



When it's not easy to do the right thing: Developmental changes in understanding cost drive evaluations of moral praiseworthiness

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Abstract

Recent work identified a shift in judgments of moral praiseworthiness that occurs late in development: adults recognize the virtue of moral actions that involve resolving an inner conflict between moral desires and selfish desires. Children, in contrast, praise agents who do the right thing in the absence of inner conflict. This finding stands in contrast with other work showing that children incorporate notions of cost and effort into their social reasoning. Using a modified version of Starmans and Bloom's (2016) vignettes, we show that understanding the virtue of *costly moral action* precedes understanding the virtue of resolving inner conflict. In two studies ($N = 192$ children, range = 4.00–9.95 years; and $N = 193$ adults), we contrasted a character who paid a personal cost (psychological in Study 1, physical in Study 2) to perform a moral action with another who acted morally without paying a cost. We found a developmental progression; 8- and 9-year-old children and adults recognized the praiseworthiness of moral actions that are psychologically or physically costly. Six- and 7-year-old children only recognized the praiseworthiness of moral actions that are *physically* costly, but not actions that are *psychologically* costly. Moreover, neither adults nor children inferred that paying a cost to act morally required having a moral desire or resolving inner conflict. These results suggest that both adults and children conceptualize obligation as a direct motivational force on actions. They further suggest that costly choice—a hallmark of moral agency—is implicated in judgments of praiseworthiness early in development.

KEYWORDS

cognitive development, costly choice, decision making, moral development, social cognition

1 | INTRODUCTION

We as adults expect people to do the right thing, even when it is difficult. But does the difficulty of doing the right thing influence an action's (or actor's) praiseworthiness? By way of example, imagine you've been waiting a year for the new season of your favorite streaming series, and have planned to watch it the day it comes out. Just as you sit down to

watch, your best friend calls—her car broke down an hour away from your place and she is stuck without a ride. Your choice to help your friend comes with a cost—giving up your anticipated time with your new show, driving an hour out of your way. You want to help, but you are tempted to stay home, relaxing with your favorite show. Does your ultimate decision to help at a personal cost make your action more morally praiseworthy than, for instance, rescuing her when she is a



five-minute drive away on a day when you had nothing else to do? And, if you happen to also feel conflicted about going, does resolving to help despite your conflicted feelings speak to your moral character?

In a recent study, Starmans and Bloom (2016) identified a surprisingly late developmental change in judgments of moral praiseworthiness regarding such cases: adults in their samples praised moral actors who resolve inner conflict to do the right thing. In contrast, they found that children from age 3 to age 8 were more likely to praise moral actors who are *not* tempted by conflicting personal desires. Starmans and Bloom (2016) propose an explanation for this developmental change: that children have something like a “character-based” view of morality in which people are judged as more virtuous if their inner desires align with their actions. Adults, on the other hand, recognize the value of willpower and self-control in behaving morally, and praise accordingly.

These results present a puzzle for emerging views on the development of moral cognition, and stand in contrast with a growing body of evidence that children engage in adult-like moral evaluations at young age (Baird & Astington, 2004; Cushman et al., 2013; Hamlin et al., 2007; Killen et al., 2011; Rhodes & Wellman, 2017; Schmidt & Sommerville, 2011). Studies show that even preschoolers and toddlers evaluate moral actions—their own and other people’s—in light of the *cost* or *effort* required to perform those actions (Chernyak & Kushnir, 2013; Jara-Ettinger et al., 2015). For example, Jara-Ettinger et al. (2015) finds that toddlers exonerate agents who refuse to help others when helping is costly. Moreover, preschool children internalize the moral value of costly choice in their own prosocial decisions, even considering the relative proportionality of cost to themselves as a sign of their moral agency (Chernyak & Kushnir, 2013; Chernyak et al., 2017). Finally, children recognize the possibility of exercising “willpower” from at least age 6, and this understanding relates to their own success and failure with self-control (Zhao, Wenthe, et al., 2021). Given these findings, it seems puzzling that adults, but not children, place moral value on being able to resolve inner conflict to do the right thing.

Here we aim to resolve this puzzle. We contrast two different conceptual models relating personal desires, moral obligations and actions that people may employ to evaluate moral decisions—the *model of inner conflict*, and the *model of costly action*. Across two studies, we show that, when explicit reference to conflicting desires is removed from vignettes involving difficult moral decisions, both children and adults spontaneously invoke a model of costly action, rather than a model of inner conflict, to evaluate actions. Importantly, we show that children make adult-like judgments of moral praiseworthiness using the model of costly action. Finally, we show that children’s understanding of different types of cost-psychological versus physical-predicts their moral judgments of agents who act morally at a cost to themselves. We then discuss the implications of our findings for understanding moral cognition.

1.1 | The two models

The difference between the *model of inner conflict* and the *model of costly action* is illustrated in Figure 1 using an example story from Starmans

Research Highlights

- Eight- and 9-year-olds and adults recognize the praiseworthiness of moral actions that are psychologically or physically costly.
- Six- and 7-year-olds can only recognize the praiseworthiness of moral actions that are *physically* costly, but not moral actions that are *psychologically* costly.
- Both children and adults conceptualize obligation as a direct motivational force on actions, without inferring a moral desire or inner conflict.
- The “model of costly action” is simpler and more intuitive, and guides moral judgments earlier in development than the “model of inner conflict.”

and Bloom (2016). In their study, each pair of stories featured two characters, both of whom are faced with a moral decision—whether or not to help her brother. One of the characters must overcome a personal desire (wants to play outside) to act prosocially (also wants to help, see full story of this character in Figure 1), while the other (not shown) does not have a conflicting desire. In the original vignettes, the conflict one character has between two desires—the desire to help and the desire to play outside—is explicitly mentioned. The ultimate outcome for both characters is the same—they both help.

Both a *model of inner conflict* and a *model of costly action* are possible frameworks that can be used to make judgments about moral actions that involve overcoming temptation. The key distinction between the two models is a *direct* versus *indirect* causal influence of moral obligations on actions. Under the *model of inner conflict* obligations cause a desire to act morally, and action follows from that moral desire. Under this model an agent who has a personal desire that conflicts with the obligation must resolve an inner conflict between two desires: the personal desire (e.g., wanting to play outside) and the moral desire (e.g., wanting to help). Under the *model of costly action*, obligations act as a direct cause of moral action, so an agent who has a different personal desire would forgo it to act on the obligation, paying a personal cost.

From an adult perspective (in particular adults in WEIRD societies which place a premium on psychological motivations for action, Henrich, 2020), these models do not seem that different. When a person acts morally, they probably wanted to do it. Furthermore, when a person overcomes inner conflict to act morally, they are also giving up something else they want, thus paying a cost. We suggest that this looks different from a child’s perspective: explicitly mentioning moral desires and inner conflict goes against how young children conceptualize obligations, actions, and cost. Moreover, we suggest that even adults use the simpler model when inner conflict is not mentioned.

1.2 | Obligation as a direct causal force on actions

Several lines of work suggest that children view obligations act as a direct causal force on action, separate from desires. Children as young

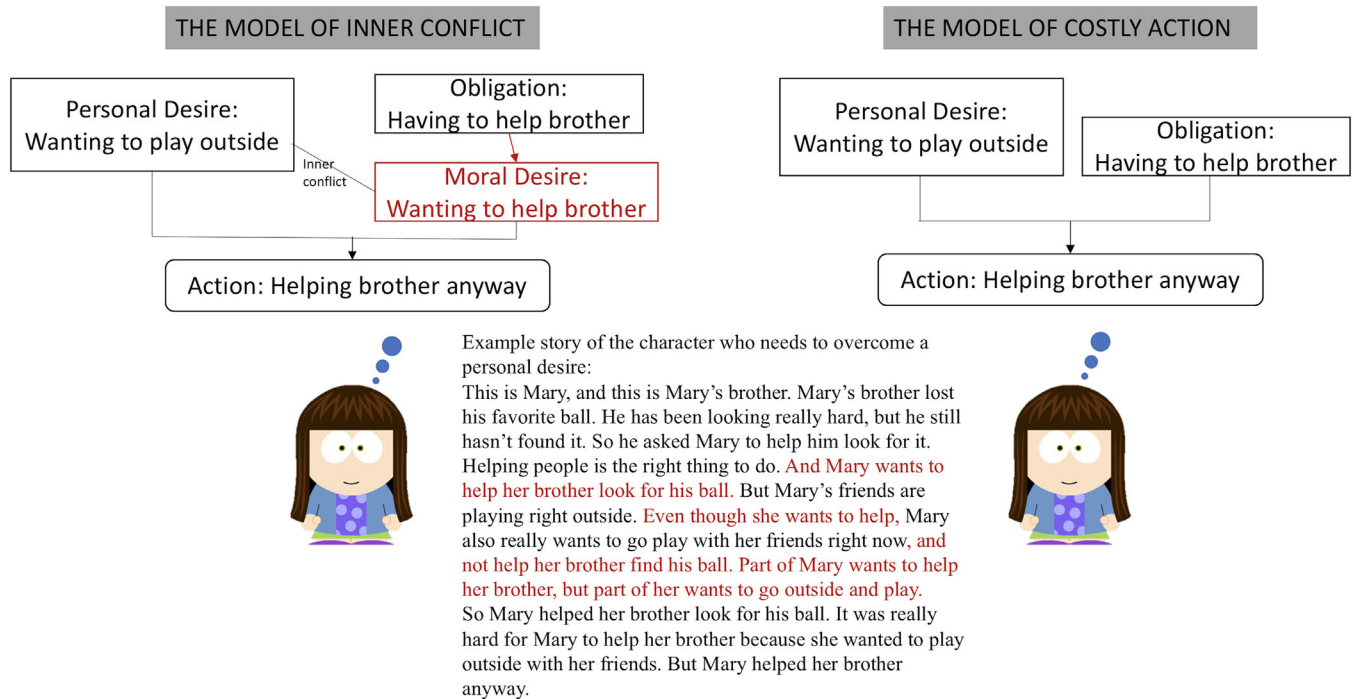


FIGURE 1 The model of inner conflict and the model of costly action with example item, taken from Starmans and Bloom (2016). In our studies, explicit references to the character's moral desire (shown in red) are omitted from the vignettes. In the example, a character acts morally forgoing a self-interested personal desire. Arrows indicate decision pathways. In *the model of inner conflict* (left), moral action is motivated by moral desire, so the moral decision requires resolving conflicts between a personal desire and a moral desire; in *the model of costly action* (right), moral action is directly motivated by obligation, so the moral decision simply requires giving up a personal desire

as three enforce norms on others, even when those norms are somewhat arbitrary and novel (Rakoczy et al., 2008; Schmidt & Tomasello, 2012). By preschool age, children explicitly state that norm violations are not okay (e.g., Dahl et al., 2020; Smetana, 1981), and explain human behaviors based on norms more than based on personal preferences (Kalish & Shiverick, 2004). Four-year-old children across cultures view obligations to others as constraints on actions that supersede personal desires, stating that one must follow social or moral norms, and cannot do otherwise even if one really wants to (Chernyak et al., 2013, 2019). These findings among others have led theorists to suggest that even ordinary prosocial actions such as helping a person in distress take on the normative force of obligations for young children (see Rhodes & Wellman, 2017; Tomasello, 2020).

1.3 | Developing understanding of inner conflict

The literature on children's developing theory of mind suggests that scenarios about inner conflict may be particularly hard for younger children to understand. For example, preschool children tend to think that one cannot have two conflicting desires simultaneously (Bennett & Galpert, 1993; Lagattuta, 2005; Rostad & Pexman, 2014) and one cannot act against a strong desire (Kushnir et al., 2015; Wentz et al., 2016; Zhao, Zhao, et al., 2021). Choe et al. (2005) found that children under age 7 do not understand how having conflicting desires (e.g., want to eat the cookie and also do not want to eat the cookie) at the same time

can influence actions. Similarly, children under age 7 have difficulties understanding that one can have mixed emotions (e.g., Harter, 1983; Harris, 1989; Harter & Buddin, 1987; Pons et al., 2004).

1.4 | Developing understanding of cost

In contrast to inner conflict, considerations of cost play a role in children's evaluations of goal-directed, intentional actions from a young age. Infants consider physical obstacles such as distance or barriers when evaluating agents' personal and social goals (Brandone & Wellman, 2009; Gergely & Csibra, 2003; Hamlin et al., 2007; Liu et al., 2017; Liu & Spelke, 2017). Toddlers and preschoolers consider cost in evaluating the social character of individuals: for example, they infer incompetence if physical effort is necessary to accomplish an action (Bridgers et al., 2020; Jara-Ettinger et al., 2015).

As mentioned above, there is also evidence that cost plays a role in children's moral evaluations. For example, toddlers evaluate agents who refuse to help others as "nicer" if the refusal has an excuse—which suggests cost matters in at least a refusal to blame if not a reason to praise (Behne et al., 2005; Jara-Ettinger et al., 2015). Preschool children internalize the moral value of costly choice in their own prosocial decisions, which provides suggestive, but not direct evidence that cost matters to praiseworthiness (Chernyak & Kushnir, 2013).

Taken together, these studies predict that children should praise moral actions based on the costs incurred to accomplish those actions.



To date, however, studies have focused on tangible costs—physical obstacles such as distance or barriers (Brandone & Wellman, 2009; Gergely & Csibra, 2003; Liu et al., 2017), valuable resources such as toys or stickers (Chernyak & Kushnir, 2013; 2018), physical competence (Jara-Ettinger et al., 2015), and physical effort (Bridgers et al., 2020). These studies leave open the question of whether children can consider more intangible, psychological costs—such as forgoing a personal desire to act morally—in their social evaluations. This also leaves open the possibility there are developmental changes in how children use cost to inform their moral judgments. Children incorporate physical costs into their understanding of goal-directed actions as early as infancy and toddlerhood (Jara-Ettinger et al., 2015; Liu et al., 2017). In contrast, conceptualizing the psychological consequences of forgoing desires, reasoning about the mental effort of self-control, and making sense of desires that conflict with obligations or norms are all relatively late-emerging understandings (e.g., Kushnir et al., 2015; Lagattuta, 2005; Lagattuta et al., 2010; Yang & Frye, 2018; Zhao, Wenthe, et al., 2021). Thus, children may incorporate physical cost into moral evaluations first, and psychological cost only later.

1.5 | The current study

We examine whether 4- through 9-year-old children and adults use a *model of costly action* to make judgments of moral praiseworthiness. In study 1, we adapted the items in Starmans and Bloom (2016) by removing explicit references to the characters' moral desires and inner conflict, while maintaining all other aspects of the story (see Figure 1 for an example). Thus, participants see two characters who make the same moral decision with the same positive moral outcome, but we leave open the possibility that participants (children and adults) might view *obligations* to help rather than moral desires as the motive. Like Starmans and Bloom (2016), we ask participants to make comparative social evaluations of the two characters. In addition, we ask participants to rate the moral desires of the two characters. In study 1, we examine children's and adults' social evaluations when one character pays a psychological cost to act on obligations (as in Starmans & Bloom, 2016). In study 2, we extend this to cases in which a character pays a physical cost to act on obligations. From the literature reviewed above, we suggest that both children and adults find the *model of costly action* more intuitive, and propose three hypotheses and related predictions.

First, while adults praise both costly moral actions and resolutions of inner conflict, children only praise the former and not the latter. We test this hypothesis by removing explicitly stated moral desires in the Starmans and Bloom's (2016) vignettes and comparing our developmental results to theirs. We predict that when inner conflict is not mentioned explicitly, children show adult-like moral evaluations earlier in development.

Second, we suggest the model of costly choice is more intuitive, even for adults. Thus, when explicit mention of a moral desire is removed from the story, this model predicts that adults will not spontaneously infer that the character who acts on obligation at a cost to themselves necessarily has the desire to act morally. Moreover, under this model,

moral desire rating of the character who pays a cost should be unrelated to judgments of praise. Alternatively, if adults always frame costly actions in terms of inner conflict, then we should find that they infer high moral desires whenever a character pays a cost to act morally, and high moral desire rating of the character who pays a cost should correlate with high praise. We test these predictions by asking both children and adults to rate the moral desires of both story characters, and look at their ratings in relation to their judgments of praise.

Third, we hypothesize that developmental changes in moral evaluations are linked to changes in understanding cost. Since physical cost is easier for children to conceptualize than psychological cost, they should incorporate it into evaluative judgments at earlier ages. We test this prediction in Study 2 by comparing vignettes in which a character pays a psychological cost to act morally with those in which a character pays a physical cost to act morally.

2 | STUDY 1

2.1 | Method

2.1.1 | Participants

One-hundred and twelve 4- to 9-year-olds (4.02–9.95, $M = 6.86$, $SD = 1.67$, 52 boys) from a university town in the Northeastern U.S. were recruited for this study. Roughly mirroring the procedure in Starmans and Bloom (2016), we divided the children into three age groups: 4- to 5-year-olds, 6- to 7-year-olds, 8- to 9-year-olds. Specifically, 39 4- to 5-year-olds (4.02–5.85, $M = 4.99$, $SD = 0.52$, 21 boys), 37 6- to 7-year-olds (6.00–7.98, $M = 6.94$, $SD = 0.64$, 17 boys) and 36 8- to 9-year-olds (8.00–9.95, $M = 8.80$, $SD = 0.60$, 14 boys) were included in the analyses. In addition, 92 adults participated in this study on Amazon Mechanical Turk and were included in the analyses.

2.1.2 | Materials and procedure

Each child was read four pairs of stories and shown accompanying pictures adapted from Starmans and Bloom (2016) (see Figure 2 for an example). Each pair of stories described two characters who both fulfilled an obligation (e.g., helping her brother). One (the *high-cost* character) was described as having an alternative personal desire (something else she really wanted to do), thus paid a cost in order to fulfill the obligation. The other (the *low-cost* character) was described as having no personal desire, thus performed the action without paying a cost. Two of the four story items (one Helping Story about helping siblings, one Honesty Story about telling truth to mom) were adapted from Starmans and Bloom (2016, Study 2) and concerned prosocial actions. Our adaptations removed the reference to a moral desire (e.g., "Mary wants to help her brother look for the ball"), and thus also the reference to conflicting desires (e.g., "part of Mary wants to help her brother, but part of her wants to go outside and play") but were otherwise replications of the originals (See Figure 2 for details on

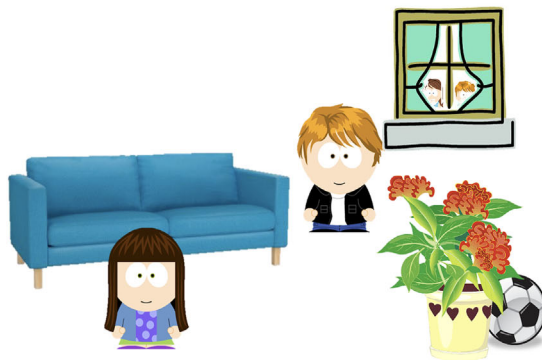


FIGURE 2 Example of the images and scripts presented in Study 1

the items). The other two pairs of stories had the same structure as above and were about social norms: following household rules (the “Dishes Story” about cleaning up dishes¹, the “Toy Story” about playing with a specific toy). The procedures and analyses plan of the current studies were pre-registered on As Predicted. All the materials and data can be accessed at https://osf.io/2jft5/?view_only=0a7322f59e814575bf6a4afdf2d92616.

All the characters were the same gender as the participants. The order of presenting the four story items was counterbalanced across participants. The order of presenting the high-cost and low-cost characters was randomized across story items for each participant. After hearing each pair of stories, the child was asked two memory check questions: “Who found it easy to do something good?” and “Who found it hard to do something good?” Children answered both memory check questions correctly for 90% of the trials. We only included these trials where both memory check questions were answered correctly. Including those trials where the check questions were answered incorrectly did not change the pattern or significance of results reported here.

Following each story, we asked children two *social evaluation* questions. The first question (i.e., Prize question) was used to assess virtue judgments in Starmans and Bloom (2016, Study 1): “Which of the two characters would you give a prize to?” This was followed by a second question (i.e., Nicer question) that has been used in prior work to assess positive social evaluations (Jara-Ettinger et al., 2015; Zhao, Zhao, et al., 2021), “which one do you think is nicer?” For each question, children were also asked “why” to explain their responses.

We followed this by asking children a *moral desire rating* question for each character (high-cost, low-cost) in each pair of stories: “How much do you think she wants to do the right thing?” For each question, children were asked to use a three-point rating scale (“really wants to,” “sort of wants to,” “doesn’t want to at all”) to infer the degree of moral desire.

High-cost Character (Psychological Cost):

This is Ana, and this is Ana’s brother. Ana’s brother lost his favorite ball. He has been looking for it really hard, but he still hasn’t found it. So he asked Ana to help him look for it. Helping people is the right thing to do. Ana’s friends are playing right outside. Ana likes playing outside. She wants to go play outside right now. But Ana helped her brother look for his ball. It was really hard for Ana to help her brother because she wanted to play outside. But Ana helped her brother anyway.

Low-cost Character (Psychological Cost):

This is Tiffany, and this is Tiffany’s brother. Tiffany’s brother lost his favorite ball. He has been looking really hard, but he still hasn’t found it. So he asked Tiffany to help him look for it. Helping people is the right thing to do. Tiffany’s friends are playing right outside. But Tiffany doesn’t like playing outside. She doesn’t want to go play outside right now. So Tiffany helped her brother look for his ball. It was really easy for Tiffany to help her brother because she didn’t want to play outside. So Tiffany helped her brother.

The adults received identical stimuli and questions, but read through these materials themselves online, and gender of the characters were counterbalanced across stories for adult participants.

2.1.3 | Coding

Children’s explanations were coded so as to separate references to cost (e.g., *she wanted to play outside but still helped*) and references to inner conflict (e.g., *she wanted to play outside and also wanted to help*) from all other types. See details of full coding categories in [Supplementary Materials](#). The first author coded all the explanations. Another research assistant blind to the study design coded all the explanations. The inter-coder reliabilities between the primary and secondary coders were 93.9%. Discrepancies were resolved through discussion between the coders.

2.2 | Results

2.2.1 | Social evaluation

We hypothesized that children would evaluate the high-cost character positively, in contrast to how they evaluate the conflicted character in Starmans and Bloom (2016). Following our pre-registration, we first investigated how our results compare to Starmans and Bloom (2016) for the replicated items on the same DV, the Prize question. We conducted a binary logistic GEE on participants’ responses to Prize question (the high-cost character = 1, the low-cost character = 0) for the two stories we adapted from Starmans and Bloom (2016) (i.e., Helping and Honesty), with age group (4- to 5-year-olds, 6- to 7-year-olds, 8- to 9-year-olds, adults) as a between-subjects factor, and story item

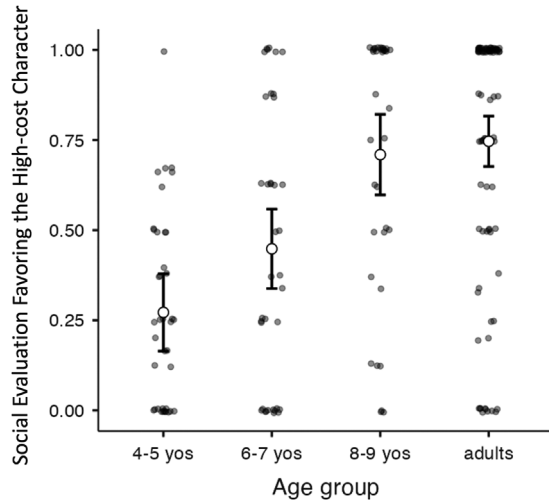


FIGURE 3 Children's and adults' mean social evaluations in favor of the character who paid a personal cost to help in Study 1. Error bars represent 95% confidence intervals

(Helping, Honesty) as a within-subject factor.² We found a significant main effect of age group (Wald $\chi^2(3, N = 204) = 51.85, p < 0.001$) and no effect of story item (Wald $\chi^2(1, N = 204) = 0.50, p = 0.48$). In contrast to Starmans and Bloom (2016), 8- to 9-year-olds in our study were not significantly different from the adults (Wald $\chi^2(1, N = 128) = 3.35, p = 0.067$). We also saw a linear increase in the adult-like response with age: 8- to 9-year-olds were significantly more likely to favor the high-cost character than the 6- to 7-year-olds (Wald $\chi^2(1, N = 73) = 6.19, p = 0.013$), and the 6- to 7-year-olds were also significantly more likely to favor the high-cost character than the 4- to 5-year-olds (Wald $\chi^2(1, N = 76) = 3.96, p = 0.047$). Adults were more likely to favor the character who paid a cost to help than either 6- to 7-year-olds (Wald $\chi^2(1, N = 129) = 24.07, p < 0.001$) or the 4- to 5-year-olds (Wald $\chi^2(1, N = 131) = 43.37, p < 0.001$).

Our next preregistered analysis included all four stories and included both evaluation questions. See Figure 3 for participants' preference for the high-cost character in social evaluation questions. Using McNemar's tests, we verified consistency in evaluative responses using the Prize question and the Nicer question for all stories (p 's > 0.296). We thus sum each participants' response to Prize question and Nicer question and form a social evaluation score for each story item (0–2). We then ran an ordinal GEE on this social evaluation score (0–2), with story item (Helping, Honesty, Dishes, Toys) as a within-subject factor and age group (4- to 5-year-olds, 6- to 7-year-olds, 8- to 9-year-olds, adults) as a between-subject factor³. The final model revealed a significant main effect of age group (Wald $\chi^2(3, N = 204) = 81.31, p < 0.001$). Again, children's responses showed a linear increase: The 8- to 9-year-olds were not significantly different from the adults, Wald $\chi^2(1, N = 128) = 0.21, p = 0.650$, but were more likely to favor the high-cost character than the 6- to 7-year-olds (Wald $\chi^2(1, N = 73) = 9.31, p = 0.002$), and the 6- to 7-year-olds were also more likely to favor the high-cost character than the 4- to 5-year-olds (Wald $\chi^2(1, N = 76) = 5.93, p = 0.015$). Adults were more likely

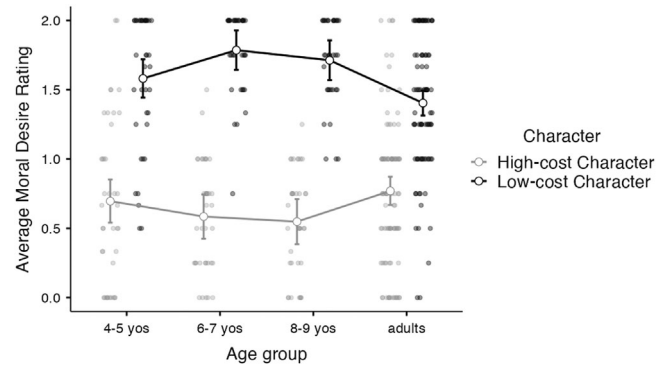


FIGURE 4 Mean moral desire ratings split by character and age group in Study 1. Error bars represent 95% confidence intervals

to favor the high-cost character than either 6- to 7-year-olds (Wald $\chi^2(1, N = 129) = 19.95, p < 0.001$) or the 4- to 5-year-olds (Wald $\chi^2(1, N = 131) = 69.72, p < 0.001$). Thus, the age-related changes in children's social evaluations of all four stories combined parallel the age differences in the two moral stories alone.

This same analysis revealed a main effect of story item (Wald $\chi^2(3, N = 204) = 8.81, p = 0.032$). Participants of all ages had a slightly greater tendency to favor the high-cost character in the Helping story and the Honesty story than the Dishes story (Helping vs. Dishes: Wald $\chi^2(1, N = 204) = 5.00, p = 0.025$; Honesty vs. Dishes: Wald $\chi^2(1, N = 204) = 6.05, p = 0.014$).

To further explore the age-related changes in social evaluations, we averaged participants' responses to the two social evaluation questions across four story items and compared them to chance response (0.5) using two-tailed one-sample t -tests. Eight- to nine-year-olds and adults evaluated the high-cost character at rates above chance (8- to 9-year-olds: $M = 0.71, t(35) = 0.349, p = 0.001, 95\% CI [0.08, 0.33]$; adults: $M = 0.75, t(91) = 6.88, p < 0.001, 95\% CI [0.18, 0.32]$). Responses of the 6- to 7-year-olds did not differ from chance ($M = 0.45, t(36) = -0.83, p = 0.412, 95\% CI [-0.18, 0.07]$). Only the youngest children—4–5-year-olds—significantly favored the low-cost character at above chance levels ($M = 0.27, t(38) = -5.43, p < 0.001, 95\% CI [-0.31, -0.14]$).

2.2.2 | Moral desire ratings

We then investigated participants' inferences of each character's moral desire (see Figure 4). We hypothesized that, when explicit mention of inner conflict was removed from vignettes, both adults and children would infer a direct causal link between obligations and actions, without necessarily inferring a moral desire. We ran an ordinal logistic GEE on moral desire ratings (2 = "really wants to," 1 = "sort of wants to," 0 = "doesn't want to at all") with age group (4–5-year-olds, 6–7-year-olds, 8–9-year-olds, adults) as a between-subject factor, and character (the high-cost character, the low-cost character) and story item as within-subject factors, and the interaction term between age group and character. We found a significant main effect of character



(Wald $\chi^2(1, N = 204) = 255.55, p < 0.001$) such that participants rated the moral desire of the low-cost character ($M = 1.57, SD = 0.63$) higher than the moral desire of the high-cost character ($M = 0.66, SD = 0.71$). We also found a significant main effect of story item (Wald $\chi^2(3, N = 204) = 48.09, p < 0.001$) such that participants' ratings of moral desire were lower for the Dishes story than the three other stories (Dishes: $M = 0.96, SD = 0.83$, Helping: $M = 1.20, SD = 0.75$, Honesty: $M = 1.15, SD = 0.81$, Toy: $M = 1.16, SD = 0.83$, Dishes vs. other stories: $p < 0.001$). We also found a significant interaction between age group and character (Wald $\chi^2(3, N = 204) = 25.92, p < 0.001$). Follow-up analyses confirmed that participants in all age groups rated the moral desire of the low-cost character higher than the moral desire of the high-cost (4- to 5-year-olds: low-cost character: $M = 1.60, SD = 0.72$, high-cost character: $M = 0.65, SD = 0.81$, Wald $\chi^2(1, N = 39) = 31.93, p < 0.001$; 6- to 7-year-olds: low-cost character: $M = 1.79, SD = 0.44$, high-cost character: $M = 0.55, SD = 0.57$, Wald $\chi^2(1, N = 37) = 73.61, p < 0.001$; 8- to 9-year-olds: low-cost character: $M = 1.72, SD = 0.47$, high-cost character: $M = 0.55, SD = 0.56$, Wald $\chi^2(1, N = 36) = 61.90, p < 0.001$; adults: low-cost choice character: $M = 1.42, SD = 0.67$, high-cost character: $M = 0.74, SD = 0.76$, Wald $\chi^2(1, N = 92) = 58.03, p < 0.001$), though the difference was smaller for adults than children.

2.2.3 | Relation between social evaluation and moral desire rating

The results above suggest that even adults do not infer a moral desire for someone who acts on obligations at a personal cost. To further confirm that neither adults (nor children) based their positive evaluations on resolving inner conflict, we checked whether participants' moral desire ratings predict social evaluations. We ran a linear regression⁴ with participants' average social evaluation as the dependent variable, their average moral desire rating for the high-cost character, and their average moral desire rating for the low-cost character, age group, and interactions between age group and each of the two moral desire ratings as predictors. No significant interaction was found, so interaction terms were not included. Moral desire rating for the low-cost character significantly predicted social evaluation favoring the low-cost character ($B = -0.18, SE = 0.04, t = -3.39, p = 0.001$), but moral desire rating for the high-cost character did not significantly predict social evaluation ($B = -0.05, SE = 0.05, t = -1.09, p = 0.28$). Age significantly predicted social evaluation favoring the high-cost character ($B = 0.14, SE = 0.02, t = 7.08, p < 0.001$).

2.2.4 | Explanatory responses

For child participants, we examined explanatory responses following their social evaluation. When selecting the high-cost character, the most frequent (49%) explanations referred to cost, with very few (2%) referring to inner conflict. Importantly, with age, children's explanations referring to cost also revealed a linear increase: Univariate ANOVA on the percentage of explanations referring to cost with age group as a between-subject factor revealed a significant main effect of

age group ($F(2, 84) = 19.83, p < 0.001$). Bonferroni-adjusted pairwise comparisons revealed that 8- to 9-year-olds provided significantly higher percentages of explanations referring to cost than 6- to 7-year-olds ($p = 0.036$), and 6- to 7-year-olds provided significantly higher percentages of explanations referring to cost than 4- to 5-year-olds ($p = 0.002$). See [Supplementary Materials](#) for detailed results in all coding categories.

2.3 | Discussion

In Study 1, we found evidence that, without explicit reference to inner conflict, both 8- to 9-year-old children and adults evaluated a person who paid a psychological cost to fulfil a moral or social obligation more favorably (as deserving a "prize," and as "nicer") than a person who did not pay such a cost to do the same thing. Additionally, participants did not spontaneously infer inner conflict between a personal desire and moral desire—at all ages, participants rated the moral desire of the character who did not pay a cost as significantly higher than the moral desire of the character who paid a cost to act morally. Also, social evaluations did not depend on participants' moral desire rating of the character who paid a cost to help. Thus, our findings suggest that, when explicit reference to inner conflict is removed, the intuitive model both children and adults use to evaluate the praiseworthiness of actions is a model in which obligations act as a direct motivation, and moral actors are praised for paying psychological costs (i.e., forgoing personal desires) to fulfill the obligations.

We also found evidence for linear developmental changes in this social evaluation. Four- to five-year-old children favored the character who did not pay a cost over one who paid a cost, and 6- to 7-year-olds praised both characters equally, while 8- to 9-year-olds favored the character who paid a cost. As discussed above, one possibility for this change is that children at younger ages are in transition in how they conceptualize cost. Prior work has found that physical costs are incorporated into social evaluations as early as toddlerhood (Jara-Ettinger et al., 2015; Liu et al., 2017), while understanding of forgoing desires and performing self-control develop relatively late (e.g., Kushnir et al., 2015; Lagattuta, 2005), physical cost may be incorporated into moral evaluations earlier than psychological cost.

3 | STUDY 2

In study 2 we test this hypothesis. We modified the procedure of Study 1 by contrasting two stories (taken from Study 1) in which one character gave up a personal desire to act morally, with two similar stories in which one character exerted physical effort to act morally. We focused on the younger age groups, 4- to 5-year-olds and 6- to 7-year-olds. We also tested a group of adults as a reference group. If children use a model of costly action to inform in their judgments of praiseworthiness but are in transition in how they conceptualize cost, we would predict that they would incorporate considerations of physical cost at earlier ages than psychological cost in their positive social evaluations.

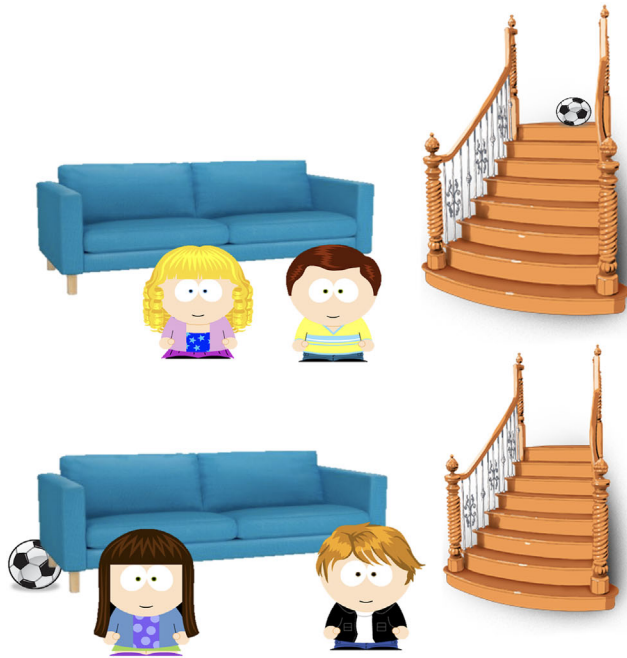


FIGURE 5 Example of the images and scripts featuring physical cost presented in Study 2

3.1 | Method

3.1.1 | Participants

Seventy-two 4- to 7-year-olds ($4.00\text{--}7.99$, $M = 5.92$, $SD = 1.17$, 32 boys) from a university town in Northeastern U.S. were recruited for this study. Specifically, 37 4- to 5-year-olds ($4.00\text{--}5.95$, $M = 4.89$, $SD = 0.58$, 21 boys), 35 6- to 7-year-olds ($6.00\text{--}7.99$, $M = 6.95$, $SD = 0.56$, 11 boys) were included in the analyses. In addition, 101 adults took part in this study on Amazon Mechanical Turk and were included in the analyses.

3.1.2 | Materials and procedure

Participants were told four pairs of stories with accompanying pictures, each contrasting a high-cost character (who made a physical or psychological effort to do the right thing) with a low-cost character (who did the same thing without effort). We chose two pairs of the stories from study 1: one prosocial action (Helping Story) and one household obligation (Dishes Story). Two pairs of stories featured psychological costs, other two pairs featured physical cost (see Figure 5). For example, in the Helping Story, the high-cost character had to walk all the way up to the top of the stairs to pick up the ball for her brother, while the low-cost character just needed to walk behind the sofa next to her and picked up the ball. All the materials are available on https://osf.io/2jft5/?view_only=0a7322f59e814575bf6a4afdf2d92616.

All the characters were the same gender as the participants. The order of presenting the stories was counterbalanced across participants. The order of presenting the high-cost character and the low-cost character were randomized across stories for each participant. After hearing each pair of stories, the child was asked two memory check

High-cost Character (Physical Cost):

This is Mary, and this is Mary's brother. Mary's brother lost his favorite ball. He has been looking really hard, but he still hasn't found it. So he asked Mary to help him look for it.

Helping people is the right thing to do. Mary sees that the ball is stuck on the top of the stairs. So to help her brother get the ball, Mary has to walk all the way up to the stairs and pick up the ball.

But Mary helped her brother get his ball. It was really hard for Mary to help her brother because the ball was stuck at the top of the stairs. But Mary still helped her brother get his ball.

Low-cost Character (Physical Cost):

This is Mia, and this is Mia's brother. Mia's brother lost his favorite ball. He has been looking really hard, but he still hasn't found it. So he asked Mia to help him look for it.

Helping people is the right thing to do. Mia sees that the ball is behind the sofa right next to her. So to help her brother get his ball, Mia just needs to walk behind the sofa and pick up the ball. So Mia helped her brother get the ball. It was easy for Mia to help his brother because the ball was just behind the sofa right next to Mia. So Mia helped her brother get his ball.

questions: "Who found it easy to do something good?" and "Who found it hard to do something good?" Children answered both memory check questions correctly for 91% of the trials. We only included these trials in the following analyses. Including those trials where the memory check questions were answered incorrectly did not change the pattern or significance of results reported here.

Following each story, children were asked the two *social evaluation* questions (order counterbalanced) and the *moral desire rating* question for each character using the same procedure as Study 1. The adults received identical stimuli and questions, but read through these materials themselves online, and the gender of characters were counterbalanced across stories for adult participants.

3.1.3 | Coding

The coding scheme was similar to Study 1. The first author coded all the explanations. Another research assistant blind to the study design coded all the explanations. The inter-coder reliabilities between the primary and secondary coders were 96.2%. Discrepancies were resolved through discussion.

3.2 | Results

3.2.1 | Social evaluations

We hypothesized that children would praise moral actions that involve physical cost at earlier ages than psychological costs. We had pre-registered to conduct separate logistic GEE to investigate the effects of age and cost type separately, we decided to first run an omnibus test to

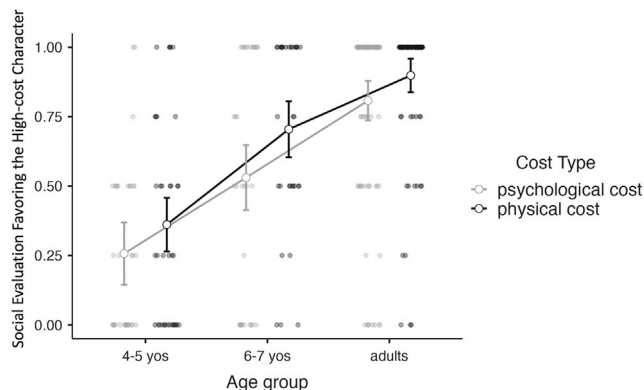


FIGURE 6 Children's and adults' mean social evaluations in favor of the character who paid a cost to help in Study 2. Error bars represent 95% confidence intervals

investigate the effects of age group and cost type together. This allows us to test the effects of age and cost type in one model.

We first checked for effects of question type (Prize question, Nicer question) and story item (Helping, Dishes) by running McNemar's tests, and found no significant effects of question type ($p_s > 0.15$) or story items ($p_s > 0.65$). Thus, we sum up each participant's response to two dependent measure questions in two story items to form a social evaluation score (0–4) for each cost type (psychological, physical). We then run an ordinal logistic GEE on the social evaluation score, with age group (4- to 5-year-olds, 6- to 7-year-olds, adults) as a between-subject factor, and cost type (psychological, physical) as a within-subject factor. We did not find significant interaction between age group and cost type (Wald $\chi^2(2, N = 173) = 1.08, p = 0.58$), so the interaction term was dropped from the final model. We found a significant main effect of age group (Wald $\chi^2(2, N = 173) = 80.94, p < 0.001$). Specifically, adults were more likely to favor the high-cost character than either the 6- to 7-year-olds (Wald $\chi^2(1, N = 136) = 9.57, p = 0.002$), or the 4- to 5-year-olds (Wald $\chi^2(1, N = 138) = 80.74, p < 0.001$). The 6- to 7-year-olds were also more likely to favor the high-cost character than the 4- to 5-year-olds (Wald $\chi^2(1, N = 72) = 20.71, p < 0.001$). We also found a significant main effect of cost type (Wald $\chi^2(1, N = 173) = 12.74, p < 0.001$) such that participants across ages were more likely to favor the high-cost character in the physical stories than in the psychological stories.

To further investigate the overall age effects, we averaged participants' responses across two question types and two story items for each type of cost story (Physical, Psychological). See Figure 6 for participants' preference for the high-cost character in social evaluation questions. We ran one-sample t -tests to compare participants' responses in each cost type to chance (0.5) for each age group. Adults significantly favored the high-cost character in both physical stories ($M = 0.87, SD = 0.27, t(94) = 13.27, p < 0.001, 95\% CI [0.32, 0.43]$) and psychological stories ($M = 0.80, SD = 0.33, t(92) = 8.65, p < 0.001, 95\% CI [0.23, 0.36]$). Four- to 5-year-olds significantly favored the low-cost character both for both physical costs ($M = 0.36, SD = 0.37, t(35) = -2.28, p = 0.029, 95\% CI [-0.26, -0.02]$) and psychological costs ($M = 0.25, SD = 0.29, t(36) = -5.16, p < 0.001, 95\% CI [-0.35, -0.15]$). Six- to

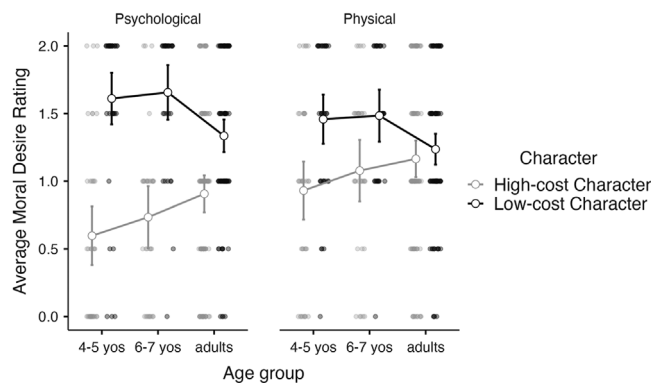


FIGURE 7 Mean moral desire ratings split by character, age group and cost type in Study 2. Error bars represent 95% confidence intervals

7-year-olds significantly favored the high-cost character for the physical stories ($M = 0.70, SD = 0.34, t(32) = 3.46, p = 0.002, 95\% CI [0.08, 0.32]$), but their responses did not differ from chance for the psychological stories ($M = 0.53, SD = 0.43, t(32) = 0.40, p = 0.69, 95\% CI [-0.12, 0.18]$).

3.2.2 | Moral desire ratings

We then examined participants' moral desire ratings for the characters (see Figure 7). We ran an ordinal logistic GEE with age group (4- to 5-year-olds, 6- to 7-year-olds, adults) as a between-subject factor and character (high-cost character, low-cost character), cost type (psychological, physical), and the interaction of character and cost type, and the interaction of character and age group⁵ and story item (Helping, Dishes) as a within-subject factor. We found significant main effects of character (Wald $\chi^2(1, N = 173) = 91.98, p < 0.001$), that participants rated the moral desire of the low-cost character higher than the moral desire of the high-cost character. We also found a significant main effect of cost type (Wald $\chi^2(1, N = 173) = 5.69, p = 0.017$). Participants rated the moral desire of both characters in the physical stories higher than the moral desire of those characters in the psychological stories. We also found a significant main effect of story item (Wald $\chi^2(1, N = 173) = 32.74, p < 0.001$). Participants rated the moral desire of the characters in the Helping stories higher than those in the Dishes stories. We did not find a main effect of age group (Wald $\chi^2(1, N = 173) = 1.37, p = 0.51$). We also found a significant interaction between character and cost type (Wald $\chi^2(1, N = 173) = 31.67, p < 0.001$) and a significant interaction between character and age group (Wald $\chi^2(2, N = 173) = 26.52, p < 0.001$).

To explore the interaction further, we followed up by looking at the two cost types separately. Patterns for psychological stories replicated findings in Study 1. Children of both age groups and adults rated the moral desire of the low-cost character higher than the moral desire of high-cost character (4- to 5-year-olds: low-cost character: $M = 1.60, SD = 0.66$, high-cost character: $M = 0.63, SD = 0.79$,

Wald $\chi^2(1, N = 37) = 20.07, p < 0.001$; 6- to 7-year-olds: low-cost character: $M = 1.68, SD = 0.54$, high-cost character: $M = 0.70, SD = 0.66$, Wald $\chi^2(1, N = 35) = 33.16, p < 0.001$; adults: low-cost character: $M = 1.33, SD = 0.63$, high-cost character: $M = 0.90, SD = 0.74$, Wald $\chi^2(1, N = 101) = 26.42, p < 0.001$), though the difference was stronger among children than adults.

For physical stories, children of both age groups rated the moral desire of the low-cost character higher than the moral desire of the high-cost character (4- to 5-year-olds: low-cost character: $M = 1.45, SD = 0.72$, high-cost character: $M = 0.94, SD = 0.81$, Wald $\chi^2(1, N = 37) = 9.34, p = 0.002$; 6- to 7-year-olds: low-cost character: $M = 1.50, SD = 0.61$, high-cost character: $M = 1.07, SD = 0.77$, Wald $\chi^2(1, N = 35) = 8.33, p = 0.004$), while adults rated similar level of moral desire for both characters (low-cost character: $M = 1.23, SD = 0.68$, high-cost character: $M = 1.16, SD = 0.81$, Wald $\chi^2(1, N = 101) = 0.90, p = 0.34$).

3.2.3 | Relation between social evaluation and moral desire rating

Similar to Study 1, we analyzed whether participants' social evaluations of the two characters depended on their ratings of the characters' moral desires. For each cost type, we ran a linear regression with participants' average social evaluation as the dependent variable, their average moral desire rating for the high-cost character, and their average moral desire rating for the low-cost character, age group and interactions between age group and each of the two moral desire ratings as predictors. No significant interaction was found, so interaction terms were not included. For psychological stories, replicating findings in Study 1, moral desire rating for the low-cost character significantly predicted social evaluation favoring the low-cost character ($B = -0.11, SE = 0.05, t = -2.48, p = 0.014$), while moral desire rating for the high-cost character did not predict social evaluation ($B = 0.06, SE = 0.04, t = 1.54, p = 0.125$). Age significantly predicted social evaluation favoring the high-cost character ($B = 0.25, SE = 0.03, t = 7.36, p < 0.001$). For physical stories, we did not find significant predictive effects of any moral desire ratings (moral desire rating for the high-cost character: $B = 0.05, SE = 0.04, t = 1.34, p = 0.18$; moral desire rating for the low-cost character: $B = -0.06, SE = 0.05, t = -1.41, p = 0.16$). Age significantly predicted social evaluation favoring the high-cost character ($B = 0.23, SE = 0.03, t = 7.54, p < 0.001$).

3.2.4 | Explanatory responses

Similar to Study 1, when selecting the high-cost character, most children's explanations referred to cost (42.7% in psychological stories, 50.4% in physical stories), with very few references to inner conflict (3.9% in psychological stories, 0% in physical stories). Also, 6- to 7-year-olds provided significantly higher percentage of explanations referring to costs than 4- to 5-year-olds in both psychological stories ($t(41) = 3.46, p = 0.001$) and physical stories ($t(50) = 4.20,$

$p < 0.001$). See [Supplementary Materials](#) for detailed results in all coding categories.

3.3 | Discussion

In Study 2, we found that children as young as 6 incorporate physical cost into their positive social evaluations. This suggests that the type of cost in the original stories—forgoing a personal desire—was partially responsible for the developmental changes found in Study 1. But our hypothesis that understanding psychological cost was the barrier to adult-like moral judgments was only partially supported: 4- to 5-year-olds still praised the person for whom the moral action was not effortful at all, despite a host of studies suggesting that even younger children can (and do) incorporate cost into other types of social judgments (Jara-Ettinger et al., 2015; Liu et al., 2017). What is driving this interesting developmental change remains an open question. We return to this discussion in more details in General Discussion.

That aside, we found further support in Study 2 for a model of costly action, rather than a model of inner conflict, as a driver of moral evaluations. Like in Study 1, praise for the character who paid a cost did not depend on participants' ratings of this character's moral desires. In fact, all participants, regardless of age, gave higher ratings for the moral desires of characters who acted *without* a cost. These results show that neither adults nor children spontaneously infer that an agent experiences inner conflict. They instead suggest a more direct evaluation of the effort the agent makes to fulfill a moral obligation.

4 | GENERAL DISCUSSION

Across two studies, we reveal important developments in children's consideration of costs in their social and moral evaluations. By age 6, children account for *physical costs* in positive social evaluations, rating a person who pays a physical cost (i.e., traveling a longer distance) to fulfill a moral or social obligation as more praiseworthy and "nicer" than a person who does not pay a physical cost to do the same thing; and then by age 8, children also account for *psychological costs*, praising someone who gives up their personal desire to fulfill an obligation more than someone who fulfills an obligation without giving up their personal desire.

Unlike prior work (Starmans & Bloom, 2016), our stories made no explicit reference to wanting to act on moral obligations, or to inner conflict. Importantly, we found that neither children nor adults spontaneously inferred inner conflict between a self-interested desire and moral desire. Both children and adults said that the character who did not pay a cost wanted to help more than the character who paid a cost, and positive social evaluations of the high-cost character were unrelated to ratings of this character's moral desire. Also, in their explanations for praiseworthiness judgments, children consistently refer to costs (e.g., "she wanted to play outside but still helped") rather than inner conflict (e.g., "she wanted to play outside and also wanted to help").



Together, the results of these two studies provide support for the idea that children employ a *model of costly action*—where obligation acts as a direct motivation for moral acts, separate from personal desires. Importantly, the developmental changes found in the current study suggest that moral evaluations based on cost are also most intuitive for children, while understanding of the virtue of overcoming inner conflict may not develop until later. The question of when children begin to understand the virtue of resolving inner conflict remains open.

Our findings suggest that the model of costly action is more intuitive than a model of inner conflict even for adults. This suggests that while we as adults find exercising “willpower” to resolve inner conflict virtuous, moral desires are not necessary for causing moral behaviors, and inner conflict isn’t a prerequisite for virtue. Our results align with the idea that even members of WEIRD societies are likely more “collectivistic” toward our social groups than is generally accepted in standard psychological models of moral thought and action (Tomasello, 2020; Wellman & Miller, 2008). A belief in the direct force of prosocial motives and/or obligations to others may be culturally universal (Aknin et al., 2013; Kanngiesser et al., 2022).

What underlies the development that occurs between ages 4 and 6 remains an open question. There is a wealth of evidence that even infants and toddlers can incorporate physical cost in social inferences (Brandone & Wellman, 2009; Gergely & Csibra, 2003; Jara-Ettinger et al., 2015; 2016; Liu et al., 2017; Sommerville et al., 2018). Furthermore, as our own data shows, even 4-year-olds can correctly answer which character found it hard or easy to do something good, and frequently refer to difficulty (e.g., “it’s hard/easy for her”) in their qualitative explanations. However, different from older children and adults, these younger children significantly favor the person who find it easy to do something good. One possibility for this developmental change is that younger children base their moral judgment on the link between difficulty and competence. This possibility is consistent with prior work on preschooler’s judgments of skill or expertise: 4-year-olds judge someone who finds an academic task (such as a puzzle or math problem) easy or who spends less effort to finish a task to be “smarter” than one who finds the same task hard or spends more effort to finish the same task (Heyman et al., 2003; Muradoglu & Cimpian, 2020). These suggests that, young children may hold similar “easier = smarter” reasoning regarding moral competence or moral skill, considering someone who finds moral acts easier as more morally competent than someone who finds moral acts harder. Another possibility is that young children may see those who find it easier to do the right thing as simply luckier than those who find it harder to do the right thing. There is evidence that young children prefer those who are lucky over those who are unlucky (Olson et al., 2006), and even see lucky people are nicer than unlucky people (Olson et al., 2008).

An additional and not mutually exclusive possibility is that it may require experience, particularly first-person experience of making difficult moral choices, for children to realize the importance and value of paying cost to do something good. In a recent study, Zhao, Went, et al. (2021) found that children’s first-person experience of self-control can shape their development of beliefs about choice to overcome desires, and such development occurs around similar age (age 4–8) as the devel-

opmental change found in the current study. Chernyak and Kushnir (2013; 2018) found that children’s own experience of making costly choice to act prosocially leads to subsequent prosocial behaviors in a novel context. As children get older, they may reflect on their own experience of making hard (but right) choices and use that experience to inform their moral evaluations of others.

This study reveals a developmental progression in children’s moral reasoning that corresponds to domain-specific understandings of physical and psychological causes for action, and in turn the difference between physical effort and mental effort. Imagining the psychological struggles and the mental efforts involved in overcoming one’s personal desire may be part of higher-order theory-of-mind understandings that continue to develop in middle childhood (Lagattuta, 2005). Considering the time it takes for children to develop their self-control capacities (Carlson & Moses, 2001; Diamond & Lee, 2011; Kochanska et al., 2001), and to reflect on these self-control experiences and form the belief in free will to perform self-control (Zhao, Zhao, et al., 2021), it may not be surprising that children praise psychologically effortful actions later than physically effortful ones. Exploring interactions of understanding of costs and children’s understanding of mental states and self-control is an important direction for future work.

The current findings are consistent with a growing literature on inference and evaluation of moral character, arguing for the importance of studying judgments of the moral decision-making processes that are more informative of the actor’s character, rather than just the actions themselves (Gray et al., 2012; Goodwin et al., 2014; Helzer & Critcher, 2018; Uhlmann et al., 2015). Particularly, there is mounting evidence that moral decisions that involve costs for the decision maker are perceived as more informative of moral character than moral decisions that do not involve costs (Bigman & Tamir, 2016; Kraft-Todd & Rand, 2019; Ohtsubo & Watanabe, 2009). Our findings add to this work by revealing developmental origins of these moral intuitions. One reason why cost is informative of moral character may be that such information is particularly predictive of future moral decisions, specifically the one who pays cost to help would be very much likely to help in future, while the one who does not pay cost to help may not help if next time there is cost involved in the decision-making contexts.

The current findings suggest that the costs incurred in the moral decisions seem to weigh a lot in moral praise, but it remains a question how much costs weigh in children’s judgments of moral blame. Previous work with adults reveals that the process for assigning moral praise seems to be different from the process for assigning moral blame (Anderson et al., 2020; Schein et al., 2020). For example, intentionality and controllability of an act weigh more in judgments of moral blame than in moral praise (Pizarro et al., 2003). Thus, future research can examine whether costs may influence moral blame more than moral praise, and whether children may incorporate costs in their judgments of moral blame at earlier ages than moral praise.

To navigate the social world, we human beings are constantly evaluating others, identifying the ones who are nice and trustworthy that worth forming relationship, and those who we should avoid in future. When doing so, we do not just look at actions themselves, we are also

highly attuned to the cues and information in the decision-making process that inform what kind of person the actor is. Our work reveals the subtlety of our moral judgments by revealing that we are sensitive to the difficulty involved in the decision. We thank our friend more if she gives up her favorite TV show to offer a ride than if she simply has nothing else to do, or if she is 1-h drive away than if she is just 5-min drive away. Our works also reveal the development of such intuition that children gradually transition from a bias toward easy action, to a recognition of the moral praiseworthiness of doing something physically hard, and then later to a recognition of the praiseworthiness of doing something psychologically hard.

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CONFLICT OF INTEREST

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

DATA AVAILABILITY STATEMENT

All study materials, data and pre-registration information can be accessed at https://osf.io/2jft5/?view_only=ff2bdac06ea34a9baa59e72f1fded1dc.

ENDNOTES

¹Note that the "Dishes Story" were adapted from Starmans and Bloom (2016), but they framed the story as about keeping or breaking promise to mom, while here we framed the story as about following household rules. See https://osf.io/2jft5/?view_only=0a7322f59e814575bf6a4afdf2d92616 for details of the materials.

²Prior to running this preregistered model, we ran a full model with age, story item, and an age by story item interaction. The interaction was non-significant therefore was removed from further analyses.

³We first ran a full model with the story item by age group interaction. The interaction was non-significant, therefore, was removed from further analyses.

⁴We had pre-registered correlation analyses between social evaluation and moral desire rating for each character, but decided to present results on linear regression as this allows us to examine the potential influence of moral desire ratings of both characters in one single model, and allows us to examine potential interaction with age. Note that correlation analyses yielded similar results.

⁵We first ran a model with all interactions, and dropped the nonsignificant three-way interaction between age group, character and cost type and the nonsignificant interaction between age group and cost type from the final model.

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