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Seeing Gray in a World of Black and White: Children Appreciate Reasoners Who Approach Moral Dilemmas With Humility

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ABSTRACT

Moral decisions often involve dilemmas: cases of conflict between competing obligations. In two studies ($N = 204$), we ask whether children appreciate that reasoning through dilemmas involves acknowledging that there is no single, simple solution. In Study 1, 5- to 8-year-old US children were randomly assigned to a Moral Dilemma condition, in which story characters face dilemmas between two prosocial actions, or a Personal Cost control, in which story characters face decisions between a matched prosocial action and a self-interested action. Children were then presented with two reasoners who made the same judgment, but one confidently endorsed one moral action, and the other hesitantly acknowledged both actions. As they aged, children became more likely to prefer the uncertain reasoner's "way of thinking" in the Moral Dilemma compared to the Personal Cost condition. They also inferred that the uncertain reasoner was nicer and more trustworthy than the confident one. In Study 2, when both reasoners acknowledged the dilemma and differed only in their level of uncertainty, 5-year-olds preferred the acknowledgment to be accompanied by a confident decision, 6- and 7-year-olds preferred it be accompanied by uncertainty, and 8-year-olds showed no preference. These results show that, before the age at which children can resolve dilemmas successfully on their own, they recognize and value others who approach dilemmas with appropriate humility.

1 | Introduction

The moral domain involves not only determining which actions are right or wrong based on basic moral principles and norms, but also making difficult decisions that require balancing competing values and principles. For example, should a person lie to protect a loved one from getting in trouble? Would it be fair to hurt the interests of one person to prioritize the interests of a group? These questions illustrate that some moral decisions involve *moral dilemmas*: cases of conflict between competing obligations in which acting will satisfy one obligation, while violating another (Sarkissian et al. 2011; Sinnott-Armstrong 1988). These cases involve recognizing that there is no clear-cut right answer and that some amount of uncertainty might be part of the process of arriving at a decision (Sinnott-Armstrong 1988; Tessman 2014).

Classic research suggests that the independent reasoning skills necessary to resolve dilemmas emerge late in development (Piaget 1965; Kohlberg 1969). Kohlberg (1969), in particular, viewed children's inability to resolve dilemmas concerning

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Research Highlights

- In two studies, we ask whether children appreciate that reasoning through dilemmas involves acknowledging that there is no single, simple solution.
- In Study 1, 5- to 8-year-old children endorsed an uncertain reasoner's "way of thinking" over a confident reasoner's when the decision involves conflicts between two prosocial moral obligations.
- With age, children judged the reasoner who acknowledges the dilemma and is less certain as more morally and epistemically commendable.
- In Study 2, expressions of certainty and uncertainty and agreement between a reasoner's decision and their own influenced children's evaluations differently at different ages.
- Before the age at which children can resolve dilemmas successfully on their own, they recognize and value others who approach dilemmas with appropriate humility.

ethical principles (rather than merely citing avoidance of punishment or appealing to social convention) as a signal that they were not fully developed moral thinkers. In part as a reaction to Kohlberg's views, contemporary research has steered away from using dilemmas as a tool for investigating early moral psychology. Seminal work challenged the classic view by showing that even preschoolers understand the difference between moral principles and social conventions (Turiel 1983; Smetana 1981, 1985). More recent work shows that moral knowledge originates with infants' expectations that agents will avoid harm and act fairly (Hamlin, Wynn, and Bloom 2007; Geraci and Surian 2011; Sloane, Baillargeon, and Premack 2012; Schmidt and Sommerville 2011) and is demonstrated by their own prosocial acts (Brownell, Svetlova, and Nichols 2009; Liszkowski et al. 2006; Warneken and Tomasello 2009). These studies focus almost exclusively on clear-cut moral decisions, rather than conflict between competing obligations, thus leaving the question of when and how children understand moral dilemmas unaddressed.

There is some evidence suggesting that children may implicitly recognize that not all moral decisions are clear-cut. Mammen, Köymen, and Tomasello (2019, see also Kruger and Tomasello 1986) presented dilemmas to children aged 4–6 to assess their collaborative moral reasoning with age-matched peers. Children heard stories in which two characters are faced with the same dilemma—keeping a promise to one friend versus helping another—but resolve it differently. Reward distribution suggests that peer dyads gave equal moral status to both actions: roughly half of the peer dyads distributed at least 2 out of 5 rewards to both characters, and neither action was overwhelmingly favored for the majority of rewards. Mammen et al.'s findings suggest that children as young as 4 implicitly recognize dilemmas when they involve simple moral actions that relate closely to children's own moral experiences and capabilities. Similarly, child-friendly versions of classic "trolley" dilemmas, in which one harm is pitted against many (Pellizzoni, Siegal, and Surian 2010; Bucciarelli 2015; Dworazik et al. 2019), find that preschool and school-aged children have moral intuitions similar to those of adults (Cushman, Young, and Hauser 2006; Greene et al. 2001; Haidt 2001). Moreover, with age, children distinguish between simple (e.g., prototypical harm) and complex moral situations (e.g., necessary harm) in their moral judgments (Jambon and Smetana 2014), suggesting an emergence of more nuanced moral appraisals during middle childhood.

These examples suggest that children as young as 4–8 years may independently recognize that the appropriate reasoning process for moral dilemmas involves acknowledging that there is no single, simple solution. One way of doing this may be to state it directly (as in "there is no right answer" or "both options are good things to do"). Another way of doing this may be more indirect: by displaying hesitancy or admitting uncertainty ("I'm not sure" or "I don't know", e.g., Sabbagh and Baldwin 2001; Kushnir and Koenig 2017). Together, these cues might signal to a young child that a reasoner is approaching a dilemma with *humility*—recognizing that certainty, confidence, and correctness are not a given in such cases (Sinnott-Armstrong 1988). If children view these signals from a moral reasoner as epistemically and morally commendable, we take this as evidence that, even before the age at which they can independently resolve moral dilemmas, they are already capable of recognizing and appreciating humility in moral reasoning. This potential early recognition is distinct from, yet related to, the broader concept of Intellectual Humility, which focuses on the recognition that our knowledge is inherently limited and extends beyond the moral domain (e.g., Church and Barrett 2016; Leary et al. 2017).

To investigate this in young children, we borrow methods from studies in which children are asked to judge the relative competence or expertise of two informants who demonstrate either confidence or uncertainty in their answers to factual questions (e.g., Sabbagh and Baldwin 2001; Kushnir, Vredenburgh, and Schneider 2013). All else equal, both adults (Price and Stone 2004; Tenney et al. 2007) and young children (Birch, Akmal, and Frampton 2010; Brosseau-Liard and Poulin-Dubois 2014; Jaswal and Malone 2007; Sabbagh and Baldwin 2001; Hartwell et al. 2022) take confidence as a sign of competence. However, there are times when children view the acknowledgment of uncertainty as the most appropriate response. For example, children as young as 4 are willing to learn from a person who has previously admitted her ignorance but would not learn from a person who has confidently made false claims (Kushnir and Koenig 2017). By age 9, children prefer an informant who admits ignorance about unknowable scientific facts (such as the number of leaves on all the trees in the world) over one who confidently claims to know factual matters that are practically unattainable (Kominsky, Langthorne, and Keil 2016). These studies together suggest that somewhere in middle childhood a similar sophistication about the virtue of ignorance might emerge in moral reasoning.

In the current studies, we ask whether and when children appreciate that reasoning about dilemmas requires humility. In Study 1, we show 5- and 8-year-old US children stories about a character who has to make a moral decision. One group of children in the Moral Dilemma condition heard stories that were dilemmas in the sense defined above: the moral decision involves

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a conflict between one moral action (helping) and another (keeping a promise). We chose these two actions because they have been shown to be understood by preschool-age children to be moral obligations (Mammen, Köymen, and Tomasello 2019; Kanngiesser, Mammen, and Tomasello 2021). In contrast, another group of children in the Personal Cost condition heard stories in which the moral decision involves a conflict between a moral action (helping) and a selfish desire (playing). The comparison stories are taken from studies showing that young children recognize that acting morally sometimes comes at a personal cost (e.g., Starmans, and Bloom 2016; Zhao and Kushnir 2023). After hearing each story, children heard two reasoners—one who confidently endorsed one moral action as the right thing to do, and the other who acknowledged that both actions were right, and who showed uncertainty in which decision to make. Importantly, both reasoners concluded by recommending the same moral decision (e.g., deciding the character should help), thus differing only in the *process* by which they reached their decision. We ask children to determine which reasoner had a better way of thinking and to make comparative judgments about the reasoners' other positive character traits. If children recognize that the appropriate moral reasoning process toward moral dilemmas involves acknowledging that there is no clear right answer, they should judge the reasoner who acknowledges the dilemma and is less certain as more morally and epistemically commendable in the Moral Dilemma condition but not in the Personal Cost condition.

In Study 2, we further explore the role of uncertainty as a cue in children's evaluation of two reasoners who *both* acknowledge moral dilemmas. We present 5- to 8-year-old children with reasoners who both acknowledge a dilemma in the story between helping and keeping a promise. Again, both recommend the same moral decision but one does so confidently and the other with uncertainty. We were interested in the importance of acknowledging the limits of moral knowledge changes across this age range, paralleling the increasing awareness of uncertainty as an expression of humility in nonmoral situations.

2 | Study 1

2.1 | Method

2.1.1 | Participants

Participants included 129 children aged 5–8 years (M_{age} = 6.96 years; SD = 1.19 years; range = 5.04–8.88 years; 63 boys and 66 girls), recruited from a university-managed database of families in a mid-sized city in the Southeastern United States. We have preregistered our commitment to finish data collection once we have recruited 128 participants. An a priori G Power 3.1 analysis (Faul et al. 2007) was conducted based on a medium effect size of $\eta_p^2 = 0.06$ ($f = 0.25$) with an alpha level of 0.05, which showed that a sample size of 124 was needed to achieve 80% power for the main analyses of participants' thinking evaluation responses[1].

Information on ethnicity collected from parental questionnaires showed that the participants were 71.32% White, 4.65% Black, 3.87% Asian, and 20.16% identified their child with multiple races or ethnicities. Self-reported social-economic status was high for the parents: 58.91% of the primary caregiver had a Graduate/Professional School degree, 36.43% a College Diploma, and 4.65% completed High School or Lower. For the participants' other caregiver, 48.82% had a Graduate/Professional School degree, 37.01% a College Diploma, and 14.17% had a High School diploma or lower. Participants' parent reported income was primarily middle to upper class, with 65.6% of the parents reporting an annual income greater than $100,000 per year, 26.4% reported an income between $50,000 and $100,000, and 8% reported an annual income lower than $50,000. All participants were tested in online sessions via video-conferencing with a live experimenter.

2.1.2 | Procedure

Children were randomly assigned to two between-subjects conditions, a Moral Dilemma condition and a Personal Cost condition. In the Moral Dilemma condition, children heard three stories in which the main character faced a dilemma between two moral actions (e.g., helping someone in need and keeping a promise to someone else). In the Personal Cost condition, children heard three stories in which the main character faced a decision between a matched moral action (e.g., helping someone in need) and a self-interested action (e.g., playing outside). After each story, the experimenter summarized the decision to be made by asking: "What is the right thing to do? Should Liam [help James] or [keep his promise with Noah]?" The stories and stimuli were kept as consistent as possible across conditions (see Figure 1 for an example), and the action that came first was counterbalanced across trials and participants.

Across both conditions, after each of the three stories, children watched a video of a pair of unfamiliar adult reasoners (named "Daisy" and "Iris"). The actors wore the same T-shirt in different colors (blue and red) and were presented side-by-side on the screen. In each video, children heard the two reasoners reach the same conclusion, but one reasoner was confident in her response and stated that there was one right answer, and the other was uncertain and acknowledged that there was no clear answer. For example, the confident reasoner spoke without hesitation: "I know there is *definitely* a right way and a wrong way. *Only* [helping James] makes sense. Liam should [help James]." By contrast, the uncertain reasoner said: "Hmmm, I don't know if there is a right way and a wrong way. Both [helping James] and [keeping his promise with Noah] make sense. Hmmm…okay, Liam should [help James]. " The specific reasoner who was confident and the order in which they spoke was counterbalanced across participants. In the Moral Dilemma condition, we counterbalanced which moral action the reasoners endorsed across trials. In the Personal Cost condition, the reasoners consistently endorsed the moral actions (e.g., helping) over the self-interested actions (e.g., playing) across the three trials.

2.1.2.1 | Reasoning Evaluation and Niceness Questions. After each pair of claims were made in each trial, the experimenter repeated what each reasoner had said, and the children were asked a *reasoning evaluation question*: "Who do you think has a better way of thinking, Daisy or Iris?" After the children had chosen one way of thinking, the experimenter also asked

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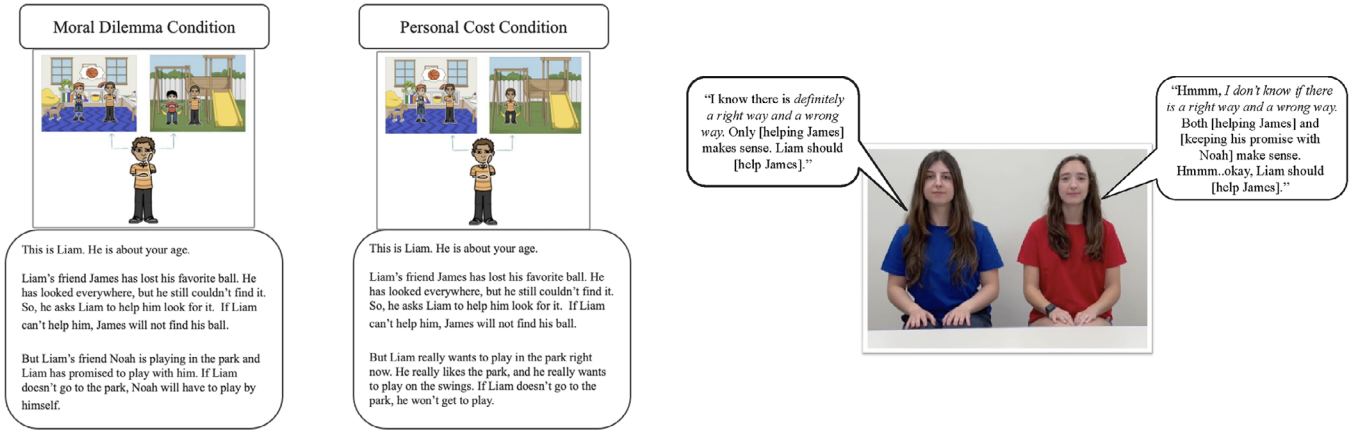


FIGURE 1 | Example of story scripts used across the two conditions (left) and reasoner claims (right) in Study 1. In the Moral Dilemma condition, the main character faced dilemmas between two prosocial actions; In the Personal Cost condition, the main character faced conflicts between a prosocial action and a self-interested action. In each of the three trials, one reasoner shows confidence in her judgments and the other displays uncertainty.

them an open-ended justification question in which they could explain their choices (e.g., "Why do you think Daisy has a better way of thinking?"). To explore whether children would judge the uncertain reasoner to be more morally virtuous, children also received a *niceness question* (e.g., Zhao and Kushnir 2023): "Who do you think is nicer, Daisy or Iris?".

2.1.2.2 | Selective Learning task. To further probe children's own social learning decisions from the two reasoners who varied in expressed confidence, we also included a *selective learning* task after all three trials (Kushnir and Koenig 2017). Specifically, children were asked to choose one of the two reasoners to learn new empirical, instrumental, conventional, and moral information. For example, in the *novel label* trial, children saw an image of an unfamiliar object, and they were first presented with an *ask* question: "Hmmm, I wonder what this is? I bet one of these people can tell us. Who would you like to ask?" After the children made the selection, the experimenter showed a video with the two reasoners making conflicting claims about the name of the object (e.g., "This is a *biff*."; "This is a *zazz*."), and asked children whose answer they would endorse (e.g., "What do you think this is called, a *biff* or a *zazz*?") The procedure for the other trials was similar, except that children were asked to learn the efficiency or permissibility of novel actions from the two reasoners (i.e., which button makes a box light up, what is the right thing to do to make a child feel better, what is the rule for putting toys into boxes). The order of which reasoners spoke first, and their corresponding judgments were counterbalanced across participants.

2.1.2.3 | Explicit Judgment Task. After the selective learning task, we ended with a series of comparative questions to explore children's social, epistemic, and moral evaluations of the two reasoners. To assess who children preferred to affiliate with, we asked which reasoner they liked more and would like to play with more. To explore children's general evaluations of the reasoners' competence, we asked which reasoner was smarter and knew more. Finally, for moral evaluations, we asked which reasoner was a better person. These questions were presented in a fixed order across participants.

2.2 | Results

Since all outcome variables were coded as binary (i.e., choosing the reasoner who was uncertain = 1, choosing the reasoner who was confident = 0) and each task involved multiple trials, we followed our preregistration and analyzed participants' responses using Generalized Linear Mixed- Effect Models (GLMMs) with binomial error distribution and logistic link function. All models were fit using the *glmer* function in the *lme4* package (Bates et al. 2015) in R (version 1.2.5019; R Core Team 2019) with Age (continuous, centered), Condition (Moral dilemma vs. Personal cost), and their interactions as fixed effects, and participant as a random effect. Preliminary analysis revealed no significant effects for any of the counterbalanced orders. For all measures, we report odd ratios (ORs) and their confidence intervals as the most easily interpreted effect size measures for ordinal logistic regressions.

2.2.1 | Reasoning Evaluation Question ("Who do you Think has a Better way of Thinking?")

Our primary question of interest is whether participants judged the uncertain reasoner as having a better way of thinking. We found a significant main effect of Condition on children's likelihood of choosing the uncertain reasoner, OR = 0.34, 95% CI = [0.2, 0.59]; $p < 0.001$. Overall, children were more likely to indicate that the uncertain reasoner had a better way of thinking in the Moral Dilemma condition compared to the Personal Cost condition (see Figure 2). There was also a significant main effect of Age, OR = 1.58, 95% CI = [1.13, 2.22]; $p = 0.008$, indicating that in general, older children were more likely to choose the uncertain reasoner compared to younger children. The interaction between age and condition was marginal but not significant (OR = 0.67, 95% CI = [0.42, 1.06]; $p = 0.08$), indicating that the differences in children's judgments between the two conditions were similar across all age groups, but slightly more disparate in older children.

2.2.2 | Reason Justification Question

Children's answers to the reason *justification* questions were transcribed from videotaped sessions and coded by two coders

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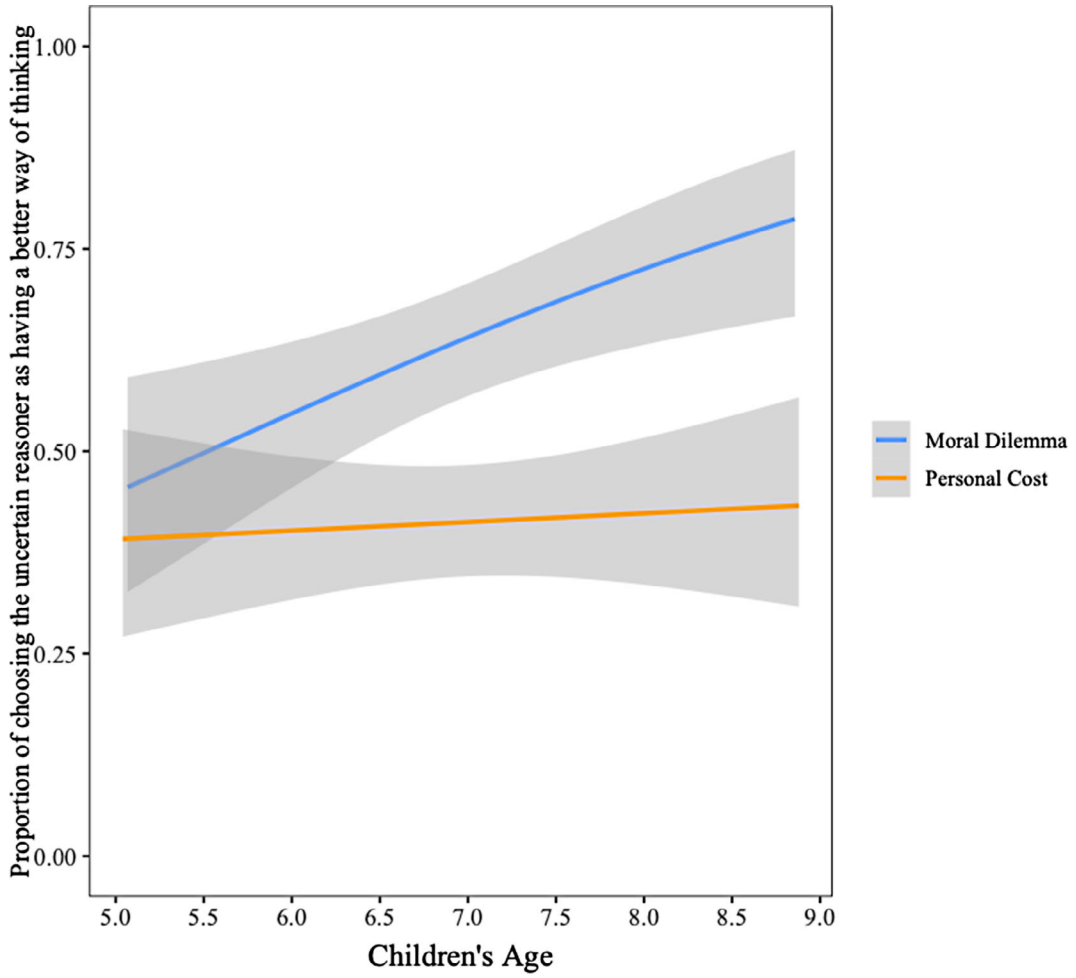


FIGURE 2 | Proportion of choosing the uncertain reasoner as having a better way of thinking as a function of Age and Condition in Study 1. Separate line types indicate children's thinking evaluation responses in the Moral Dilemma and Personal Cost conditions. Gray shading indicates standard errors.

who were blind to children's age and condition. Reliability coding was then calculated based on 25% of the justifications. Interrater reliability was high (95%). Discrepancies were resolved through discussion.

Here, we coded participants' responses into the following types of reasoning: (1) discussing specific moral context, (2) discussing general reasoning process, (3) meta-talk about reasoners, and (4) uninformative justifications. Within each type of reasoning, we had different coding categories for each specific type of response (see categories, definitions, and examples of the categories in Table 1).

Overall, around 40%–50% of the responses across both conditions focused on reasoning about the moral actions in each story. Notably, children were also more likely to discuss the reasoner's general reasoning process in the Moral Dilemma condition (26.6%) compared to the Personal Cost condition (12.3%). Some of the responses also consist of meta-talk about the reasoners, though only a small percentage of responses focused on the certainty of the reasoners (Moral Dilemma condition 5.5% and Personal Cost condition 7.9%; see Table 2)

2.2.3 | Niceness Question ("Who do you Think is Nicer?")

Another main question is whether participants judged the uncertain reasoner as nicer in the Moral Dilemma condition. Here, we found a significant interaction between Age and Condition, OR = 0.44, 95% CI = [0.25, 0.77]; $p = 0.004$, indicating that with age, children were more likely to distinguish between the two conditions and judge the uncertain reasoner as nicer in the Moral Dilemma condition compared to the Personal Cost condition (see Figure 3). In addition, the main effects of Age (OR = 1.92, 95% CI = [1.27, 2.88]; $p = 0.002$) and Condition (OR = 0.34, 95% CI = [0.18, 0.65]; $p = 0.002$) were also significant.

To further unpack the interaction between Age and Condition, we divided children up into a younger age group (5- and 6-year-olds) and an older age group (7- and 8-year-olds). We first compared each age group's likelihood of choosing the uncertain reasoner to chance. Overall, young children's responses were not significantly different from chance in either of the conditions ($ps > 0.6$). But for the older age group, children were significantly more likely to judge the uncertain reasoner as nicer than the

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TABLE 1 | Children's justification categories for choices of better way of thinking in Studies 1 and 2.

Justification type	Category name	Description	Example
Discussing specific moral context	One-sided reasoning	Explaining how one of the two actions in the story is right without discussing the other action.	"Because you have to help the little boy find his basketball."
	Reasoning about both sides	Reasoning about the validity of both actions in the story.	"It's nice to help somebody pick up blocks but it's really good to keep a promise and a promise is a promise."
Discussing general reasoning process	One right answer	Explicitly saying that there is a right and wrong action.	"Because there might actually not be a right or wrong answer."
	No right answer	Explicitly saying that there are no right and wrong actions.	"Both of them are good things to do and they will make you feel good afterwards. They are the same so there isn't one right way and wrong way."
Meta-talk about the reasoners	Meta-talk about reasoner's level of confidence	Commenting on the reasoners' level of uncertainty or confidence	"Daisy said 'definitely' not ' I think' there is a wrong way and a right way."
	Other meta-talk	Other meta-talk about the reasoner's epistemic or moral characters	"She keeps on thinking all these good ideas and she's acting like a really nice friend."
Uninformative justifications	Uninformative	Restating their choices without elaborating on why one reasoner's thinking is better, making comments that are irrelevant to the reasoners' statements and the stories or saying that they don't know.	"Because blue is the lucky color."

TABLE 2 | Children's justifications for choices of better thinking across Studies 1 and 2.

Justification type	Category name	Study 1 Moral dilemma co	Study 1 Personal cost condition	Study 2
Discussing specific moral context	One-sided reasoning	25.60%	44.70%	29.70%
	Reasoning about both sides	13.90%	13.30%	13.40%
Discussing general reasoning process	One right answer	4.40%	2.70%	3.60%
	No right answer	22.20%	9.60%	16.90%
Meta-talk about the reasoners	Meta-talk about reasoner's level of confidence	5.50%	7.90%	21.30%
	Other meta-talk	12.20%	8.50%	4%
Uninformative justifications	Uninformative	16.10%	13.30%	15.60%

confident reasoner in the Moral Dilemma condition ($M = 0.76$, 95% CI: [0.16, 0.34], $p < 0.01$), but they were not selective in the Personal Cost condition ($M = 0.47$, 95% CI: [0.47, 0.67], *ns*). We next compared children's responses across the two conditions for each age group. Post-hoc B–H corrected pairwise comparisons of estimated marginal means (EMMs) revealed that on average, the younger children did not differ between the two conditions ($p = 0.5$), but the older children were more likely to say the uncertain reasoner was "nicer" than the confident reasoner ($p < 0.001$).

2.2.4 | Children's Own Responses to the Dilemma

We also assessed children's own decisions about the right course of action (e.g., "What is the right thing to do? Should Liam [help James] or [keep his promise with Noah]?"). Out of 129 participants, 104 answered the question in at least one trial, and 100 participants responded across all three trials.

In the Moral Dilemma Condition, children stated that the main character should help in 62/143 of their responses across trials

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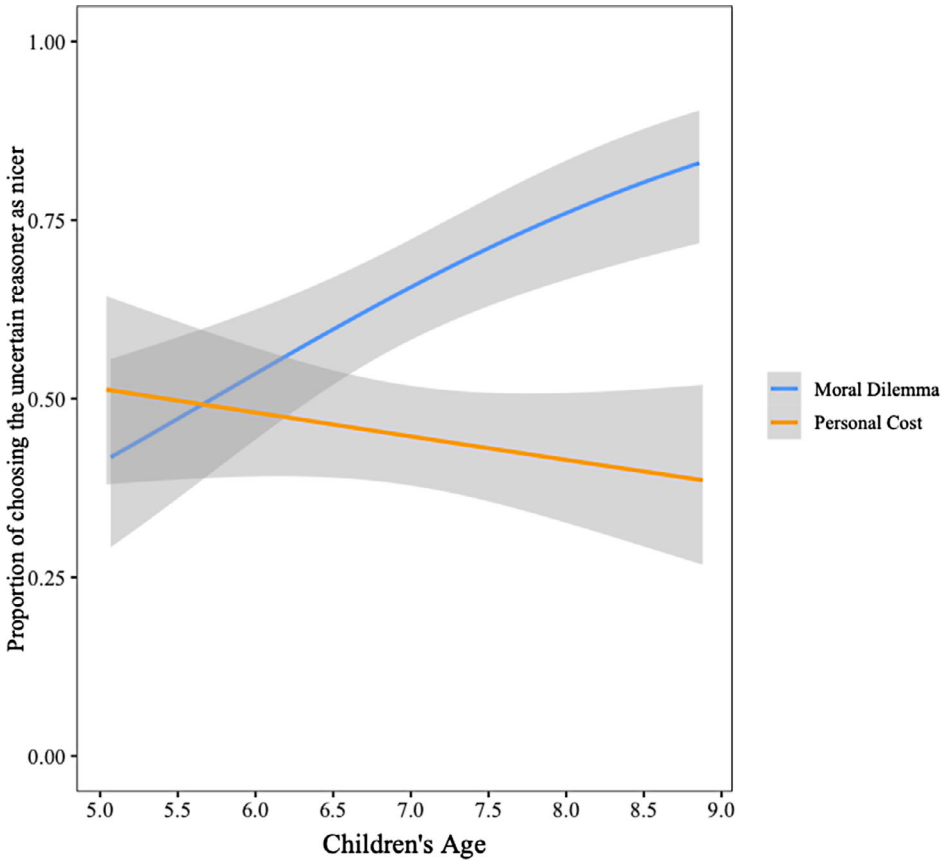


FIGURE 3 | Proportion of choosing the uncertain reasoner as nicer as a function of Age and Condition in Study 1. Separate line types indicate children's nicer judgments in the Moral Dilemma and Personal Cost conditions. Gray shading indicates standard errors.

(43.4%), keep the promise in 49/143 of their responses (34.3%), and expressed uncertainty or indicated that both actions would be appropriate in 32/143 (22.4%) of the responses. There is no significant difference in the frequency of "help" and "promise" responses, $\chi^2(1, N = 111) = 1.52$, *ns*. In the Personal Cost Condition, children stated that the main character should choose the prosocial action (i.e., help or keep the promise) in 136/164 (82.9% - 61 help and 75 promise, due to counterbalancing) of the responses, perform the self-interested action in 9/164 (5.5%) of the responses, and were unsure or suggested both actions in 19/164 (11.6%) of the responses. A chi-square test for goodness of fit revealed that the prosocial and self-interested responses were not equal, $\chi^2(1, N = 145) = 111.23$, $p < 0.001$. This pattern of results shows that children preferred one right course of action in the Personal Cost condition but did not do so in the Moral Dilemma condition.

To explore whether children's own responses affected their evaluations of the reasoners, we also coded children's responses as "matching" the confident reasoner if they made the same judgment as the reasoners (e.g., child agreed with the reasoners that the story character should help), and as "not matching" the confident reasoner if they made a different judgment (e.g., child indicated that the main character should keep the promise, or was unsure). We found that whether children's responses matched the confident reasoner did not significantly predict children's reason evaluation responses (OR = 1.34, 95% CI = [0.73, 2.48]; $p = 0.3$) or their niceness responses (OR = 1.5, 95% CI = [0.86, 2.61]; $p = 0.2$), indicating that children's own responses in Study 1 did not significantly influence their judgments about the reasoners.

2.2.5 | Selective Learning Task

To explore whether participants demonstrated selectivity in their learning from the two reasoners, we analyzed their responses in the *selective learning task*. Preliminary analyses revealed no significant effects of question type (*ask* vs. *endorse* questions) or the orders of the informants in the selective trust task, so we collapsed *ask* and *endorse* responses for all subsequent analyses (as in, e.g., Doebel and Koenig 2013).

The generalized linear mixed-effect model with Age and Condition revealed a significant main effect of condition on children's selective learning choices, OR = 0.71, 95% CI = [0.52, 0.97], $p = 0.03$. These results indicate that children were more likely to learn from the reasoner who expressed uncertainty in the Moral Dilemma condition compared to the Personal Cost condition (see Figure 4). There were no other main effects, and adding interaction terms did not significantly impact model fit. In addition, including the type of trial (i.e., factual, instrumental, moral, and normative) as a predictor in the model did not significantly improve model fit ($ps > 0.3$), indicating that children's likelihood of seeking information from the uncertain reasoner is not affected by the domain of knowledge. Comparison to chance revealed that on average, younger children (5- and 6-year-olds) did not

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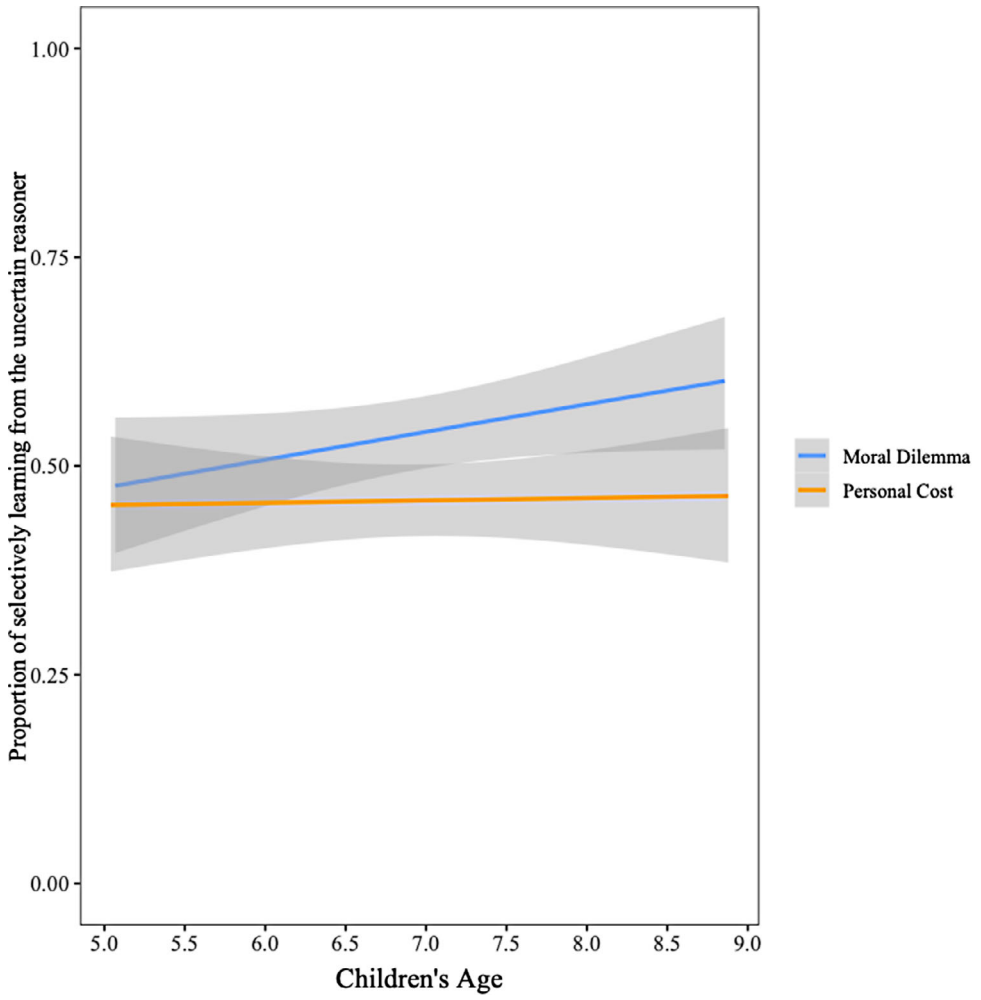


FIGURE 4 | Proportion of choosing the uncertain reasoner to learn from as a function of Age and Condition in Study 1. Separate line types indicate children's learning decisions in the Moral Dilemma and Personal Cost conditions. Gray shading indicates standard errors.

distinguish between the two reasoners in their learning choices (*ps* > 0.1); whereas older children (7- and 8-year-olds) preferred to learn from the uncertain reasoner in the Moral Dilemma condition (M = 0.6, 95% CI: [0.34, 0.47], p = 0.002), but not in the Personal Cost condition (p = 0.3).

2.2.6 | Explicit Judgment Task

The explicit judgment task was included to explore whether children's preference for one type of moral reasoning would affect their overall epistemic and social evaluations of the two reasoners.

For children's responses to the *liking question*, we found a main effect of Age (OR = 2.03, 95% CI = [1.25, 3.51]; p = 0.006) and a significant interaction between age and condition, OR = 0.47, 95% CI = [0.24, 0.89]; p = 0.02. This indicates that with age, children were more likely to indicate that they liked the uncertain speaker more in the Moral Dilemma condition compared to the Personal Cost condition. Similarly, we found a significant main effect of Condition for children's responses to the *play question* (i.e., who participants wanted to play with more), OR = 0.48, 95% CI = [0.24, 0.97]; p = 0.04.

We did not find a Condition effect when children were asked who a better person was (p = 0.05), who knew more (p = 0.07), and who was smarter (p = 0.075), but the pattern of results was trending in similar ways as children's responses to the other questions (see Supplementary Materials for the visualization of the data and a detailed report of the analyses and results).

2.3 | Discussion

In Study 1, we explored whether 5- to 8-year-old children appreciate that reasoning about dilemmas requires acknowledging that there are no clear-cut solutions. Our findings revealed that with age, children were increasingly likely to make positive epistemic and moral evaluations of a reasoner who acknowledged the existence of a moral dilemma (both actions are "good things to do") and who expressed uncertainty in their recommendation of what to do. Children in the Moral Dilemma condition preferred the uncertain reasoner's way of thinking, judged her to be nicer, and more trustworthy to learn from, and indicated that they liked her more. In contrast, we found no such preference when a reasoner acknowledged a dilemma in, and was uncertain about, a decision involving choosing between personal desire and moral action. Similar to prior work (e.g., Zhao and Kushnir 2023), so long

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as both reasoners recommended the character make the moral decision, how they arrived at the recommendation did not matter.

Previous research has indicated that like adults (Price, and Stone 2004; Van Swol and Sniezek 2005; Tenney et al. 2007), children as young as 4 years of age almost always take confidence as sign of competence (Birch, Akmal, and Frampton 2010; Brosseau-Liard, and Poulin-Dubois 2014; Jaswal, and Malone 2007; Sabbagh and Baldwin 2001). Therefore, it is noteworthy that children in Study 1 consider a humble approach to reasoning about dilemmas to be the most appropriate response. Minimally, this suggests that children implicitly recognize that the uncertainty inherent in choosing one moral action over another is uniquely different from the uncertainty inherent in incurring a personal cost for the benefit of others (Starmans, and Bloom 2016; Zhao and Kushnir 2023).

But of course, the expression of confidence in our set-up was a confident statement that there was one right answer. Conversely, the expression of uncertainty was accompanied by an acknowledgment that there was no clear right answer (that both were right). Thus, one question that remains unanswered is whether children's positive epistemic and moral evaluations of the uncertain reasoner is driven by the uncertain reasoner's acknowledgment that both actions are morally right, her expressions of uncertainty, or a combination of both. We address this question in Study 2 with a set up in which both reasoners acknowledge the dilemma (no "right answer") but one is confident about how to resolve it while the other admits that they are uncertain.

3 | Study 2

3.1 | Method

3.1.1 | Participants

A total of 75 children aged 5–8 years completed Study 2 (M_{age} = 7.06 years; SD = 1.11 years; range = 5.23–8.86 years; 32 boys and 43 girls). Participants were recruited from the same departmental database as Study 1. Children were predominantly White (75.9% White, 3.1% Asian, 3.5% Black, 9.2% Hispanic or Latino, and 8.3% identified their child with multiple races or ethnicities). Similar to Study 1, self-reported socioeconomic status was high for the parents: 63.6% of the primary caregiver had a Graduate/Professional School degree, and 33.8% had a College Diploma. Of the participants' other caregivers, 54.5% had a Graduate/Professional School degree, and 36.4% had a College Diploma. Participants' parent reported income was primarily middle to upper class, with 68.8% of the parents reporting an annual income greater than $100,000 per year, 23.4% reporting an income between $50,000 and $100,000, and 7.8% reporting an annual income lower than $50,000.

3.1.2 | Procedure

The general procedure of Study 2 was the same as the Moral Dilemma condition in Study 1, with one important change: In Study 2, both the confidence reasoner and the uncertain reasoner acknowledged the legitimacy of both moral actions (i.e., saying that both helping and promise keeping are good choices), and they only differed in their certainty level. For example, the confident reasoner said: "I am sure there is a right answer. Both [helping] and [keeping a promise] are good things to do. But I'm sure the right answer is that Liam should [help James]." By contrast, the uncertain reasoner reached the same conclusion but was less sure about her choice: "Hmmm, I am not sure there is a right answer. Both [helping] and [keeping a promise] are good things to do. So I'm not sure what right answer is, but hmm, ok, Liam should [help James]." Same as Study 1, in each of the three trials, children then answered a *reasoning evaluation question* ("Who do you think has a better way of thinking, Daisy or Iris?"), an open-ended *justification* question (e.g., "Why do you think Daisy has a better way of thinking?"), and a *niceness question* ("Who do you think is nicer, Daisy or Iris?"). Children then completed the same *Selective Learning task* and *Explicit Judgment Task* as in Study 1.

3.2 | Results

As in Study 1, we used Generalized Linear Mixed-Effect Models (GLMMs) with binomial distributions for data analysis. Preliminary analysis revealed no significant effects for gender or the counterbalanced orders.

3.2.1 | Reasoning Evaluation Question ("Who do you Think has a Better way of Thinking?")

For the main analyses, we included Age (continuous and centered) as a fixed effect, and participant as a random effect. Interestingly, a preliminary examination of the distribution of children's responses suggests that the relationship between Age and children's reasoning evaluation responses is not linear. Therefore, we also included a model that included Age as a quadratic term. The model with the quadratic term provided a better model fit than the model without it ($\chi^2(1) = 5.62$, $p = 0.02$). Specifically, we found a significant main effect of the quadratic term of Age, OR = 0.64, 95% CI = [0.44, 0.94]; p = 0.02 (see Figure 5). To further unpack this age effect, we compared children's choice of the uncertain reasoner with chance. We found that 5-year-old children were significantly below chance in choosing the uncertain reasoner ($p = 0.004$), indicating that they had a strong preference for the confident reasoner. In contrast, 6- and 7-year-olds chose the uncertain reasoner at the above chance levels (6-year-olds: $p = 0.02$, 7-year-olds: $p = 0.03$). Interestingly, 8-year-olds were at the chance and did not have a preference for either reasoner's "way of thinking" ($p = 1$).

3.2.2 | Justification Question

We coded children's responses to the reason justification questions using the same categories as in Study 1. Reliability was assessed on 25% of the justifications, resulting in an inter-rater reliability (IRR) of 93%. Any discrepancies were resolved through discussion.

In Study 2, 43.1% of the responses focused on reasoning about the specific moral actions (29.7% one-side reasoning, 13.4% reasoning

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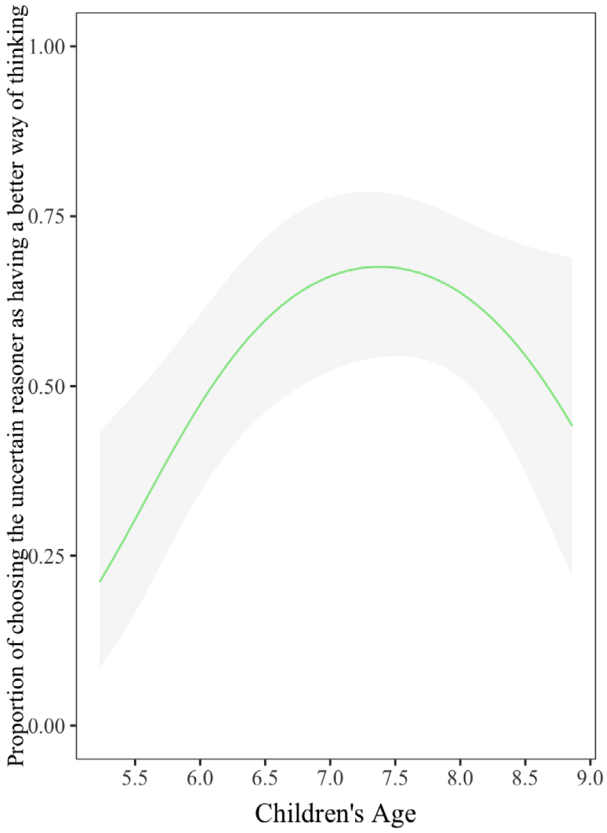


FIGURE 5 | Proportion of choosing the uncertain reasoner as having a better way of thinking as a function of age in Study 2. Gray shading indicates standard errors.

from both sides), and 20.5% of the responses focused on discussing the general reasoning process (3.6% indicating there is one right answer, and 16.9% indicated there is no right answer, see Table 2). While these percentages were similar to children's responses in Study 1, more reactions in Study 2 (21.3%) focused on meta-talk about the reasoners' level of certainty (e.g., "because they're both good things and it's good to not be sure which one is better").

3.2.3 | Niceness Question ("Who do you Think is Nicer?")

A similar age-related pattern emerged when we asked participants to judge which reasoner was nicer. Comparisons to chance revealed that 5-year-olds chose the uncertain reasoner at below chance levels ($p = 0.004$), indicating that they considered the confident reasoner as nicer. Children in the older age groups were at chance of choosing who was nicer ($ps > 0.1$). However, the main effect of Age as a continuous variable was not significant (OR = 1.45, 95% CI = [0.97, 2.16]; $p = 0.07$).

3.2.4 | Children's Own Responses

In Study 2, all participants gave their moral judgments across all three trials. A total of 47.1% of the responses (106/ 225) were focused on helping, 40.9% of the responses (92/225) were focused on promise keeping, and 12% of the responses (27/225) reflected uncertainty or that both actions were good. As in the Moral Dilemma condition in Study 1, there is no significant difference in proportions of "help" and "promise" responses, $\chi^2(1, N = 198) = 8.1$, *ns*.

We found that whether children's own choice matched the reasoners' conclusions was a significant predictor of children's reason evaluation responses (in addition to the quadratic main effect of Age), OR = 4.31, 95% CI = [1.97, 9.42]; $p = 0.0003$. Post-hoc Benjamini–Hochberg corrected pairwise comparisons of estimated marginal means (EMMs) revealed that on average, 5- and 6-year-olds' responses were not affected by their moral judgments ($ps > 0.2$), but for 7- and 8-year-olds, children were more likely to choose the uncertain reasoner if their responses did not match the reasoners (7-year-olds: $p = 0.006$; 8-year-olds: $p = 0.006$, see Figure 6). Children's moral judgments did not significantly influence their judgments of the reasoner's niceness (OR = 1.25, 95% CI = [0.63, 2.5]; $p = 0.5$).

3.2.5 | Selective Learning Task

The generalized linear mixed-effect model for children's selective learning choices did not reveal a significant effect of Age, OR = 1.22, 95% CI = [0.98, 1.51], $p = 0.07$. However, comparison to chance revealed that on average, 5-year-olds again preferred the confident reasoner, $M = 0.36$, $p = 0.001$, and older children (6- to 8-year-olds) did not distinguish between the two reasoners in their selective learning choices ($ps > 0.08$).

3.2.6 | Explicit Judgment Task

Overall, the age-related patterns in the *explicit judgment* task were also consistent with their *reason evaluation* responses. Five-year-old children evaluated the confident reasoner more positively than the 6- and 7-year-old children (see Table 3). Specifically, the quadratic term for Age (continuous) was significant in children's responses to who knows more (OR = 0.62, 95% CI = [0.39, 0.96], $p = 0.04$). We also found a moderate linear main effect of Age for the question "who is a better person" (OR = 1.55, 95% CI = [1.02, 2.43], $p = 0.045$). The main effects of Age were not significant for the social preference questions assessing who children liked more, preferred to play with more ($ps > 0.2$), or judged as smarter ($p = 0.06$).

3.3 | Discussion

In Study 2, we presented children with two reasoners who both recognized the dilemma by acknowledging both prosocial actions were "good things to do," and they only differed in their certainty or uncertainty about which courses of action to recommend. Under these conditions, we found that children's evaluative judgments of the reasoners changed with age. Younger children (5-year-olds) preferred a reasoner that both acknowledges the dilemma and displays confidence in how to resolve it. In contrast, 6- and 7-year-olds showed a preference for a reasoner that acknowledges the dilemma and also admits uncertainty about which decision to make. Eight-year-olds showed no overall preference for uncertainty overconfidence. In addition to uncertainty, we found that 7- and 8-year-old children considered how the

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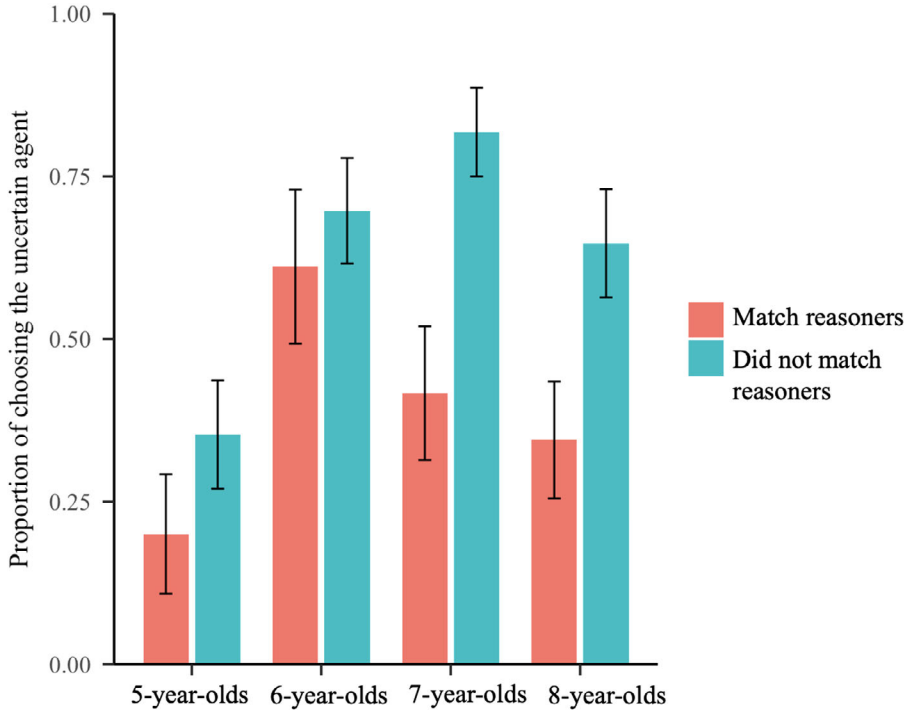


FIGURE 6 | Mean proportions of choosing the uncertain reasoner in Study 2 as a function of age and whether children's moral judgments matched the reasoners'. Error bars represent the standard errors of the mean proportions.

TABLE 3 | Children's responses to the explicit judgment questions in Study 2. The mean proportions represent children's choices of the uncertain reasoner.

	Like more		Play with more		Smarter		Knows more		Better person	
	M	(*SD*)	*M*	(*SD*)	*M*	(*SD*)	*M*	(*SD*)	*M*	(*SD*)
5-year-olds ($N = 18$)	0.44	(0.12)	0.44	(0.12)	0.33	(0.11)	0.28	(0.11)	0.28	(0.11)
6-year-olds ($N = 17$)	0.65	(0.12)	0.53	(0.13)	0.59	(0.12)	0.69	(0.12)	0.47	(0.13)
7-year-olds ($N = 19$)	0.78	(0.1)	0.47	(0.12)	0.63	(0.11)	0.63	(0.11)	0.67	(0.11)
8-year-olds ($N = 21$)	0.62	(0.11)	0.33	(0.11)	0.57	(0.11)	0.38	(0.11)	0.57	(0.11)

reasoners' judgments matched or mismatched from their own, and preferred the confident reasoner when their own moral judgments matched her judgment.

The age-related patterns in Study 2 are consistent with previous work showing that younger children value confidence (Jaswal and Malone 2007; Sabbagh and Baldwin 2001). As the reasoners we presented were adults, 5-year-old children may have treated the adult who confidently resolves a dilemma as displaying moral expertise (Lutz and Keil 2002; Koenig, and Jaswal 2011; Kushnir, Vredenburgh, and Schneider 2013). Six- and 7-year-olds, however, still valued acknowledgments of the limits of moral knowledge—that moral dilemmas may indeed be unknowable or unsolvable (Sinnott-Armstrong 1988). This is consistent with a growing literature showing that over the elementary school years, children increasingly appreciate that it is important to express openness about one's own knowledge limitations (Tenney et al. 2011; Kominsky, Langthorne, and Keil 2016; Hagá and Olson 2017; Mills and Keil 2004)—a key aspect of intellectual humility (Porter et al. 2021).

Interestingly, we also found that children's evaluations were influenced by whether the reasoners' specific judgments aligned with children's moral judgments (which action they think the character should decide to do). All else equal, 7- and 8-year-old children only displayed a preference for reasoners who showed uncertainty or hesitancy in their tone when the reasoners' moral choices differed from their own. These results suggest that, beyond recognizing the dilemma, older children may also value agreement or affirmation of their moral judgments. When a reasoner does not share their moral judgments, children may prefer that the reasoner exhibits uncertainty because it implies a recognition of the child's perspective as potentially valid, signaling that the reasoner is open to reconsidering their stance and is not dismissing the child's viewpoint. This tendency to desire agreement may echo similar findings in the literature on children's tendency to positively evaluate and affiliate with individuals whose moral judgments align with their own (Wainryb and Ford 1998). This pattern is also consistent with adults' "myside bias" in moral reasoning (Rottman, Foster-Hanson, and Bellersen 2023; Čavojová, Šrol, and Adamus 2018). Following

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this interpretation, an interesting question remains about why the 6-year-olds preferred uncertainty and not agreement. One possibility is that they were less sure of their own moral decision than the older children and that if the decisions were complex enough, even 8-year-olds may prefer a reasoner who was as uncertain as themselves. Further research is needed to explore this possibility.

4 | General Discussion

In two studies, we show that 5- to 8-year-old children recognize that situations that involve conflicts between two moral actions are dilemmas with no single right answer, which is prior to the age at which children are thought to have the requisite skills or experience necessary to resolve dilemmas on their own (Kohlberg 1969). In Study 1, children judged a moral reasoner who acknowledged the existence of a moral dilemma with appropriate uncertainty about the answer as epistemically and morally praiseworthy. They did not favor the same uncertainty in situations that involved a conflict between a moral action and a personal desire. In Study 2, we examined children's evaluations of expressions of uncertainty ("I don't know" and "I'm not sure") in cases where both reasoners acknowledged the dilemma. In this case, expressions of certainty and uncertainty influenced children's evaluations differently at different ages. Overall, 5-year-olds preferred that the acknowledgment be accompanied by a confident decision, 6- and 7-year-olds preferred that it be accompanied by uncertainty, and 8-year-olds showed no preference.

Our results show that young children are responsive to signals of a humble approach to reasoning about moral dilemmas. Across this age range, the most important signal that children value as a sign of character is the explicit acknowledgment that there is no single and simple answer. Although less predominant, 6- and 7-year-old children may also look for indirect signals, such as admitting uncertainty about the right decision. Given that previous research has shown that young children and adults find confidence to be a salient cue of reliability (e.g., Birch, Akmal, and Frampton 2010; Sabbagh and Baldwin 2001; Price, and Stone 2004), it is notable that children in the current study did not use confidence as a positive indicator of moral competence by default. Instead, children's character judgments (moral and epistemic combined) suggest that with age children recognize and value individuals who appreciate the complexity inherent in moral dilemmas and recognize that more than one course of action could be considered morally right.

The age-related changes across the two studies also suggest a general growing understanding of a humble approach when reasoning about more complex moral situations. These developmental patterns are consistent with work on children's evaluations of others' reasoning quality: Between 5 and 7 years of age, children can explain and justify their evaluations of someone's reasoning (Domberg, Koymen, and Tomasello 2019) and use meta-talk to discuss other people's knowledge states (Hartwell et al. 2022; Koymen and Tomasello 2018). Between the ages of 6–9, children's evaluations of others' reasoning shift from being outcome-focused to being process-focused (Schleihauf et al. 2023.). Our results add increasingly sophisticated moral reasoning to this growing body of work showing that between 5 and 8, children develop a greater capacity to both recognize unknowable circumstances and value people who acknowledge their limitations in thinking.

When the dilemma was acknowledged by both reasoners, an additional predictor of older (7- and 8-year-old) children's epistemic evaluations in Study 2 was an agreement between the reasoners' judgments and children's moral judgments. This, combined with the results of Study 1, suggests that a potential strategy that children use for evaluating reasoners who face moral dilemmas may involve *metacognitive reflection*. In Study 1, children could reflect on their uncertainty, or their understanding that there was no clear right decision, then match their thinking with the reasoner who had the same reasoning process (i.e., "both [moral actions] make sense"). In Study 2, when both reasoners acknowledged the dilemma, some older children focused more on whether the reasoners' specific choice of moral action agreed with their own.

Children's judgments could also have been based on a *social-cognitive process* that reflect their appreciation for epistemic uncertainty, specifically that dilemmas should be approached with an awareness of the limitations of one's own moral knowledge. In Study 1, children could have attributed greater epistemic competence to the uncertain reasoner because she signaled open-mindedness in considering both possible actions and their respective moral implications. In Study 2, when both reasoners acknowledged the dilemma, 6- and 7-year-old children could have made the inference that, unlike the confident reasoner, the uncertain reasoner understood the limits of her own knowledge. This appreciation of epistemic uncertainty aligns well with other work showing that throughout early- to middle-childhood children begin to understand the virtue of admitting ignorance when there are clear epistemic limits (Kushnir and Koenig 2017; Kominsky, Langthorne, and Keil 2016; Tenney et al. 2011).

This latter possibility also relates to the growing body of work showing that children and adults recognize signs of intellectual humility more generally, which often involves an awareness of one's knowledge limits and the fallibility of one's beliefs (Hagá, and Olson 2017; Porter et al. 2021; Porter and Cimpian 2023). This line of recent work is not specific to the moral domain, and in fact, is often situated around issues in the scientific domain or other empirical topics (e.g., object names and mathematics). Therefore, it remains an open empirical question whether and how intellectual humility about empirical issues relates to humility in moral reasoning. One possibility is that children (and adults) do not judge humility in the moral domain similarly as they do about humility about science or other empirical topics. When it comes to scientific inquiries, the expressions of uncertainty can be deemed appropriate and virtuous when one lacks sufficient factual knowledge. In contrast, moral reasoning is often intertwined with deeply held values and principles, and such admittance of uncertainty cannot be easily resolved by procuring more factual knowledge. Thus, expressing signals of hesitancy in moral situations can be humble, but also unsettling because it touches on fundamental aspects of who we are and what we stand for. Indeed, when it comes to issues in the moral realm, even adults struggle with admitting their uncertainty and displaying flexibility in taking a moral stance (Huppert et al. 2023). Instead, they often have

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strong moral convictions in the face of controversial moral issues (Skitka et al. 2021), and are unforgiving of people who do not share their moral values (Rottman, Foster-Hanson, and Bellersen 2023).

Valuing others' humility is only sensible when the moral decisions to be made have no clear best course of action. Our current study ensured this by presenting conflicts between similarly weighed moral obligations. But not all dilemmas are equal: sometimes one moral outcome has much more severe consequences than the other, and in such cases perhaps more confidence about a best course of action is appropriate. Thus, one important future direction is to explore is how children judge uncertainty versus certainty in these cases (e.g., helping someone who is severely injured vs. keeping a promise to play with someone else).

Real-life moral decisions are often complex and multifaceted and lack a clearly correct answer. Taken together, our work suggests that before successfully resolving moral dilemmas independently, children recognize that the appropriate approach to reasoning about dilemmas involves acknowledging there is no single, simple solution. These studies provide insights into methods that empower children to become more open-minded as they navigate the complex moral landscape of the modern world, where they encounter a diversity of perspectives.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data and study materials that support the findings of the studies are openly available in Open Science Framework and can be accessed at the following link, https://osf.io/dfywt/. Study 1 was preregistered on AsPredicted (https://aspredicted.org/blind.php?x=T7Y_ZKY).

Endnotes

[1]We added additional participants so that each age group could have a balanced number of participants across all the counterbalanced orders.

References

Bates, D., M. Mächler, B. Bolker, and S. Walker. 2015. "Fitting Linear Mixed-Effects Models Usinglme4." *Journal of Statistical Software* 67, no. 1. https://doi.org/10.18637/jss.v067.i01.

Birch, S. A., N. Akmal, and K. L. Frampton. 2010. "Two-Year-Olds Are Vigilant of Others' Non-Verbal Cues to Credibility." *Developmental Science* 13: 363–369. https://doi.org/10.1111/j.1467-7687.2009.00906.x.

Brosseau-Liard, P. E., and D. Poulin-Dubois. 2014. "Sensitivity to Confidence Cues Increases During the Second Year of Life." *Infancy* 19: 461–475. https://doi.org/10.1111/infa.12056.

Brownell, C., M. Svetlova, and S. Nichols. 2009. "To Share or Not to Share: When Do Toddlers Respond to Another's Needs?" *Infancy* 14: 117–130. https://doi.org/10.1080/15250000802569868.

Bucciarelli, M. 2015. "Moral Dilemmas in Females: Children Are More Utilitarian Than Adults." *Frontiers in Psychology* 6: 1345. https://doi.org/10.3389/fpsyg.2015.01345.

Čavojová, V., J. Šrol, and M. Adamus. 2018. "My Point Is Valid, Yours Is Not: Myside Bias in Reasoning About Abortion." *Journal of Cognitive Psychology* 30, no. 7: 656–669. https://doi.org/10.1080/20445911.2018.1518961.

Church, I. M., and J. L. Barrett. 2016. "Intellectual Humility." In *Handbook of Humility*, 78–91. New York, United States: Routledge.

Cushman, F., L. Young, and M. Hauser. 2006. "The Role of Conscious Reasoning and Intuition in Moral Judgment: Testing Three Principles of Harm." *Psychological Science* 17, no. 12: 1082–1089.

Doebel, S., and M. A. Koenig. 2013. "Children's Use of Moral Behavior in Selective Trust: Discrimination Versus Learning." *Developmental Psychology* 49, no. 3: 462.

Domberg, A., B. Koymen, and M. Tomasello. 2019. "Young Children Choose to Reason With Partners Who Submit to Reason." *Cognitive Development* 52: 100824. https://doi.org/10.1016/j.cogdev.2019.100824.

Dworazik, N., J. Kärtner, L. Lange, and M. Köster. 2019. "Young Children Respond to Moral Dilemmas Like Their Mothers." *Frontiers in Psychology* 10: 2683. https://doi.org/10.1111/j.1467-9280.2006.01834.x.

Faul, F., E. Erdfelder, A. G. Lang, and A. Buchner. 2007. "G* Power 3: A Flexible Statistical Power Analysis Program for the Social, Behavioral, and Biomedical Sciences." *Behavior Research Methods* 39, no. 2: 175–191.

Geraci, A., and L. Surian. 2011. "The Developmental Roots of Fairness: Infants' Reactions to Equal and Unequal Distributions of Resources." *Developmental Science* 14: 1012–1020. https://doi.org/10.1111/j.1467-7687.2011.01048.x.

Greene, J. D., R. B. Sommerville, L. E. Nystrom, J. M. Darley, and J. D. Cohen. 2001. "An fMRI Investigation of Emotional Engagement in Moral Judgment." *Science* 293, no. 5537: 2105–2108. https://doi.org/10.1126/science.1062872.

Hagá, S., and K. R. Olson. 2017. "'If I Only Had a Little Humility, I Would be Perfect': Children's and Adults' Perceptions of Intellectually Arrogant, Humble, and Diffident People." *Journal of Positive Psychology* 12, no. 1: 87–98. https://doi.org/10.1080/17439760.2016.1167943.

Haidt, J. 2001. "The Emotional Dog and Its Rational Tail: A Social Intuitionist Approach to Moral Judgment." *Psychological Review* 108, no. 4: 814. https://doi.org/10.1037/0033-295X.108.4.814.

Hamlin, J. K., K. Wynn, and P. Bloom. 2007. "Social Evaluation by Preverbal Infants." *Nature* 450, no. 7169: 557–559. https://doi.org/10.1038/nature06288.

Hartwell, K., S. Brandt, L. Boundy, G. Barton, and B. Koymen. 2022. "Preschool Children's Use of Meta-Talk to Make Rational Collaborative Decisions." *Child Development* 93: 1061–1071. https://doi.org/10.1111/cdev.13750.

Huppert, E., N. Herzog, J. F. Landy, and E. Levine. 2023. "On Being Honest About Dishonesty: The Social Costs of Taking Nuanced (but realistic) Moral Stances." *Journal of Personality and Social Psychology* 125: 259. https://doi.org/10.1037/pspa0000340.

Jambon, M., and J. G. Smetana. 2014. "Moral Complexity in Middle Childhood: Children's Evaluations of Necessary Harm." *Developmental Psychology* 50, no. 1: 22. https://doi.org/10.1037/a0032992.

Jaswal, V. K., and L. S. Malone. 2007. "Turning Believers Into Skeptics: 3-Year-Olds' Sensitivity to Cues to Speaker Credibility." *Journal of Cognition and Development* 8: 263–283. https://doi.org/10.1080/15248370701446392.

Kanngiesser, P., M. Mammen, and M. Tomasello. 2021. "Young Children's Understanding of Justifications for Breaking a Promise." *Cognitive Development* 60: 101127. https://doi.org/10.1016/j.cogdev.2021.101127.

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Koenig, M. A., and V. K. Jaswal. 2011. "Characterizing Children's Expectations About Expertise and Incompetence: Halo or Pitchfork Effects?." *Child Development* 82: 1634–1647. https://doi.org/10.1111/j.1467-8624.2011.01618.x.

Kohlberg, L. 1969. "Stage and Sequence: The Cognitive-Developmental Approach to Socialization." In *Handbook of Socialization Theory and Research*, edited by D. A. Goslin, 347–480. Chicago: Rand McNally.

Kominsky, J. F., P. Langthorne, and F. C. Keil. 2016. "The Better Part of Not Knowing: Virtuous Ignorance." *Developmental Psychology* 52: 31. https://doi.org/10.1037/dev0000065.

Koymen, B., and M. Tomasello. 2018. "Children's Meta-Talk in Their Collaborative Decision Making With Peers." *Journal of Experimental Child Psychology* 166: 549–566. https://doi.org/10.1016/j.jecp.2017.09.018.

Kruger, A. C., and M. Tomasello. 1986. "Transactive Discussions With Peers and Adults." *Developmental Psychology* 22: 681. https://doi.org/10.1037/0012-1649.22.5.681.

Kushnir, T., and M. A. Koenig. 2017. "What I Don't Know Won't Hurt You: The Relation Between Professed Ignorance and Later Knowledge Claims." *Developmental Psychology* 53, no. 5: 826. https://doi.org/10.1037/dev0000294.

Kushnir, T., C. Vredenburgh, and L. A. Schneider. 2013. ""Who Can Help Me Fix this Toy?" The Distinction Between Causal Knowledge and Word Knowledge Guides Preschoolers' Selective Requests for Information." *Developmental Psychology* 49, no. 3: 446. https://doi.org/10.1037/a0031649.

Leary, M. R., K. J. Diebels, E. K. Davisson, et al. 2017. "Cognitive and Interpersonal Features of Intellectual Humility." *Personality and Social Psychology Bulletin* 43, no. 6: 793–813. https://doi.org/10.1177/0146167217697695.

Liszkowski, U., M. Carpenter, T. Striano, and M. Tomasello. 2006. "12- and 18-Month-Olds Point to Provide Information for Others." *Journal of Cognition and Development* 7: 173–187. https://doi.org/10.1207/s15327647jcd0702_2.

Lutz, D. J., and F. C. Keil. 2002. "Early Understanding of the Division of Cognitive Labor." *Child Development* 73, no. 4: 1073–1084. https://doi.org/10.1111/1467-8624.00458.

Mammen, M., B. Köymen, and M. Tomasello. 2019. "Children's Reasoning With Peers and Parents About Moral Dilemmas." *Developmental Psychology* 55: 2324–2335. https://doi.org/10.1037/dev0000807.

Mills, C. M., and F. C. Keil. 2004. "Knowing the Limits of One's Understanding: The Development of an Awareness of an Illusion of Explanatory Depth." *Journal of Experimental Child Psychology* 87, no. 1: 1–32. https://doi.org/10.1016/j.jecp.2003.09.003.

Pellizzoni, S., M. Siegal, and L. Surian. 2010. "The Contact Principle and Utilitarian Moral Judgments in Young Children." *Developmental Science* 13, no. 2: 265–270. https://doi.org/10.1111/j.1467-7687.2009.00851.x.

Piaget, J. 1965. *The Moral Judgement of the Child*. Translated by M. Gabain. New York: Free Press. (Original work published 1932).

Porter, T., C. R. Baldwin, M. T. Warren, et al. 2021. "Clarifying the Content of Intellectual Humility: A Systematic Review and Integrative Framework." *Journal of Personality Assessment* 104, no. 5: 573–585. https://doi.org/10.1080/00223891.2021.1975725.

Porter, T., and A. Cimpian. 2023. "A Context's Emphasis On Intellectual Ability Discourages the Expression of Intellectual Humility." *Motivation Science* 9, no. 2: 120–130. https://doi.org/10.1037/mot0000289.

Price, P. C., and E. R. Stone. 2004. "Intuitive Evaluation of Likelihood Judgment Producers: Evidence for a Confidence Heuristic." *Journal of Behavioral Decision Making* 17, no. 1: 39–57. https://doi.org/10.1002/bdm.460.

Rottman, J., E. Foster-Hanson, and S. Bellersen. 2023. "One Strike and You're a Lout: Cherished Values Increase the Stringency of Moral Character Attributions." *Cognition* 239: 105570. https://doi.org/10.1016/j.cognition.2023.105570.

Sabbagh, M. A., and D. A. Baldwin. 2001. "Learning Words From Knowledgeable Versus Ignorant Speakers: Links Between Preschoolers' Theory of Mind and Semantic Development." *Child Development* 72: 1054–1070. https://doi.org/10.1111/1467-8624.00334.

Sarkissian, H., J. Park, D. Tien, J. C. Wright, and J. Knobe. 2011. "Folk Moral Relativism." *Mind & Language* 26, no. 4: 482–505.

Schleihauf, H., Z. Zhang, A. Gomez, and J. M. Engelmann. 2023. "From Outcome to Process: A Developmental Shift in Judgments of Rational Reasoning." *Cognition* 236: 105425. https://doi.org/10.1016/j.cognition.2023.105425.

Schmidt, M. F., and J. A. Sommerville. 2011. "Fairness Expectations and Altruistic Sharing in 15-Month-Old Human Infants." *PLoS ONE* 6, no. 10: e23223. https://doi.org/10.1371/journal.pone.0023223.

Sinnott-Armstrong, W. 1988. *Moral Dilemmas*. Oxford: Basil Blackwell.

Skitka, L. J., B. E. Hanson, G. S. Morgan, and D. C. Wisneski. 2021. "The Psychology of Moral Conviction." *Annual Review of Psychology* 72: 347–366. https://doi.org/10.1146/annurev-psych-063020-030612.

Sloane, S., R. Baillargeon, and D. Premack. 2012. "Do Infants Have a Sense of Fairness?." *Psychological Science* 23: 196–204. https://doi.org/10.1177/0956797611422072.

Smetana, J. G. 1981. "Preschool Children's Conceptions of Moral and Social Rules." *Child Development* 4: 1333–1336. https://doi.org/10.2307/1129527.

Smetana, J. G. 1985. "Preschool Children's Conceptions of Transgressions: Effects of Varying Moral and Conventional Domain-Related Attributes." *Developmental Psychology* 21: 18–29. https://doi.org/10.1037/0012-1649.21.1.18.

Starmans, C., and P. Bloom. 2016. "When the Spirit Is Willing, But the Flesh Is Weak: Developmental Differences in Judgments About Inner Moral Conflict." *Psychological Science* 27, no. 11: 1498–1506. https://doi.org/10.1177/0956797616665813.

Tenney, E. R., R. J. MacCoun, B. A. Spellman, and R. Hastie. 2007. "Calibration Trumps Confidence as a Basis for Witness Credibility." *Psychological Science* 18, no. 1: 46–50. https://doi.org/10.1111/j.1467-9280.2007.01847.x.

Tenney, E. R., J. E. Small, R. L. Kondrad, V. K. Jaswal, and B. A. Spellman. 2011. "Accuracy, Confidence, and Calibration: How Young Children and Adults Assess Credibility." *Developmental Psychology* 47, no. 4: 1065. https://doi.org/10.1037/a0023273.

Tessman, L. 2014. *Moral Failure: On The Impossible Demands of Morality*. New York, United States: Oxford University Press.

Turiel, E. 1983. *The Development of Social Knowledge: Morality and Convention*. Cambridge, England: Cambridge University Press.

Van Swol, L. M., and J. A. Sniezek. 2005. "Factors Affecting the Acceptance of Expert Advice." *The British Journal of Social Psychology* 44, no. 3: 443.

Wainryb, C., and S. Ford. 1998. "Young Children's Evaluations of Acts Based on Beliefs Different From Their Own." *Merrill-Palmer Quarterly* 44, no. 4: 484–503.

Warneken, F., and M. Tomasello. 2009. "The Roots of Human Altruism." *British Journal of Psychology* 100, no. 3: 455–471. https://doi.org/10.1348/000712608x379061.

Zhao, X., and T. Kushnir. 2023. "When It's Not Easy to Do the Right Thing: Developmental Changes in Understanding Cost Drive Evaluations of Moral Praiseworthiness." *Developmental Science* 26: e13257. https://doi.org/10.1111/desc.13257.

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