Age-Related Changes in Information-Seeking Behavior about Morally Relevant Events

Daniel Yonas and Larisa Heiphetz Solomon

Department of Psychology, Columbia University

Author Note

Daniel Yonas https://orcid.org/0000-0003-2509-2995

Larisa Heiphetz Solomon

Correspondence concerning this article should be addressed to Daniel Yonas, Columbia University, 1190 Amsterdam Ave, New York, NY 10027. Email: dy2415@columbia.edu

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Abstract

With age, people increasingly emphasize intent when judging transgressions. However, people often lack information about intent in everyday settings; further, they may wonder about reasons underlying pro-social acts. Three studies investigated 4-to-6-year-olds', 7-to-9-year-olds', and adults' (data collected 2020-2022 in the northeastern United States, total n=669, ~50% female, predominantly White) desire for information about why behaviors occurred. In Study 1, older children and adults exhibited more curiosity about transgressions versus pro-social behaviors (ds=.52-.63). Younger children showed weaker preferences to learn about transgressions, versus pro-social behaviors, than did older participants (d=.12). Older children's emphasis on intent, but not expectation violations, drove age-related differences (Studies 2-3). Older children may target intent-related judgments specifically toward transgressions, and doing so may underlie curiosity about wrongdoing.

Keywords: curiosity; morality; social cognitive development

Introduction

Daily life presents numerous opportunities to experience morally relevant behaviors. During the course of a normal day at school, children might encounter pro-social actions like a peer sharing a snack with them as well as transgressions like a peer knocking them over. In order to figure out how to respond, it may be important to understand *why* the behavior occurred. For instance, children may expect more future pro-sociality from someone who shared because she wanted to rather than someone who shared because the teacher told her to. Similarly, children may expect future wrongdoing from someone who harmed them because of personal dislike, whereas someone who performed the same transgression because she was having an unusually hard day—or someone who did not even mean to cause harm but did so accidentally—may seem more capable of subsequent moral improvement.

These examples illustrate a number of key points about moral cognition. First, individuals often try to understand why others perform morally relevant behaviors (Ball et al., 2017; Smetana et al., 2013; Zelazo et al., 1996). Second, when morally relevant events occur, individuals seek information about the people performing the behavior in order to draw conclusions about them (Narvaez & Bock, 2002; Wojciszke et al., 1998). Third, information about the intent behind morally relevant actions shapes how individuals evaluate the morality of these behaviors and judge the people who perform them (Payir & Heiphetz, 2022; Young et al., 2007).

While a large body of work highlights the importance of intent to moral judgments, especially judgments made by elementary-schoolers and older individuals (e.g., Cushman, 2015; Killen et al., 2011; Zelazo et al., 1996), two important questions remain unaddressed. First, prior work on intent has typically provided participants with information about what an actor meant to

do and then probed moral judgments. However, in everyday life, information about intent is not always readily available. Thus, the current work examined children's and adults' desire to obtain information about intent. Second, prior work on children's intent-based moral judgment has largely focused on transgressions (e.g., Cushman et al., 2013; Killen et al., 2011; Payir & Heiphetz, 2022; Young et al., 2007; see Margoni & Surian, 2017, for an exception). However, intent shapes adults' judgments regarding praiseworthy as well as blameworthy actions (Lin-Healy & Small, 2013; Silver & Silverman, 2022). Thus, there is reason to suspect that children may exhibit curiosity about the intent underlying pro-social actions. Therefore, the current work investigated the extent to which children and adults desire information about the intent underlying pro-social behaviors versus transgressions.

The Development of Intent-Based Moral Judgments

Adults reliably focus on information about intent when judging the moral wrongness or rightness of others' behaviors (e.g., Ames & Fiske, 2013; Cushman, 2008; Heiphetz & Young, 2014). For instance, in one line of work (Young et al., 2007), adults delivered harsher moral judgments in cases of intentional rather than accidental harm. In contrast, young children often place less emphasis on intent and instead emphasize the outcome of the behavior. In one classic study demonstrating this effect (Piaget, 1932/1965), an experimenter told 6- to 10-year-olds about one character who broke a relatively large number of cups with positive intentions and a different character who broke a smaller number of cups with negative intentions. Younger children typically perceived the former character as more culpable despite that character's positive intent. However, with increasing age, children's moral judgments shifted to place greater emphasis on the character's intentions. In a related line of work (Killen et al., 2011), experimenters presented 3- to 8-year-olds with a story in which a well-intentioned child mistook

a peer's cupcake (which was concealed in a paper bag) for trash and threw it away. Here, older children were less likely than younger children to attribute negative intent to the transgressor and to advocate for punishing a person who committed an accidental harm.

The early elementary school years typically mark a shift from more outcomes-focused moral judgments to more intent-focused moral judgments. For instance, in one line of work (Cushman et al., 2013), participants learned about one character who performed an unintentional harm (e.g., accidentally tripped and pushed someone over) and another character who failed to perform an intentional harm (e.g., tried but failed to push someone over). While 4- to 5-year-olds judged accidental harms more harshly than failed attempts at harms, older participants showed the opposite pattern. In other words, older participants prioritized intent by giving characters credit for their positive desires.

Traditionally, studies investigating the role of intent in children's and adults' moral judgments have communicated whether or not specific behaviors were intentional (e.g., by explicitly stating that particular behaviors were intentional or providing contextual clues that led participants to make this inference; Baird & Astington, 2004; Cushman, 2008; Wainryb et al., 2004). These design choices are necessary to answer the main question posed in these studies, i.e., the extent to which participants' moral judgments show sensitivity to information about intent. At the same time, these paradigms do not always capture the reality of moral situations that people encounter during everyday life, when it can be difficult to obtain explicit information about intent—particularly in cases of intentional transgression, when actors may hesitate to provide information about their negative desires.

In these cases, individuals may seek information about intent to inform their moral judgments. That is, they may exhibit curiosity, or a desire to learn information that they do not

currently possess (Kidd & Hayden, 2015; Loewenstein, 1994; Marvin et al., 2020). Early in development, children make many attempts to satisfy curiosity; for instance, they explore (Ruggeri et al., 2019; Schulz & Bonawitz, 2007; Wu & Gweon, 2021) and ask questions (Legare et al., 2012; Liquin & Lombrozo, 2020; Ronfard et al., 2018). Much prior work on curiosity has focused on the domain of science, showing that children and adults seek to obtain information they currently lack (Gopnik, 2012; Jirout & Klahr, 2012; Legare, 2014; Metcalfe et al., 2017) and positively evaluate others' curiosity (Gill & Lombrozo, 2023; Mosley et al., 2024; White et al., 2024) regarding empirically verifiable matters such as how a piece of technology works or how the natural world functions. The current research built on these prior findings to investigate children's and adults' desire to seek information about a topic that is less subject to objective empirical verification—namely, other people's mental states.

Curiosity about Intent Underlying Transgressions versus Pro-Social Behaviors

As discussed above, much prior work on the role of intent in moral judgments has focused specifically on judgments of transgressions (Cushman et al., 2013; Killen et al., 2011; Payir & Heiphetz, 2022). Several important exceptions to this general rule have revealed that 10-month-olds (Woo et al., 2017) and 4- to 7-year-olds (Margoni & Surian, 2017) show sensitivity to the intent underlying pro-social behaviors as well. Nevertheless, there is reason to think that people may care about intentions particularly strongly when encountering wrongdoing. For instance, although 10-month-olds show sensitivity to intent for both positive and negative actions, they appear to prioritize intent especially strongly in the latter case (Woo et al., 2017). Additionally, children and adults show a negativity bias, attending to and remembering negative events more than positive ones (Baltazar et al., 2012; Rozin & Royzman, 2001; Vaish et al., 2008). Although positive information can sometimes exert a stronger influence on social

judgment than negative information once people have attended to it (e.g., Thorn et al., 2021), children and adults tend to initially allocate their attention to negative rather than positive stimuli. Thus, negative information may also exert a stronger pull than positive information on participants' desire to learn more.

Additionally, understanding why someone did something wrong might seem more important than understanding why someone behaved pro-socially, and topics that appear more important may elicit more curiosity than topics that appear less important (Dubey et al., 2022). Making inferences about others' mental states allows people to predict how those others will behave in the future (Young & Tsoi, 2013) and people are often more motivated to avoid negative outcomes rather than seek positive outcomes (Higgins, 1997; Tversky & Kahneman, 1991). In particular, when people encounter instances of harm, they may ask themselves whether the actor is likely to continue harming others—including, potentially the observer—in the future, or whether the actor will change for the better and cease their harmful behavior. If avoiding future harm is a higher priority for people than receiving future help, and if understanding others' intentions helps people feel that they can predict others' behaviors, then participants may be more curious about why people transgress rather than why they perform positive actions. Relatedly, some prior work has suggested that curiosity and its behavioral manifestations (e.g., exploration) are especially likely to emerge when observers notice a discrepancy between what they expect and what actually occurs (Liquin & Lombrozo, 2020; Stahl & Feigenson, 2015). Because pro-social behaviors are common (Frey & Meier, 2004; Rand et al., 2014; Warneken, 2018), transgressions may be unexpected and therefore elicit more curiosity than do pro-social behaviors.

An alternative possibility is that participants would show more interest in why people performed pro-social behaviors rather than transgressions. Indeed, adults do show sensitivity to intent when evaluating others' pro-social actions in some circumstances; for instance, they exhibit suspicion of others' motives when their pro-social actions benefit themselves (Lin-Healy & Small, 2013; Silver & Silverman, 2022). Children, too, attend to possibly unsavory reasons underlying pro-social acts. In one line of work, participants played a game with either a competitor who had an ulterior motive to provide false information in order to win the game or a partner who shared their interests and had no ulterior motive (Mills & Grant, 2009). Here, children as young as five years old were skeptical of the testimony of the individual with an ulterior motive. Similarly, 9- to 10-year-olds evaluated people who gave away a valuable resource in public as less generous than people who performed the same behavior privately (Heyman et al., 2014). If participants are looking out for ulterior motives underlying pro-social actions, they may be more curious about why others perform positive rather than negative behaviors.

Participants may also have more positive reasons for being more curious about pro-social behaviors rather than transgressions. Pro-social actors typically elicit more positive responses than people who have transgressed (Dirks et al., 2018; Hamlin, 2013; Vaish et al., 2018; Ziv et al., 2021), and participants may seek more information about people they like more and with whom they may want to affiliate. They may also exhibit curiosity about why others perform pro-social actions to bolster their own positive behaviors. Doing the right thing can sometimes be difficult, and knowing what motivated another person to do something hard may bolster participants' own motivations. For instance, children may hear from their parents that they should say nice things to others, and they may be motivated to please their parents but also struggle to

be nice in a given moment. They may want to learn why other people do nice things as a way to help themselves perform similar behaviors in the future.

To probe the extent to which children and adults show interest in the motivations underlying different behaviors, the current work presented participants with pairs of characters. In each pair, one person performed a pro-social behavior while the other person transgressed. Participants indicated the behavior about which they would prefer to learn, allowing us to test between two competing hypotheses—i.e., to determine whether participants preferred to learn about why transgressions or pro-social behaviors occurred.

Overview Of Current Studies

Extending prior research showing that children's responses to transgressions become more sensitive to intent as they get older (Baird & Astington, 2004; Killen et al., 2011), the current work examined the extent to which participants at different developmental milestones sought information about why people performed transgressions versus pro-social acts. Based on work showing that reasoning about intent shifts during the early elementary school years (Cushman et al., 2013), we compared 4- to 6-year-olds, who typically place relatively little emphasis on intent when evaluating moral transgressions, with 7- to 9-year-olds, whose moral judgments typically show more sensitivity to others' intentions. Study 1 compared the extent to which 4- to 6-year-olds, 7- to 9-year-olds, and adults preferred to learn about others' negative versus positive behaviors. Studies 2-3 sought to determine whether Study 1's results would replicate in new samples and to test possible mechanisms underlying the age-related differences observed in Study 1. Together, these studies extend scientific understanding of moral development, curiosity, and social cognitive development more broadly.

Study 1

Study 1 used a forced-choice paradigm to investigate the extent to which children and adults want to learn why transgressions, versus pro-social behaviors, occur. Because children's use of information about intent shifts in early elementary school (Baird & Astington, 2004; Killen et al., 2011), we compared 4- to 6-year-olds, 7- to 9-year-olds, and adults. We collected these data in between December of 2020 and May of 2021. We preregistered this study and relevant analyses at https://aspredicted.org/blind.php?x=C2G_VNZ.

Method

Participants. Our final sample included 77 children between four and six years old (m_{age}=4.75 years, sd_{age}=0.81 years; 37 female, 40 male), 80 children between seven and nine years old (m_{age}=8.10 years, sd_{age}=0.87 years; 38 female, 42 male), and 192 adults (m_{age}=37.69 years, sd_{age}=10.83 years; 91 female, 101 male). We determined sample sizes prior to collecting data using G*Power, indicating 80% power for a two-tailed *t*-test and estimating an effect of Cohen's *d*=.50. Adult participants and the parents of child participants completed a demographic questionnaire during or before the session on which they identified themselves or their children as White or European American (*n*=256), Black or African American (*n*=13), Asian or Asian American (*n*=40), Native American or Pacific Islander (*n*=4), multiracial (*n*=31), or another, unlisted group (*n*=2); the remaining participants did not answer this question. Our demographic questionnaire asked about ethnicity separately from race, and 26 participants (or parents of child participants) identified as Hispanic or Latinx. We recruited children through a departmental database and tested them in a synchronous online session due to the COVID-19 pandemic; families received a $5 gift card. Adults were recruited and completed the study via Amazon Mechanical Turk; they received $2.00 in compensation. In addition to these participants, we tested and excluded six children whose parents submitted consent forms that were only partially

completed and one child who did not complete the study. We did not exclude any adult respondents.

Procedure. All procedures for this and each subsequent study were conducted in accordance with APA ethical standards. Procedures were approved by the IRB at the authors' institution.

An experimenter greeted children and told them that they would answer a series of questions that had no right or wrong answers. The experimenter then presented children with a series of five vignettes describing a pair of individuals, one of whom performed a transgression and the other of whom performed a matched pro-social behavior. For example, on one trial, participants saw the image depicted in Figure 1. The experimenter indicated that the person on the right saw the person in the middle crying and made fun of them, while the person on the left saw the person in the middle crying and made them feel better. At no point did the experimenter say why any behavior occurred. The order of vignettes and valence of character described first were counterbalanced across participants. The full text of all vignettes is located in the supplementary online materials.

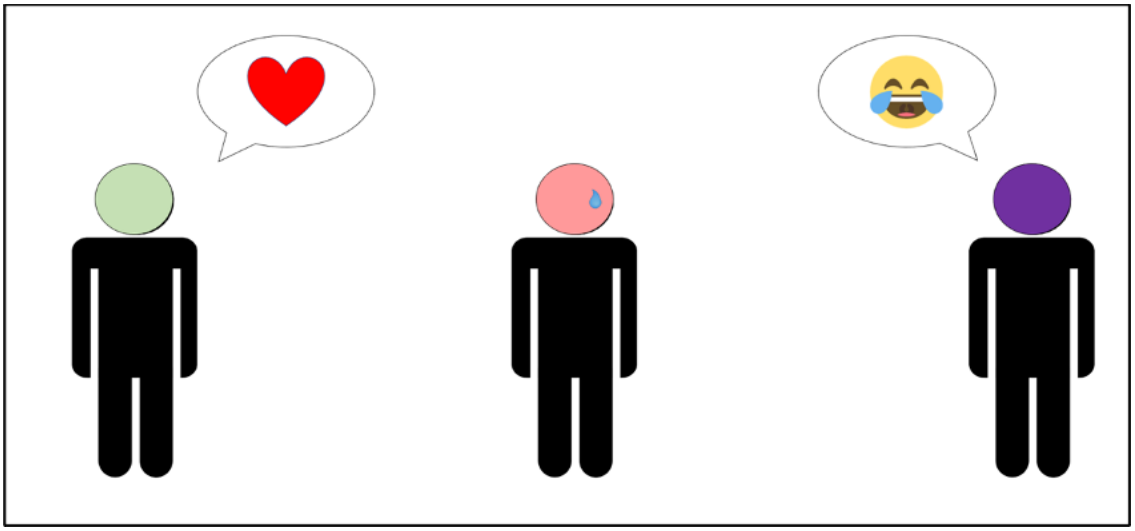

Fig. 1. Sample stimulus item, Study 1.

After each vignette, the experimenter asked children three questions in counterbalanced order: (1) "Let's pretend I can tell you the reason why this person did X or why this person did Y. Which would you like to hear more about?" (2) "Let's pretend you can ask this person why [he or she] did X or this person why [he or she] did Y. Which person would you rather ask?" (3) "Let's pretend I cannot tell you why this person did X or why this person did Y. Which would you try to learn more about by yourself?" Children typically express curiosity about a wide variety of phenomena (e.g., Jirout & Klahr, 2012; Liquin & Lombrozo, 2020; Wu & Gweon, 2021); therefore, we employed a forced-choice paradigm to determine the type of behavior about which children wanted to learn *more*.

After participants selected one of the characters, the experimenter probed the degree to which they would want to gather information about the morally valanced act (e.g. "Do you want to ask why this person did X a little bit, kind of, or a lot?"). We coded responses on a scale from -2.5 (indicating the strongest desire to learn about the transgression) to +2.5 (indicating the strongest desire to learn about the pro-social behavior). This coding scheme allowed for the distance between scores on the same side of 0 (e.g., +2.5, indicating that the participant wanted information about the pro-social behavior "a lot," and +1.5, indicating that the participant wanted information about the pro-social behavior "kind of") to correspond to the distance between scores on opposite sides of 0 (e.g., +0.5, indicating that the participant wanted information about the pro-social behavior "a little bit," and -0.5, indicating that the participant wanted information about the transgression "a little bit"). These items had acceptable reliability (Cronbach's alpha=.90 for younger children, .78 for older children, and .88 for adults); therefore, we averaged across them to create one dependent measure. For instance, if a participant reported that they wanted to learn about the transgression "a little bit" in response to the first question, to learn

about the transgression "a lot" in response to the second question, and to learn about the pro-social behavior "kind of" in response to the third question, they would receive scores of -0.5, -2.5, and +1.5, respectively, for an average score of -0.5 for that participant.

Adult participants read these vignettes to themselves in a self-paced online study. Because adults did not interact with an experimenter, we labeled one character in each pair "Person A" and the other character "Person B" rather than pointing to Power Point images of the characters. Following the main experimental items, adults completed an attention check asking them to describe one of the vignettes they had read as well as a demographic questionnaire. All adults correctly completed the attention check question.

Results

We averaged responses across fifteen items (three dependent measures across five vignettes) and entered this average score into a one-way, three-level ANOVA comparing younger children, older children, and adults (Fig. 2). For Studies 1-3, our pre-registration mistakenly described this analysis as a 3 (Participant Age: younger children vs. older children vs. adults) x 2 (Act: pro-social behavior vs. transgression) mixed design. Because we measured curiosity about pro-social behaviors versus transgressions using one scale, the ANOVA reported here is the correct analysis. This ANOVA revealed a main effect of age group (F (2, 337)=11.08, p<.001, η^2=.06). To further probe this main effect, we compared each age group with each other age group. This test included three comparisons; therefore, to pass the Bonferroni-corrected significance threshold, p values needed to be .017 or lower. Younger children (m=.10, sd=1.28) were less likely to choose to learn about why transgressions occurred than were older children (m=-0.62, sd=0.92; t(118.59)=-3.74, p<.001, Cohen's d=-0.63) and adults (m=-0.5, sd=1.08;

t(100.91)=-3.90, *p*<.001, Cohen's *d*=-0.52). Older children and adults did not significantly differ from each other (*t*(268)=.860, *p*=.391, Cohen's *d*=.12).

To determine whether children's responses to the first item differed from their other responses (e.g., in case curiosity about the first item shaped curiosity about later items), we conducted exploratory analyses using only responses to whichever question children answered first. This analysis revealed similar patterns as those reported above: younger children (*m*=-.08, *sd*=1.55) were less likely to choose to learn about why transgressions occurred than were older children (*m*=-0.94, *sd*=1.24; *t*(135.88)=3.73, *p*<.001, Cohen's *d*=-0.62).

In addition to comparing participants from different age groups, we also asked whether participants within each age group preferred to learn about pro-social behaviors or transgressions. This analysis was exploratory and not pre-registered. To answer this question, we conducted three one-sample *t*-tests comparing the mean responses of participants in each age group to 0; therefore, *p* values needed to be .017 or lower to pass the Bonferroni-corrected significance threshold. While no participant could receive a score of 0 on any individual trial, an average score of 0 across participants would indicate no significant preference, on average, to learn about either the pro-social behavior (coded as positive values) or the transgression (coded as negative values). Adults (*t*(191)=-6.43, *p*<.001, Cohen's *d*=-0.46) and older children (*t*(77)=-5.92, *p*<.001, Cohen's *d*=-0.67) preferred to learn about transgressions rather than pro-social behaviors. However, younger children, on average, did not show a preference in either direction (*t*(67)=.57, *p*=.573, Cohen's *d*=.07).

Younger children's responses may not have differed from chance for two reasons: either because most children did not show a strong preference regarding the behavior about which they preferred to learn or because approximately half of the children strongly preferred to learn about

transgressions while the remaining participants strongly preferred to learn about pro-social behaviors. The percent of younger children selecting the person who transgressed ranged from 39% in response to the question about whether they wanted to learn more about why someone knocked down another person's blocks versus why someone helped another person build with blocks to 58% in response to the question about whether they wanted to hear more about why someone took another person's snack versus why someone shared their snack with another person. We also calculated the number of items that elicited near-chance responding (e.g., items for which between 40% and 60% of younger children selected the person who transgressed); 13 of the 15 items fell within this range. Due to the number of items eliciting close to chance-level (e.g., 50%) responding, it appears that young children, as a group, did not exhibit strong preferences to acquire information about either character. Across all vignettes and dichotomous questions, younger children chose to learn about the transgression 51% of the time and the pro-social behavior 49% of the time. Older children preferred information about the transgression 65% of the time and the pro-social behavior 35% of the time. Finally, adults chose to learn about the transgression 63% of the time and the pro-social behavior 37% of the time. Table S1 in the supplementary online materials summarizes these results for Studies 1-3.

In addition to probing the percentage of trials on which participants chose to learn about the pro-social behavior versus the transgression, we also conducted exploratory descriptive analyses to determine the percentage of trials on which participants reported that they wanted to learn about the behavior they selected "a little," "kind of," and "a lot." These percentages could reveal whether 4- to 6-year-olds, as a group, responded at chance levels because they were less curious than were older participants about whichever behavior they selected. Results did not support this interpretation. Across all items, both older and younger children generally responded

that they wanted to learn about the behavior they selected either "kind of" or "a lot," with adults being most likely to say that they wanted to learn about the behavior they selected "a little" (the number of adults selecting this option ranged from 12% to 27% across items). In response to all items but one, a smaller percentage of 4- to 6-year-olds, as compared with 7- to 9-year-olds, reported that they wanted to learn about their selected option "kind of"; depending on the item, the percentages of participants providing this answer ranged from 30% to 49% for 4- to 6-year-olds and from 35% to 58% for 7- to 9-year-olds. In contrast, a greater percentage of 4- to 6-year-olds than 7- to 9-year-olds reported that they wanted to learn about their selected option "a lot"; the percentages of participants providing this answer ranged from 52% to 68% for 4- to 6-year-olds and from 45% to 65% for 7- to 9-year-olds. Thus, it does not appear that 4- to 6-year-olds report less curiosity overall as compared with older participants. Rather, it seems that 4- to 6-year-olds are more wide-ranging with their curiosity and show interest in both transgressions and pro-social behaviors. This result is consistent with prior theorizing suggesting that young children explore a broader array of options than do older children and adults (Gopnik, 2020).

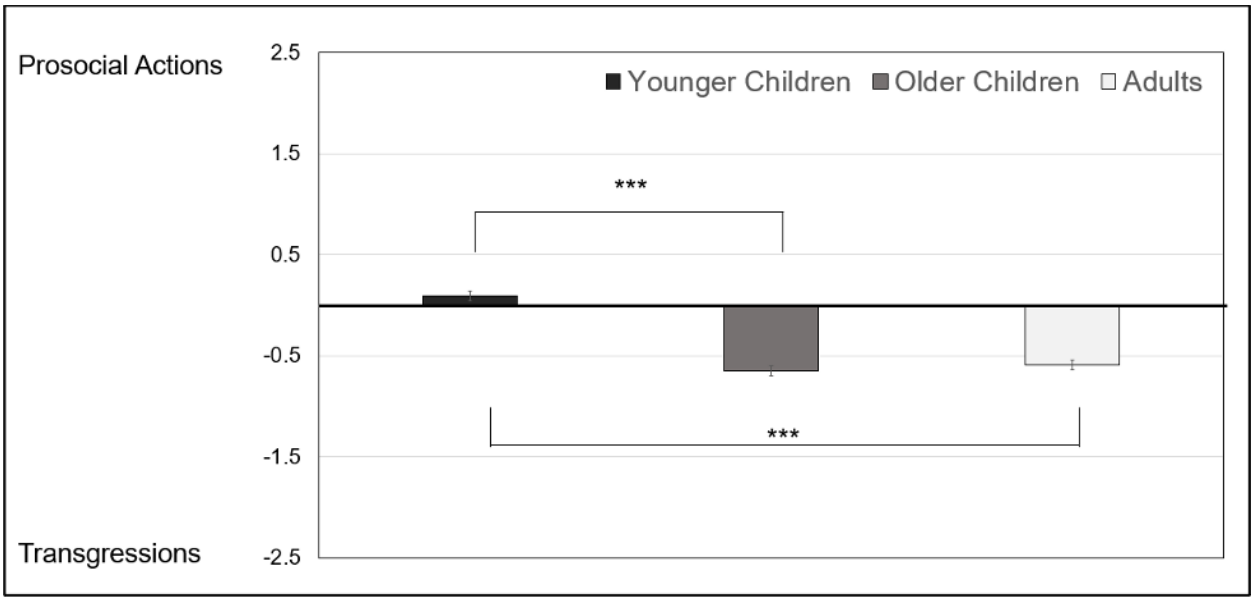

Fig. 2. Children's and adults' desire to learn about morally relevant behaviors, Study 1. Positive values indicate a desire to learn more about pro-social behaviors, while negative values indicate a desire to learn more about transgressions. Error bars represent 95% confidence intervals.

Study 2

Study 1 found age-related differences in curiosity: 7- to 9-year-olds (and adults) preferred to learn about why transgressions, versus pro-social behaviors, occurred, whereas 4- to 6-year-olds did not show this preference. The goal of Study 2 was to probe one possible mechanism drawn from the curiosity literature that could underlie this age-related difference.

Children often use information that they have learned to predict how the world will function (Cain et al., 1997; Choi & Luo, 2015; Jia et al., in press). Children, like adults, also pay closer attention when observed events violate their expectations rather than conforming to those expectations (Bonawitz et al., 2012). Indeed, observing phenomena that violate expectations often triggers curiosity (Liquin & Lombrozo, 2020; Sim & Xu, 2017; Stahl & Feigenson, 2015). Based on these prior results, Study 2 tested whether older children report a stronger preference to learn about transgressions than do younger children because older children have stronger

expectations that people will behave pro-socially (as their own tendencies for prosocial behavior also increase with age and they may expect others to behave like them; Fehr et al., 2008; Smith et al., 2013) and may experience more curiosity when others' actions violate these expectations. We collected these data in between July of 2021 and December of 2021 and pre-registered this study at https://aspredicted.org/blind.php?x=GBZ_W15.

Participants. The final sample included 69 children between four and six years old (m_{age}=4.97 years, sd_{age}=0.95 years; 33 female, 31 male, 5 other) and 75 children between seven and nine years old (m_{age}=7.87 years, sd_{age}=0.81 years; 33 female, 37 male, 5 other). Parents of participating children completed a demographic questionnaire during or before the session on which they identified their children as White or European American (n=95), Black or African American (n=7), Asian or Asian American (n=14), Multiracial (n=27), or Native American (n=2); the remaining participants did not answer this question. Additionally, 6% of parents identified their children as Hispanic or Latinx. We recruited participants in a children's museum in the New York area or via a lab database; children that participated at the museum received a small prize, and parents of those that completed the study online received a $5 gift card. We excluded 13 children that did not understand or complete the study and 5 children whose parents did not submit fully completed consent forms. Because Study 1 did not reveal differences between older children and adults, Study 2 did not include an adult sample.

Procedure. Study 2 was identical to Study 1 except for the following differences. First, the experimenter presented participants with a series of five vignettes that were similar to those in Study 1 but included a secondary character whose future acts were unclear. The experimenter asked participants to guess whether the secondary character would perform a pro-social behavior or a transgression (e.g., "[Primary character] fell down and is trying to get up. Do you think that

[secondary character] will help this person up or push them down?") and followed up with a question about certainty (e.g., "How sure are you that this person will help them up? A little, kind of, or a lot?"). As in Study 1, we coded these questions on a scale ranging from -2.5 to +2.5; here, -2.5 indicated the greatest certainty that the character would transgress and +2.5 indicated the greatest certainty that the character would behave pro-socially. Vignette order was counterbalanced across participants, and all vignettes appear in the supplementary online materials. After this block, participants completed the information-seeking block with completely novel characters that participants would not confuse with those introduced in the first block. Following recommendations for mediation designs (Baron & Kenny, 1986), all participants answered questions about their expectations regarding future behaviors (the hypothesized mediator) before answering any questions regarding the behaviors about which they wanted to learn (the dependent measure).

Results. As in Study 1, we conducted confirmatory analyses averaging the questions regarding the behavior about which children would prefer to learn (Cronbach's alpha=.91 for 4- to 6-year-olds and .83 for 7- to 9-year-olds). Replicating that earlier study (Fig. 3), an independent-samples *t*-test revealed that older children (m=-0.43, sd=1.16) showed a stronger preference to learn about transgressions than did younger children (m=0.37, sd=1.43; $t(127.91)=3.86$, $p<.001$, Cohen's d=.66). Also as in Study 1, older children preferred to learn about transgressions at rates that were significantly different from chance, $t(74)=-3.48$, $p=.001$, Cohen's d=-0.41. Unlike in Study 1, younger children showed an above-chance preference to learn about pro-social behaviors rather than transgressions, $t(68)=2.23$, $p=.029$, Cohen's d=.27. However, this difference did not pass the Bonferroni-adjusted significance threshold of $p=.025$.

As in Study 1, we also conducted two other sets of exploratory analyses. First, we analyzed participants' responses to only the first question they answered. This test revealed the same pattern as the one reported above: older children (m=-.47, sd=1.12) preferred to learn about why transgressions, rather than pro-social behaviors, occurred more than did younger children (m=-0.39, sd=1.44; t(128.31)=3.96, p<.001, Cohen's d=-0.67).

Second, we investigated whether younger children were simply less curious overall than were older children. As in Study 1, this did not seem to be the case. On 11 of the 15 items (3 questions per vignette X 5 vignettes), a smaller percentage of younger than older children reported being "a little bit" curious about their selected behavior. Percentages ranged from 10% (i.e., in response to 1 of the 15 items, 10% of younger children responded that they wanted to learn about their selected behavior "a little bit") to 20% for younger children and from 12% to 23% for older children. In contrast, on 14 of the 15 items, a larger percentage of younger than older children reported being "a lot" curious about their selected behavior; on the remaining item, the percentage among older and younger children was identical. Percentages ranged from 70% to 81% for younger children and from 55% to 72% for older children.

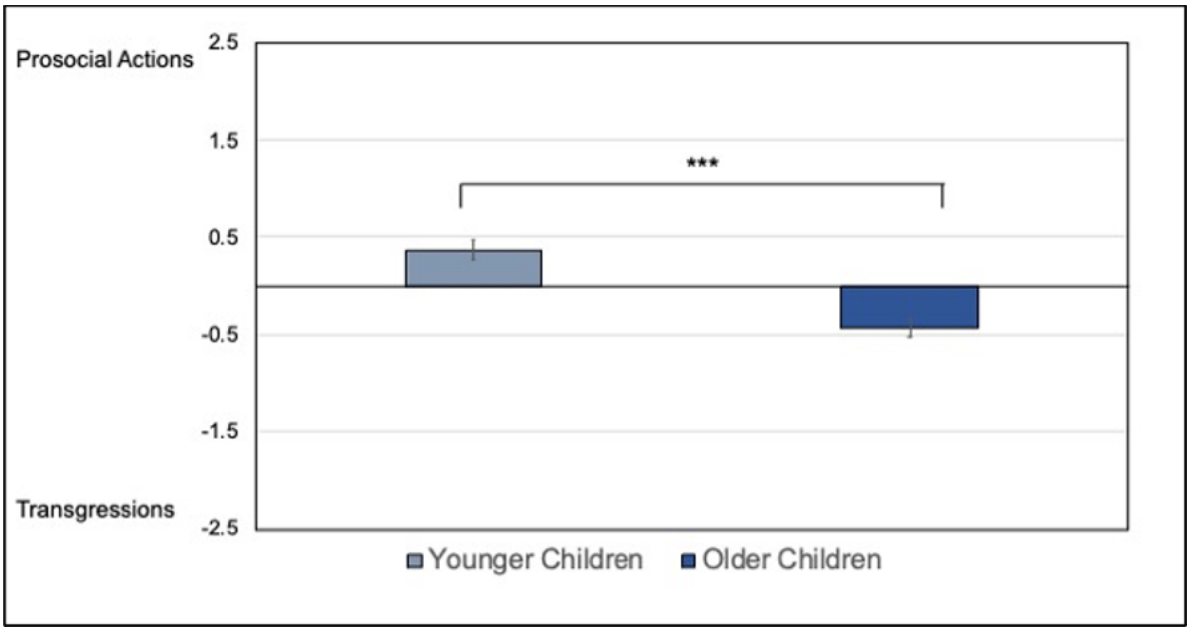

Fig. 3. Children's desire to learn about morally relevant behaviors, Study 2. Positive values indicate a desire to learn more about pro-social behaviors, while negative values indicate a desire to learn more about transgressions. Error bars represent 95% confidence intervals.

To achieve the main goal of Study 2—i.e., to determine whether expectations regarding future behaviors underlay older children's greater desire, as compared with younger children, to learn about transgressions versus pro-social behaviors—we conducted confirmatory analyses averaging responses to the items asking participants to indicate their certainty about how actors would behave in the future (Cronbach's alpha=.64 for 4- to 6-year-olds and .66 for 7- to 9-year-olds). We then conducted a mediation analysis entering participants' age group as the predictor variable, expectations about future behaviors as the mediator, and desire to learn about pro-social behaviors versus transgressions as the outcome variable. However, this mediation model did not reveal a significant indirect effect, B=-.003, p=.896; 95% CI [-.050, .055] (Fig. 4). Thus, it did not appear that expectations about future behaviors served as a mechanism underlying age-

related differences in curiosity about why transgressions, rather than pro-social behaviors, occurred.

To gain further insight into participants' expectations, we conducted two one-sample *t*-tests comparing the mean responses of participants in both groups to 0; therefore, *p* values needed to be .025 or lower to pass the Bonferroni-corrected significance threshold. Both younger children (m=1.21, sd=1.14; $t(68)$=9.33, p<.001, Cohen's d=1.11) and older children (m=1.10, sd=0.95; $t(73)$=-9.70, p<.001, Cohen's d=-1.13) were more likely than chance to expect future behaviors to be pro-social. Overall, younger and older children's responses to questions regarding future expectations did not significantly differ from one another, $t(141)$=.900, p=.370, Cohen's d=.14, providing further evidence that expectations regarding future behaviors did not drive age-related differences in curiosity.

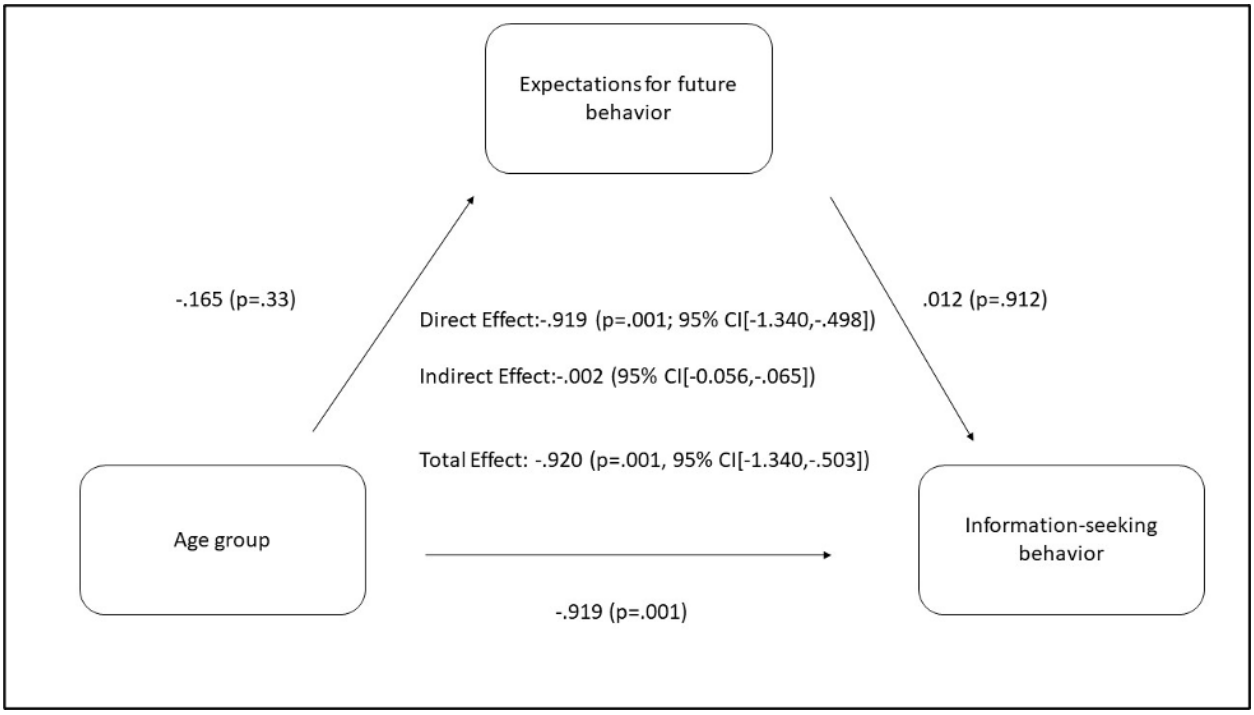

Fig. 4. Mediating relation between children's age, children's expectations for future behavior, and preference for information about either pro-social or transgressive behaviors, Study 2.

Study 3

Study 2 tested, but did not find support for, expectation violation as mechanism underlying age-related differences in curiosity about morally relevant events. Because violation of expectation is associated with curiosity in non-moral domains (Liquin & Lombrozo, 2020; Sim & Xu, 2017; Stahl & Feigenson, 2015), Study 2 suggests a potential unique quality to moral reasoning as compared to epistemic reasoning. Therefore, Study 3 looked to the moral psychology literature to test a different mechanism that could underlie the age-related effects observed in Studies 1-2.

Specifically, we wondered if the degree to which children's moral judgments show sensitivity to intent would be associated with their curiosity about why transgressions, rather than pro-social behaviors, occurred. Prior work has shown that, with increasing age, individuals respond more harshly and punitively to intentional rather than unintentional transgressions (e.g., Cushman et al., 2013; Heiphetz & Young, 2014; Killen et al., 2011; McAuliffe et al., 2017). Older children's propensity to emphasize intent when making moral decisions might underlie their desire to obtain information about intent regarding transgressions. That is, the more children care about intent when making decisions about how to punish, the more curiosity they may show about the intent underlying transgressions (versus the intent underlying pro-social behaviors, which do not elicit punishment). Study 3 tested this possibility and also included a behavioral punishment measure to probe children's responses toward people who transgressed. We collected these data between April and October of 2022.

Participants. The final sample included 82 children between four and six years old (m_{age}= 5.09 years, sd_{age}=0.77 years; 40 female, 40 male, 2 non-binary) and 95 children between seven and nine years old (m_{age}=7.71 years, sd_{age}=0.82 years; 55 female, 39 male, 1 non-binary).

In addition to these participants, we excluded 13 children whose parents did not fully complete a consent form, who had completed previous iterations of the study, or who failed to complete the study. Parents of participating children completed a demographic questionnaire during or before the session on which they identified their children as White or European American (*n*=90), Black or African American (*n*=10), Asian or Asian American (*n*=37), Native American or Pacific Islander (*n*=3), Multiracial (*n*=15), or Other (*n*=8); the remaining participants did not answer this question. Additionally, 25 parents identified their children as Hispanic or Latinx. We recruited participants in a children's museum in the New York area or via a lab database; children who participated at the museum received a small prize, and families who completed the study online after being recruited from our database received a $5 gift card.

Procedure. Study 3 was identical to Study 1 except that it also included a measure of participants' intent-based reasoning. Here, the experimenter presented participants with a series of four vignettes adapted from previous research (Cushman et al., 2013) featuring a character who committed a transgression accidentally contrasted with another character who tried to commit the same transgression but failed (e.g., a character who accidentally broke a mirror when throwing a ball and another character who tried to break the mirror with a ball but missed). Prior work has emphasized the importance of intent in moral judgments of transgression specifically (e.g., Cushman et al., 2013; Killen et al., 2011; Payir & Heiphetz, 2022; Young et al., 2007), and information about intent may be especially likely to shape participants' responses to these behaviors. That is, people may care about intent because it allows them to predict whether the actor will continue transgressing or will, instead, change for the better (Young & Tsoi, 2013). People also attend more to others' negative rather than positive acts (Rozin & Royzman, 2001; Vaish et al., 2008). Our measure of intent-based reasoning reflected this focus by asking about

transgressions. The experimenter asked participants to indicate which character should receive punishment as a result of their actions (e.g. "Which person should get in trouble?") as well as the degree to which they should be punished (e.g. "How much trouble should they get into?"). This measure allowed experimenters to infer the degree to which participants' moral judgments show sensitivity to intent. Responses indicating that attempted but failed transgressions should receive punishment show sensitivity to intent, since only the intent—not the outcome—was harmful. In contrast, responses indicating that accidental transgressions should receive punishment do not show as much sensitivity to intent, since the intent in these cases was positive. To code these questions, we used the same type of scale as in Studies 1-2, ranging from -2.5 (indicating the strongest desired punishment for the accidental transgressor) to +2.5 (indicating the strongest desired punishment for the intentional transgressor).

After this block, participants completed the items from Studies 1-2 probing the extent to which they wanted to learn about why people performed transgressions versus pro-social behaviors. As in Study 2, the hypothesized mediator (the intent measure) always preceded the block containing the main dependent measures.

Study 3 also investigated the degree to which older children use information-seeking behavior to inform their punishment judgments. After the information-seeking behavior block, participants viewed each of the transgressing characters from the previous block one at a time and learned that this individual possessed 5 stickers. Participants then indicated how many, if any, of the stickers they would throw away. This measure probed the extent to which children's information-seeking behavior might inform punishment decisions.

Results. As in Studies 1-2, we first conducted confirmatory analyses averaging the questions investigating the behavior about which children would prefer to learn (Cronbach's

alpha=.84 for 4- to 6-year-olds and .83 for 7- to 9-year-olds). Replicating these earlier studies (Fig. 5), an independent-samples *t*-test showed that older children (*m*=-0.56, *sd*=1.16) reported a stronger preference to learn about transgressions than did younger children (*m*=0.08, *sd*=1.19; *t*(175)=3.73, *p*<.001, Cohen's *d*=0.56). Furthermore, older children in Study 3 showed an above-chance preference to learn about transgressions rather than pro-social behaviors, *t*(94)=-5.05, *p*<.001, Cohen's *d*=.52, whereas younger children's responses did not significantly differ from chance, *t*(81)=.63, *p*=.530, Cohen's *d*=.05.

As in Studies 1-2, younger children's responses may not have differed from chance because most children did not show a preference regarding the type of behavior they wanted to learn about or because younger children were evenly split in strongly preferring information about moral transgressions and pro-social behaviors. The percent of younger children selecting the person who transgressed ranged from 29% response to the question whether they would prefer to learn more about why someone made fun of another person crying to 52% in response to the same question about someone stealing another individual's snack. We also calculated the number of items that elicited near-chance responding (e.g., items for which between 40% and 60% of younger children selected the person who transgressed); 10 of the 15 items fell within this range. Due to the number of items eliciting close to chance-level (e.g., 50%) responding, it appears that young children, as a group, did not exhibit strong preferences to acquire information about either character. Across all vignettes and dichotomous questions, younger children chose to learn about the transgression 48% of the time and the pro-social behavior 52% of the time, while older children preferred information about the transgression 65% of the time and the pro-social behavior 35% of the time.

As in Studies 1-2, we also conducted two other sets of exploratory analyses. First, we analyzed participants' responses to only the first question they answered. This test revealed the same pattern as the one reported above: older children (m=-.58, sd=1.32) preferred to learn about why transgressions, rather than pro-social behaviors, occurred more than did younger children (m=0.02, sd=1.35; t(128.31)=2.95, p=.004, Cohen's d=-0.45).

Second, we investigated whether young children showed less curiosity than did older children. The data for lower-curiosity responses diverged from earlier studies; on 14 of the 15 items, a *larger* percentage of younger than older children reported being "a little bit" curious about their selected behavior, and the remaining item elicited identical percentages among younger and older children. Percentages ranged from 15% to 30% for younger children and from 8% to 22% for older children. However, the data for higher-curiosity responses were similar to earlier studies. Here, the percentage of younger children reporting that they wanted to learn about their selected behavior "a lot" was higher than the percentage of older children providing that answer for all 15 items. Percentages ranged from 48% to 70% for younger children and from 45% to 60% for older children. Table S2 in the supplementary online materials summarizes these results for Studies 1-3. In conjunction with results from Studies 1-2, these findings do not provide strong evidence for the idea that younger children are less curious overall than are older children. Rather, older children seem to target their curiosity more narrowly toward transgressions than do younger children, who appear to be curious about both transgressions and pro-social behaviors.

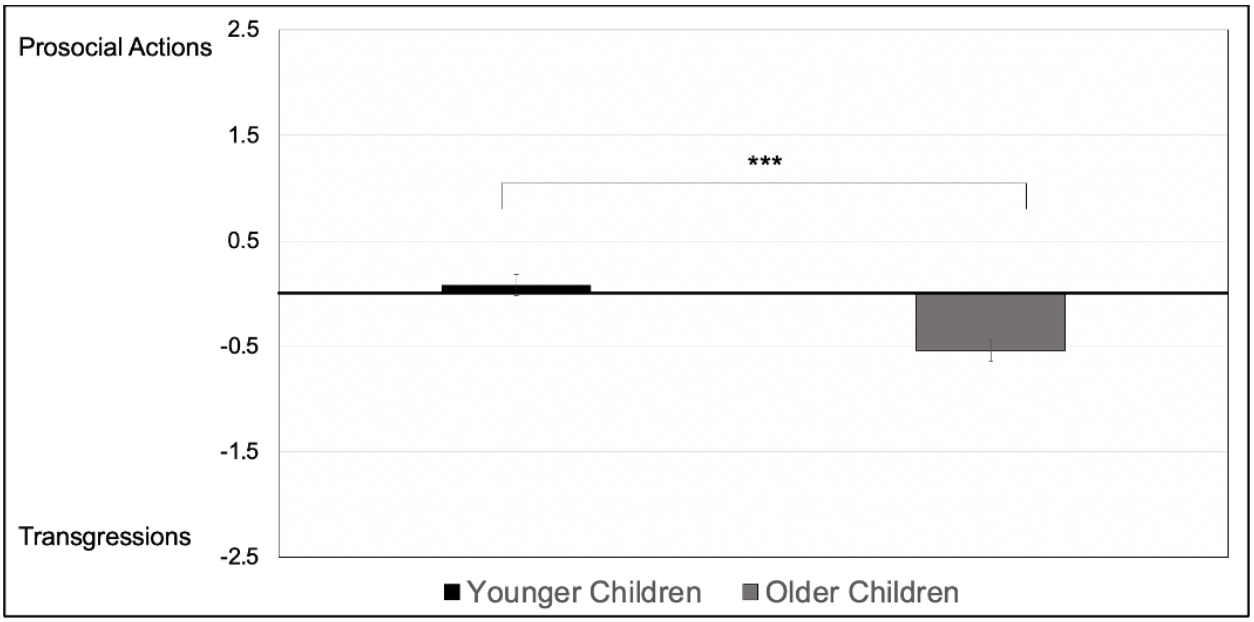

Fig. 5. Children's desire to learn about morally relevant behaviors, Study 3. Positive values indicate a desire to learn more about pro-social behaviors, while negative values indicate a desire to learn more about transgressions. Error bars represent 95% confidence intervals.

To achieve the main goal of Study 3—i.e., to determine whether age-related differences in intent-based judgments underlay older children's greater desire, as compared with younger children, to learn about transgressions versus pro-social behaviors—we conducted confirmatory analyses examining the relation between children's emphasis on intent when making punishment judgments and the degree to which they showed curiosity about why people performed transgressions versus pro-social behaviors. To do so, we conducted a mediation analysis with 5,000 bootstrapped samples (Hayes, 2017). This mediation included participants' age group (0=younger children, 1=older children) as the predictor variable, children's desire to punish accidental transgressors versus people who attempted but failed to transgress (using the measure we adapted from Cushman, 2013) as the mediator, and children's desire to learn about transgressions versus pro-social behaviors as the outcome variable. This mediation model

revealed a significant indirect effect, B=-.19, p=.001, 95% CI [-.338, -.066] (Fig. 6). Older children prioritized intent more than did younger children when making punishment judgments, and the more children prioritized intent in response to this measure, the more they preferred to learn about transgressions versus pro-social behaviors.

To gain further insight into participants' intent-based judgments, we investigated the degree to which younger versus older children's moral judgements showed sensitivity to intent. A one-sample t-test comparing participants' responses to 0 (indicating that children selected the intentional and accidental transgressors at chance levels) revealed that older children were significantly more likely than chance to report that the person who transgressed intentionally, rather than accidentally, should receive punishment, m=0.67, sd=1.34, t(94)=-4.92, p<.001, Cohen's d=.50. However, younger children's responses did not significantly differ from chance, m=-0.25, sd=1.42, t(81)=-1.56, p=.123, Cohen's d=.17. An independent-samples t-test showed that older children reported that the intentional transgressor should receive more punishment than did younger children, t(175)=4.41, p<.001, Cohen's d=0.67). These data provide further support for the idea that the development of intent-based judgments may underlie age-related differences in curiosity about morally relevant events.

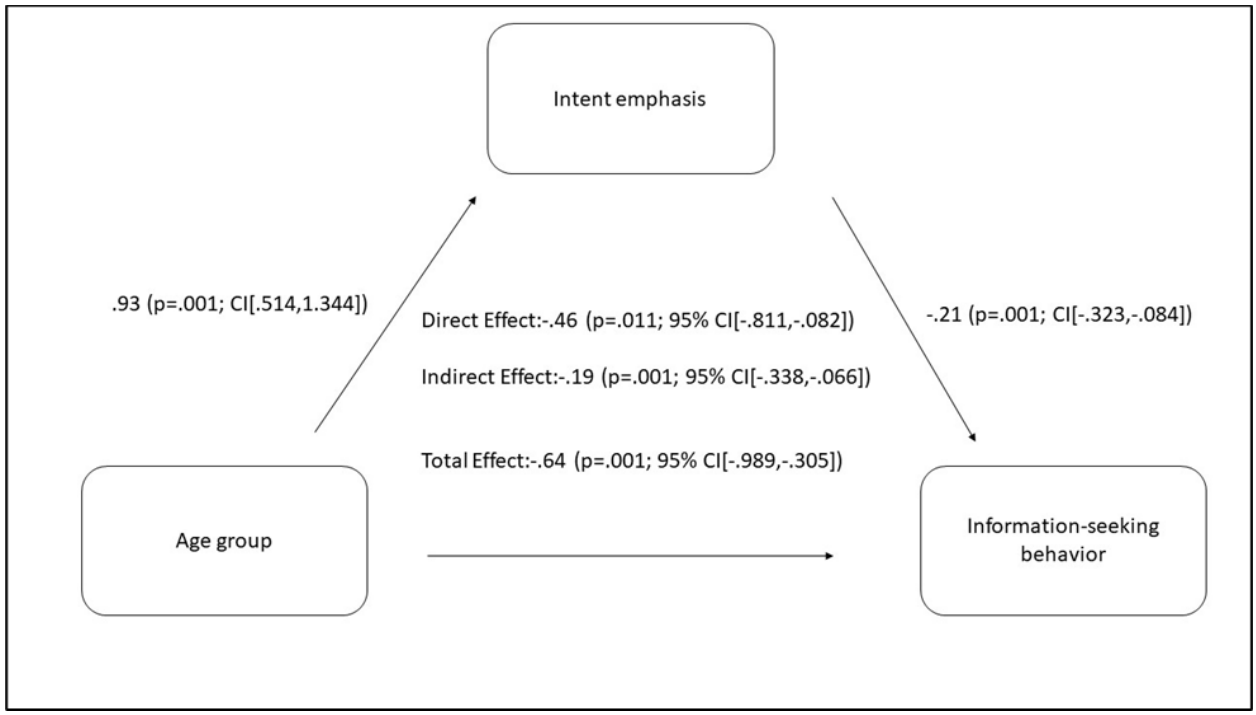

Fig. 6. Mediating relation between children's age, children's emphasis on intent, and preference for information about either pro-social or transgressive behaviors, Study 3.

Analyses of the sticker task found that children's information-seeking was not significantly related to punitive responses (i.e., the number of stickers taken away from transgressors) among either younger children (m=3.12, sd=1.31; r(81) =-.09, p =.426) or older children (m=3.35, sd=0.88; r(95)=.04, p=.694).

General Discussion

Examples of both pro-social behaviors and transgressions abound in everyday life, and people may become curious about why these events occur, in part because having this information may help them predict how the actor's morally relevant actions and characteristics will change or stay the same across time (Young & Tsoi, 2013). The present work investigated 4- to 6-year-olds', 7- to 9-year-olds', and adults' desire to learn about why people perform morally relevant acts. Study 1 accomplished this goal by using a forced-choice task to ask participants

whether they would prefer to learn about why transgressions or pro-social behaviors occurred. We observed a main effect of age, such that older children and adults preferred to seek information about moral transgressions rather than pro-social behaviors, whereas younger children did not show a preference between learning about transgressions versus pro-social behaviors. Studies 2 and 3 replicated the main patterns of Study 1, showing that older children preferred to learn about why transgressions, rather than pro-social behaviors, occurred to a greater degree than did younger children. These latter studies also investigated potential mechanisms underlying this effect. Study 2 provided evidence against the hypothesis that older children are more likely to seek information about why transgressions occurred than are younger children because transgressions violate older children's expectations more than younger children's expectations. In Study 3, the extent to which participants' moral judgments were sensitive to intent mediated the relation between age and information-seeking behavior, such that the more individuals cared about intent when making moral judgments, the more they preferred information about transgressions over pro-social behaviors.

Across all studies, older children preferred to seek information about why transgressions, rather than pro-social behaviors, occurred. This finding is consistent with prior work showing that children and adults attend more to negative rather than positive events (Baltazar et al., 2012; Rozin & Royzman, 2001; Vaish et al., 2008) and theorizing suggesting that attending to the intent underlying transgressions may help people feel that they can avoid future harm (Young & Tsoi, 2013). The current work extended past studies in part by examining cases where participants lacked clear information about intent. While numerous studies indicate that elementary-schoolers and adults show sensitivity to intent when making moral judgments, they have often done so by telling participants whether or not actors intended to transgress or

providing relevant contextual clues (e.g., Cushman et al., 2013; Jambon & Smetana, 2018; Margoni et al., 2018; McNamara et al., 2019; Payir & Heiphetz, 2022; Young et al., 2007; for exceptions, see Hamlin et al., 2013; Killen et al., 2011). However, in everyday life, others' intentions are not always clear. The current studies showed that when information about intent was not explicitly available, 7- to 9-year-olds and adults chose to acquire information about why transgressions (rather than pro-social behaviors) occurred, and they did so to a greater extent than did 4- to 6-year-olds.

Studies 2-3 investigated potential mechanisms underlying the age-related effect observed in Study 1. A significant mechanism emerged in Study 3: older participants placed more emphasis on transgressors' innocent intentions when making moral judgments than did younger participants, and the more participants emphasized intent, the more curiosity they showed about why transgressions (rather than pro-social behaviors) occurred. While prior work (e.g., Baird & Astington, 2004; Cushman et al., 2013; Killen et al., 2011) has suggested that older children emphasize intent more than do younger children when making moral evaluations, the present research adds nuance to this claim by showing that this shift to intent-based reasoning about moral transgressions was related to curiosity about transgressions, but not about prosocial behaviors. In other words, children may not begin to care equally about the intent underlying all morally relevant behaviors; rather, as their moral judgments transition to a focus on intent, they may target this focus more toward transgressions rather than more positive actions. A priori, one possible outcome of the current research would have been for older children to select randomly whether they wanted to learn about why transgressions or pro-social behaviors occurred. If older children generally care about intent, this is the result we should have observed. However, it

appears that intent may be particularly important to 7- to 9-year-olds when they are responding to moral transgressions.

Human behavior is multiply determined, and the current research does *not* show that an emphasis on intent is the only factor that drives children's curiosity about transgressions, merely that it is one such factor. However, Study 2 did test a different plausible variable that could further account for children's curiosity—namely, the degree to which the target behavior violated children's expectations—and did not reveal a significant effect. One possible explanation for this result is that children may evaluate morally relevant behaviors differently than other behaviors. Some lines of work find that children as young as six years already distinguish between morally relevant information and non-moral information (Danovitch & Keil, 2007; Marble & Boseovski, 2020). In the current work, children's expectations about future behaviors in a moral domain might have been less strong than their expectations about physical matters such as whether objects can float in midair. It is possible that older children would have been more surprised by reports of more severe transgressions than those tested in the current work, and this stronger surprise would have led to greater curiosity about why those transgressions occurred. Of course, another possibility is that violation of expectations does underlie age-related differences in curiosity regarding transgressions and that our study simply failed to detect this difference. While the current work highlighted one mechanism underlying age-related differences in curiosity about morally wrong behaviors—namely, an emphasis on intent when making punishment decisions—future work can investigate other possible mechanisms, including cases in which expectation violation might lead children to desire more information about wrongdoing.

The current studies used a forced choice paradigm to account for the fact that children typically express curiosity relatively promiscuously (e.g., Jirout & Klahr, 2012; Liquin &

Lombrozo, 2020; Wu & Gweon, 2021). Therefore, asking children how curious they were about transgressions and, separately, pro-social behaviors could have yielded high levels of curiosity about both types of behaviors (or, alternatively, low curiosity about both). Such a measure would have revealed information about participants' natural curiosity, a topic we could not study with a forced choice paradigm because we required participants to express curiosity about one of the behaviors. However, in everyday life, engaging in the types of behaviors we asked about to measure curiosity (e.g., learning about why particular events occur) cannot be limitless, and children must sometimes choose to learn about one thing rather than another. To capture this type of decision, the present studies asked children to indicate the type of behavior about which they were *more* curious. Future work can ask about transgressions and pro-social behaviors separately to determine whether both types of behaviors could elicit high (or low) curiosity.

Additionally, Study 3 leveraged a previously validated measure of children's intent emphasis (Cushman, 2013) in order to investigate a possible relationship between the tendency to emphasize intent and the propensity to show curiosity about transgressions rather than pro-social behaviors. This measure aligned with past work on intent by focusing on judgments in negative moral contexts (e.g., punishment decisions) rather than positive moral contexts (e.g., decisions about rewards; Killen et al., 2011; Payir & Heiphetz, 2022; Young et al., 2007; see Margoni & Surian, 2017, for an exception). Future work could determine whether older children reliably emphasize intent more than do younger children when making decisions in positive moral contexts. If such differences exist, future research could also probe the extent to which they are associated with children's possible curiosity about why pro-social behaviors occur.

Finally, future work can probe the translational implications of the results presented here. For instance, such work could investigate the consequences of curiosity regarding transgressions.

From a first-party perspective, such curiosity could promote perceptions of redemption (e.g., the view that a person who has transgressed has changed for the better) and reconciliation after wrongdoing. If an individual who has experienced harm engages the person who harmed them in dialogue about why the harm occurred, the victim may gain greater understanding of their experience and potentially empathy for the person who wronged them. Such dialogue, if done with sensitivity and paired with concrete action to make the victim whole, could facilitate right relationships after wrongdoing. For instance, parenting experts often advice parents to explain their own transgressions to their children to help children make sense of their experience (e.g., to apologize to children after yelling and to explain that they yelled because they were frustrated after a long day of work, not because the child deserved it; Kennedy, 2022). As another example, adolescents who reported a greater propensity to adopt other people's perspectives also showed evidence of more restorative and less punitive approaches toward people who have transgressed (Rasmussen et al., 2018).

From a third-party perspective, curiosity about why people transgress could facilitate greater re-integration of transgressors. For instance, curiosity about why one student called another a mean name can help teachers respond to children with kindness when those children transgress. Such curiosity can also help to prevent similar behaviors from happening again. A teacher may learn that the name-calling happened because the transgressor was hungry and therefore cranky, and use this information to adjust the timing of lunch. A classmate who asks questions about why the name-calling occurred could also receive information that helps them avoid similar transgressions (e.g., that they should eat a snack if they are hungry rather than taking out their cranky feelings on the people around them). At the same time, curiosity about a transgressor's motives may overshadow attention to the victim and should therefore be paired

with exhibited concern for the person who experienced the harm. For instance, a teacher who hears name-calling could attend to the needs of the person who was offended first and then exhibit curiosity about why the name-calling occurred. Future work can test whether these effects occur (e.g., whether curiosity regarding transgressions has positive effects for people when they have transgressed, been on the receiving end of a transgression, or observed one person transgressing against another) and investigate interventions to increase the potential benefits of curiosity, such as teaching third-party observers to use information about others' transgressions to avoid transgressing in similar ways themselves.

Conclusion

Three studies investigated children's desire for information about why morally relevant behaviors occurred. Adults and 7- to 9-year-olds preferred to seek information about moral transgressions, whereas 4- to 6-year-olds did not show this preference. Age-related differences in the emphasis participants placed on intent when evaluating others' morally relevant behaviors mediated the difference between older and younger children's curiosity regarding transgressions versus pro-social behaviors. Integrating work on moral development and curiosity, these studies suggest that intent may play a particularly strong role in the context of transgressions (and not other types of morally relevant behaviors, such as pro-social acts) and that a sensitivity to intent may underlie elementary schoolers' curiosity about wrongdoing.

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