M. (1989). Negative reactions to increases in perceived personal control. *Journal of Personality and Social Psychology*, 56(2), 246-256.
- Chernev, A. (2003). When more is less and less is more: The role of ideal point availability and assortment in consumer choice. *Journal of Consumer Research*, 30(2), 170-183.
- Chernyak, N., & Kushnir, T. (2013). Giving preschoolers choice increases sharing behavior. *Psychological Science*, 24(10), 1971-1979.
- Chernyak, N., Kang, C., & Kushnir, T. (2019). The cultural roots of free will beliefs: How Singaporean and US children judge and explain possibilities for action in interpersonal

- contexts. *Developmental Psychology*, 55(4), 866-876.
- Chernyak, N., & Sobel, D. M. (2016). Equal but not always fair: Value-laden sharing in preschool-aged children. *Social Development*, 25(2), 340-351.
- Choshen-Hillel, S., Lin, Z., & Shaw, A. (2020). Children weigh equity and efficiency in making allocation decisions: Evidence from the US, Israel, and China. *Journal of Economic Behavior & Organization*, 179, 702-714.
- Choshen-Hillel, S., Shaw, A., & Caruso, E. M. (2018). Disadvantaged but not dissatisfied: How agency ameliorates negative reactions to unequal pay. *Journal of Experimental Psychology: Applied*, 24(4), 578-599.
- Choshen-Hillel, S., & Yaniv, I. (2011). Agency and the construction of social preference: Between inequality aversion and prosocial behavior. *Journal of Personality and Social Psychology*, 101(6), 1253-1261.
- Cooper, J., & Fazio, R. H. (1984). A new look at dissonance theory. *Advances in Experimental Social Psychology*, 17, 229-266.
- Cordova, D. I., & Lepper, M. R. (1996). Intrinsic motivation and the process of learning: Beneficial effects of contextualization, personalization, and choice. *Journal of Educational Psychology*, 88, 715-730.
- Davis, I., Carlson, R., Dunham, Y., & Jara-Ettinger, J. (2023). Identifying social partners through indirect prosociality: A computational account. *Cognition*, 240, 105580.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum Press.
- Douneva, M., Jaffé, M. E., & Greifeneder, R. (2019). Toss and turn or toss and stop? A coin flip reduces the need for information in decision-making. *Journal of Experimental Social Psychology*, 83, 132-141.
- Dunk, R. J., Goulding, B. W., Fugelsang, J. A., & Friedman, O. (2021). Butt-dialing the devil: Evil agents are expected to disregard intentions behind requests. *Journal of Experimental Social Psychology*, 96, 104188.
- Echelbarger, M., & Gelman, S. A. (2017). The value of variety and scarcity across development.

- Journal of Experimental Child Psychology*, 156, 43-61.
- Festinger, L. (1957). *A theory of cognitive dissonance*. Evanston, IL: Row, Peterson and Company.
- Gautam, S., Owen Hall, R., Suddendorf, T., & Redshaw, J. (2023). Counterfactual choices and moral judgments in children. *Child Development*, 94(5), 13943.
- Gordon-Hecker, T., Shaw, A., & Choshen-Hillel, S. (2022). One for me, two for you: Agency increases children's satisfaction with disadvantageous inequity. *Journal of Experimental Social Psychology*, 100, 104286.
- Greifeneder, R., Scheibehenne, B., & Kleber, N. (2010). Less may be more when choosing is difficult: Choice complexity and too much choice. *Acta psychologica*, 133(1), 45-50.
- Iyengar, S. S., & Lepper, M. R. (1999). Rethinking the value of choice: A cultural perspective on intrinsic motivation. *Journal of personality and social psychology*, 76(3), 349.
- Iyengar, S. S., & Lepper, M. R. (2000). When choice is demotivating: Can one desire too much of a good thing? *Journal of Personality and Social Psychology*, 79(6), 995–1006.
- Jara-Ettinger, J., Gweon, H., Schulz, L. E., & Tenenbaum, J. B. (2016). The naïve utility calculus: Computational principles underlying commonsense psychology. *Trends in Cognitive Sciences*, 20(8), 589-604.
- Jara-Ettinger, J., Floyd, S., Tenenbaum, J. B., & Schulz, L. E. (2017). Children understand that agents maximize expected utilities. *Journal of Experimental Psychology: General*, 146(11), 1574.
- Kraft-Todd, G. T., & Rand, D. G. (2019). Rare and costly prosocial behaviors are perceived as heroic. *Frontiers in Psychology*, 10, 234.
- Kushnir, T., Gopnik, A., Chernyak, N., Seiver, E., & Wellman, H. M. (2015). Developing intuitions about free will between ages four and six. *Cognition*, 138, 79-101.
- Langer, E. J. (1975). The illusion of control. *Journal of Personality and Social Psychology*, 32(2), 311-328.
- Leotti, L. A., Iyengar, S. S., & Ochsner, K. N. (2010). Born to choose: The origins and value of the need for control. *Trends in Cognitive Sciences*, 14(10), 457-463.
- Liu, S., Ullman, T. D., Tenenbaum, J. B., & Spelke, E. S. (2017). Ten-month-old infants infer the value of goals from the costs of actions. *Science*, 358(6366), 1038-1041.

- Miller, J. G., Bersoff, D. M., & Harwood, R. L. (1990). Perceptions of social responsibilities in India and in the United States: Moral imperatives or personal decisions?. *Journal of Personality and Social Psychology*, 58(1), 33.
- Newman, G. E., & Cain, D. M. (2014). Tainted altruism: When doing some good is evaluated as worse than doing no good at all. *Psychological Science*, 25(3), 648-655.
- Peters, E., Klein, W., Kaufman, A., Meilleur, L., & Dixon, A. (2013). More is not always better: Intuitions about effective public policy can lead to unintended consequences. *Social Issues and Policy Review*, 7(1), 114-148.
- Powell, L. J. (2022). Adopted utility calculus: Origins of a concept of social affiliation. *Perspectives on Psychological Science*, 174569162110484.
- Rapp, D. J., Engelmann, J. M., Herrmann, E., & Tomasello, M. (2017). The impact of choice on young children's prosocial motivation. *Journal of Experimental Child Psychology*, 158, 112-121.
- Ryan, R. M., & Deci, E. L. (2006). Self-regulation and the problem of human autonomy: Does psychology need choice, self-determination, and will? *Journal of Personality*, 74(6), 1557-1586.
- Savani, K., Markus, H. R., Naidu, N. V. R., Kumar, S., & Berlia, N. (2010). What counts as a choice? US Americans are more likely than Indians to construe actions as choices. *Psychological Science*, 21(3), 391-398.
- Schwartz, B. (2000). Self-determination: The tyranny of freedom. *American Psychologist*, 55, 79-88.
- Schwartz, B. (2004). The tyranny of choice. *Scientific American*, 290(4), 70-75.
- Sierksma, J., Klootwijk, C. L. T., & Lee, N. C. (2022). Prosocial choices: How do young children evaluate considerate and inconsiderate behavior? *Developmental Psychology*, 58(11), 2013-2021.
- Skerry, A. E., & Spelke, E. S. (2014). Preverbal infants identify emotional reactions that are incongruent with goal outcomes. *Cognition*, 130(2), 204-216.
- Snibbe, A. C., & Markus, H. R. (2005). You can't always get what you want: Educational attainment, agency, and choice. *Journal of Personality and Social Psychology*, 88(4), 703.

- Steffel, M., & Williams, E. F. (2018). Delegating decisions: Recruiting others to make choices we might regret. *Journal of Consumer Research*, 44(5), 1015-1032.
- Steffel, M., Williams, E. F., & Permann-Graham, J. (2016). Passing the buck: Delegating choices to others to avoid responsibility and blame. *Organizational Behavior and Human Decision Processes*, 135, 32-44.
- Stephens, N. M., Markus, H. R., & Townsend, S. S. (2007). Choice as an act of meaning: The case of social class. *Journal of Personality and Social Psychology*, 93(5), 814.
- Suzuki, S. (1997). Effects of number of alternatives on choice in humans. *Behavioural Processes*, 39(2), 205-214.
- Styron, W. (1979) *Sophie's choice*. New York: Random House.
- Van Doesum, N. J., Van Lange, D. A. W., & Van Lange, P. A. M. (2013). Social Mindfulness: Skill and will to navigate the social world. *Journal of Personality and Social Psychology*, 105(1), 86-105.
- Van Lange, P. A., & Van Doesum, N. J. (2015). Social mindfulness and social hostility. *Current Opinion in Behavioral Sciences*, 3, 18-24.
- Wellman, H. M. (2014). *Making minds: How theory of mind develops*. Oxford University Press.
- Wellman, H. M., Fang, F., Liu, D., Zhu, L., & Liu, G. (2006). Scaling of theory-of-mind understandings in Chinese children. *Psychological Science*, 17(12), 1075-1081.
- Wente, A. O., Bridgers, S., Zhao, X., Seiver, E., Zhu, L., & Gopnik, A. (2016). How universal are free will beliefs? Cultural differences in Chinese and US 4-and 6-year-olds. *Child Development*, 87(3), 666-676.
- Wong, A., Cordes, S., Harris, P. L., & Chernyak, N. (2023). Being nice by choice: The effect of counterfactual reasoning on children's social evaluations. *Developmental Science*, e13394.
- Wu, Z., & Su, Y. (2014). How do preschoolers' sharing behaviors relate to their theory of mind understanding?. *Journal of Experimental Child Psychology*, 120, 73-86.
- Wu, W., Zhang, Q., & Zhao, X. (2023). Who makes the choice? The influence of choice on preschoolers' sharing behaviors and feelings. *Acta Psychologica Sinica*, 55(11), 1815.
- Zang, L., Li, D., & Zhao, X. (2023). Preference matters: Knowledge of beneficiary's preference

- influences children's evaluations of the act of leaving a choice for others. *Journal of Experimental Child Psychology*, 228, 105605.
- Zhao, X., & Kushnir, T. (2023). When it's not easy to do the right thing: Developmental changes in understanding cost drive evaluations of moral praiseworthiness. *Developmental Science*, 26(1), e13257.
- Zhao, X., Li, D., & Yang, X. (2022). The relationship between preschoolers' understanding of considerate socially-mindful actions and theory of mind. *Acta Psychologica Sinica*, 54(8), 892.
- Zhao, X., Wente, A., Flecha, M. F., Galvan, D. S., Gopnik, A., & Kushnir, T. (2021). Culture moderates the relationship between self-control ability and free will beliefs in childhood. *Cognition*, 210, 104609.
- Zhao, X., Zhao, X., Gweon, H., & Kushnir, T. (2021). Leaving a choice for others: Children's evaluations of considerate, socially-mindful actions. *Child Development*, 92(4), 1238-1253.
- Zuckerman, M., Porac, J., Latin, D., Smith, R., & Deci, E. L. (1978). On the importance of self-determination for intrinsically motivated behavior. *Personality and Social Psychology Bulletin*, 4, 443–446.