Children consider both outcome and intent in moral judgements, punishment
recommendations, and reward allocations

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Authors' note:

This research was supported by doctoral studies grant #727-2015 from Colciencias, the Colombian national foundation to support scientific research, to the first author. The authors declare that they have no conflict of interest.

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Abstract

In early-to-middle childhood children are thought to move from judging actions based solely on outcomes to also taking actors' intentions into account. There is little research on how particular cognitive capabilities contribute to this breakthrough, or whether it occurs in children outside Europe and North America. We addressed both issues in a study of 174 children (94 girls, 80 boys), aged between 3-4, 5-6 and 7-8 years old, from low-income backgrounds in Bogotá, Colombia. Participants were presented with 4 vignettes in which an action's outcome and the agent's intention were systematically varied. Children were asked how good/bad each agent was, how much punishment they deserved, and how many reward points (linked to prizes) they would receive. They also completed a standard false-belief task. Both outcome and intention affected decisions in all 3 age groups, and indeed there was a much stronger effect of intention on all three measures. There was evidence of an outcome-to-intent shift only in behavioral rewards: 3-4 and 5-6-year-old children treated accidental transgressions as equivalent to intentional transgressions or failed attempts to do harm, while 7-8-year-old children assigned more points to accidental than intentional transgressors. Performance on the false-belief task was linked more with abstract judgements than with behavioral rewards. These results add to evidence that even young children consider agents' intentions when making moral judgements. However, outcomes also mattered for all age groups, since accidents were never judged to be as acceptable as actions with both positive outcomes and positive intentions.

Keywords: Intention understanding; moral development; outcome-to-intent shift; Piaget; theory of mind; third-party punishment.

Research Highlights

- Repeated-measures study finds that intention and outcome are both important factors in young children's moral judgements, with a stronger effect of intention
- A range of dependent measures including abstract moral evaluations, advocacy of punishment and behavioral reward points show similar patterns, though children are less tolerant of accidents with the behavioral measure
- Theory-of-mind understanding is also tested using a false-belief task, and shown to influence abstract evaluation of agents as good/bad, but not the other two measures
- Participants are non-WEIRD, low-income Colombians, adding to the breadth of our knowledge on children's social and moral development in diverse cultural contexts

1. Introduction

1.1 The outcome-to-intent shift

The study of how children construct moral knowledge and how they apply this knowledge in their social interactions has been heavily influenced by Piaget's (1932) conception of moral development. This was rooted in his view of cognition as a domain-general process that changes over time through distinct stage divisions (Carey, Zaitchik, & Bascandzhev, 2015; Carpendale, 2009). One important change noted by Piaget was that children's moral judgement of an action was driven at an early age by its outcomes or consequences, which then gave way to judgement based on the intentions of the actor. More recently this has become known as the outcome-to-intent shift (Cushman, Sheketoff, Wharton, & Carey 2013). For example, young children (e.g., 5 years old), focusing on the outcomes of the actions, would consider it morally worse to accidentally break fifteen cups than to intentionally break one cup; whereas older children (e.g., 10 years old) would focus on the intentions and make the opposite judgment (Carpendale, 2009).

However, many of Piaget's general predictions about different levels of competence at particular ages have been challenged by findings of earlier competence and sensitivity to framing in various tasks (for a review, see Halford & Andrews, 2010). The outcome-to-intent shift is no exception to this pattern of criticism and revision. Since the 1970s researchers have questioned the age at which children are first able to take intentions into account in making moral judgments (Berg-Cross, 1975; Hebble, 1971; King, 1971; Shultz, Wright, & Schleifer, 1986). For example, Zelazo, Helwig, and Lau (1996) found that 3-year-old children based their judgments of acceptability and punishment solely on an action's outcomes, but from 4 years of age children were able to use rules in which both intentions and outcomes were included, showing an early progression in their sensitivity to intentions. Additionally, 4-year-old children tended to prioritize intention over foreseeability when judging responsibility for actions (Yuill & Perner, 1988). In a more recent study (Nobes, Panagiotaki, & Bartholomew, 2016), the wording of questions and the descriptions of the consequences in moral vignettes influenced whether both intentions and outcomes were considered. When the acceptability and punishment questions were agent-based ("Is X good or bad?") rather than outcome-based ("Is it OK for X to do Y?"), 4 year old children based their judgments mostly on intentions, showing that methodological factors might have influenced previous findings on the outcome-to-intent shift (see also Zelazo et al., 1996; Helwig, Zelazo, & Wilson, 2001; Margoni & Surian, 2017).

In another study highlighting children's sensitivity to how dependent measures are worded, Cushman and colleagues (2013) showed that intentions constrained judgments of naughtiness but not punishment recommendations soon after 4 years of age; yet for older children, towards 8 years old, evaluation of intentions also constrained judgments of the amount of punishment deserved. For these authors, the outcome-to-intent shift involved reorganization of a moral domain in which two cognitive systems were at work, one

outcome-based and the other mental-state-based. Rather than a change in domain-general capacities causing the shift, they saw the mental-state-based system as gradually gaining influence over actions during development. In addition to its influence on punishment, other authors revealed how mental-state reasoning was applied by 4- and 5-year-old children to distribution and cooperation tasks, as they differentiated between intentional and accidental transgressions when sharing resources (Chernyak & Sobel, 2016; Hamann, Warneken, Greenberg, & Tomasello, 2011). Thus, children's early reliance on outcomes can be affected by confounding factors such as the wording of questions or the salience of intentions in the moral vignettes employed. With more precise information about the level of care behind the actions in the stories, children based their judgments of acceptability/wrongness and punishment-worthiness on forms of behavior, such as negligence, that implicate intentions in quite complex ways (Nobes, Panagiotaki, & Engelhardt, 2017; Nobes, Panagiotaki, & Pawson, 2009).

Such findings demonstrate that if there is a shift from outcomes to intentions in moral judgments, it may happen considerably earlier than Piaget thought. Given the differences in performance over varying experimental frames, it is also doubtful that a general development in children's cognitive abilities is responsible for any shift. Yet more recent studies have questioned whether there is a specific, progressive shift in moral development at all. Based on findings that infants can take intentions into account when making moral judgements (e.g., that of Hamlin, 2013, who showed that 8-month-olds preferred successful helpers to accidental hinderers, but had no preference for accidental helpers over successful hinderers; see also Baillargeon, Scott, & Bian, 2016, for a review of research in this area), Margoni and Surian (2016) argued that young children may follow a U-shaped developmental curve, being more sensitive to intentions during infancy, on preverbal tasks, and less sensitive during the early preschool years, on verbal tasks. Using a puppet-choice paradigm, Woo, Steckler, Le,

and Hamlin (2017) found some support for this idea, showing that 10-month-old infants were more likely to reach for a puppet that had accidentally harmed another puppet than one that had done intentional harm, and conversely were more likely to reach for a puppet that had intentionally helped another puppet than one that had done so accidentally.

However, Van de Vondervoort and Hamlin (2018) found little evidence for a U-shaped developmental curve, instead showing that preferences for puppets in a similar forced-choice task remained focused on intentions during early childhood (3 and 4 years of age). This discrepancy from the results of vignette studies might be explained by the relative salience of intention and outcome in the two different types of task, as Hilton and Kuhlmeier (2019) have suggested: perhaps young children can intuitively read intentions from stylized behavioral cues in the puppet-based tasks, but have trouble with imagining intentions in the vignette-based tasks, and thus fall back on judgements based on outcomes. Alternatively, as anticipated by Margoni and Surian (2016), the discrepancy could be caused by the elevated executive-functioning requirements of verbal as compared to preverbal tasks. These arguments underline the importance of sampling children from a wide range of ages and testing them on a variety of dependent measures. Indeed, as well as pushing methodological limits to see how early in development children can take intentions into account, we still need to explain why intentions play a greater role, in a wider range of experimental frames, as children grow older. Despite decades of work, the psychological factors behind that change remain unclear. For example, the role of theory of mind (ToM) in the relations between moral judgments and the comprehension of mental states, including intentions, that differ from one's own is still poorly understood (Steglich-Petersen & Michael, 2015).

1.2 Connections between theory of mind and moral development

It makes sense that ToM would play a role in intention-based moral reasoning given that by definition, it involves the representation of other agents' mental states—including desires,

beliefs and intentions—in order to understand and explain their behavior (Premack, 1978). These three types of mental states are related, since representing an action as intentional entails representing an agent as having a desire for a certain consequence or outcome combined with a belief that the action would lead to that outcome (Sloman, Fernbach & Ewing, 2012; Cova, Dupoux & Jacob, 2012). A crucial step in the development of ToM is the understanding of false beliefs: that is, the comprehension that the content of others' beliefs can differ from the actual state of the world (Wimmer & Perner, 1983). This fundamental achievement is normally reached around 4 years of age, in its explicit form (Wellman, Cross, & Watson, 2001; Wellman & Liu, 2004). Given its importance for the understanding of other people's behaviour, researchers have often linked false-belief understanding—and ToM more generally—to various other cognitive capacities, including moral cognition (Astington, 2004; Baird & Astington, 2004; Lane, Wellman, Olson, LaBounty, & Kerr, 2010; Leslie, Knobe, & Cohen, 2006).

Investigations of the relationship between mental state comprehension and moral development have often focused on the role of intention evaluation, as has been described for the outcome-to-intent shift. However, it is important to examine how the development of other capacities contributes to moral learning (Cushman, Kumar, & Railton, 2017). Recent studies have related moral judgment with the capacity to engage in mental state reasoning (Young & Tsoi, 2013), and investigated how by applying mental concepts in different situations, children make judgments about the goodness or badness of their own and others' actions (Chakroff & Young, 2015). For example, 4-year-olds with more advanced ToM abilities evaluated moral transgressions as more impermissible independently of authority, and rated moral transgressors as less deserving of punishment, based on mental state comprehension (Smetana, Jambon, Conry-Murray, & Sturge-Apple, 2012). In a similar vein,

Lane and colleagues (2010) showed that both false-belief and emotion understanding prospectively predicted young children's moral reasoning and decision-making.

In a step further than simply relating abstract ToM understanding to moral development, Killen, Mulvey, Richardson, Jampol, and Woodward (2011) investigated what they called "morally relevant theory of mind", using a task that combined a false belief (due to the change in location of an object) with a transgression that had negative affective consequences (on someone who looked for the object and felt bad for its loss). Younger children who didn't pass a traditional ToM task attributed negative intentions to an accidental transgressor (the agent who unwittingly changed the object's location), giving more weight to the outcomes of the action than to the agent's mental states, and finding it difficult to identify a false belief when it led to a moral violation (cf. Proft & Rakoczy, 2019). However, 7–8 years olds who passed ToM tasks could attribute positive intentions to actions despite them having bad outcomes, and were more punitive with intentional transgressors. According to Sodian and colleagues (2016), this kind of morally relevant ToM is linked to a progression in the comprehension of moral agency from early infancy, beginning with the understanding of goals, desires and beliefs.

Indeed, an increasing sophistication in the understanding and use of mental states for moral judgments as children grow older leads to them including more complex mental states in various kinds of judgments. From as early as 3–4 years of age children take into account not only intentions but negligence in their judgments of acceptability and deserved punishment (Nobes et al., 2009; Nobes, et al, 2017). On the other hand, having no knowledge about the outcome of an action was not taken as a mitigating factor for judgments of intentionality before 7 years of age (Pellizzoni, Siegal, & Surian, 2009) showing that different levels of awareness of a mental state such as ignorance can cause changes in moral judgments as children develop. This applies not just to abstract judgements but also to the kinds of

behavioral decisions seen in economic games: in a third-party punishment game, for example, 6-year-old but not 5-year-old children punished unfair offers made to other agents if they showed bad intentions, as inferred from offers that were focused on self-interest (McAuliffe, Jordan, & Warneken, 2015). Again, the experimental framing seems very important: in ultimatum games, by contrast, 8–9-year-old children rejected offers based solely on the amount they would gain, regardless of the intentions of the other player (in terms of whether they had any control over whether the distribution was fair or unfair), a pattern that changed for later ages (Güroğlu, van den Bos, & Crone, 2009; Gummerum & Chu, 2014). ToM may be implicated in such behavioral decisions, but the evidence is so far unclear. On the one hand, passing the task of false belief was related to more generous offers in an ultimatum game from the age of four (Takagishi, Kameshima, Schug, Koizumi, & Yamagishi, 2010). On the other hand, some authors have found that changes in prosocial behavior are more related to age than to ToM, and even that advances in ToM might be related to less generosity in economic games (Burkart & Rueth, 2013; Cowell, Samek, List, & Decety, 2015).

The role of mental states in moral judgments and punishment behavior is probably sensitive to both the kind of transgression and the kind of mental states involved, as mental states seem more important when children evaluate moral compared to conventional violations, and intentions also seem to be more important than beliefs (Proft & Rakoczy, 2019). Moreover, just as there are cultural differences in the moral seriousness ascribed to conventional violations that involve no intent to harm others (Haidt, 2001), there are cultural differences in the roles that mental states play in moral judgments and in the rules that different groups follow to make judgments according to outcomes or intentions (Barrett et al., 2016; McNamara, Willard, Norenzayan, & Henrich, 2019). These factors make imperative a closer examination of the relationship between ToM and moral judgment, and the replication of developmental psychological methods in different cultural groups (Duncan, Engel,

Claessens, & Dowset, 2014). Given that variation has been found in the role of intentions in moral judgements according to differences in the dependent measures that are used, it is also possible that ToM could differentially impact the decisions that these are measuring.

1.3 Hypotheses

With the aim of contributing evidence on the relation between the outcome-to-intent shift in moral judgement and the development of other cognitive capacities, the present study looked for relationships between moral judgments of intentions and outcomes, ToM and counterfactual reasoning. Additionally, in the light of recent studies that show changes in levels of third-party punishment during development (e.g., Yudkin, Van Bavel, & Rhodes, 2019), this study included predictions about the relation between punishment judgements and a behavioral reward task. These hypotheses were pre-registered (Moreno-Romero & Ingram, 2017). However, when the time came to analyze the results we realized that the hypothesis set was rather complex, and that the hypotheses that concerned counterfactual reasoning, in particular, did not make much sense unless other hypotheses had been supported. For clarity, we therefore divide the hypotheses into two subsets in the current article, a set of four principal hypotheses (*H2-H4, H6*) that have to do with children's sensitivity to outcome and intention in moral judgement, and a set of three subsidiary hypotheses (*H1, H5, H7*) that have to do with the influence of counterfactual reasoning on such judgments. Analyses corresponding to the latter subset are presented in Appendix B ("Supplementary analyses"). We also include minor typographical corrections and clarifications in the presentation of the hypotheses here, while preserving the original numbering as per the pre-registration.

H2. Outcome influences judgments of acceptability and punishment in all groups, since a bad outcome leads to a judgement of less acceptability and more punishment.

H3. Intention also influences judgements of acceptability and punishment, since a positive intention leads to more acceptability and less punishment, but not for (*H3A*) younger

children or (*H3B*) those who fail to pass a ToM task. Negative intention shows the reverse pattern.

H4. Situations that combine positive intentions with positive outcomes show more acceptability and less punishment ratings with respect to the other combinations and across all age groups. *H4A*. Situations that combine negative intentions with negative outcomes show less acceptability and more punishment ratings with respect to the other combinations and across all age groups.

H6. For older children, punishment correlates more with acceptability judgements than for younger children. *H6A*. At the same time, performance on punishment questions correlates with behavior in the points game for older children (see Smith, Blake, & Harris, 2013).

2. Materials and Methods

2.1 Participants

Children were recruited from two sites, a public school and a preschool, located in low-to-middle-income neighborhoods in Bogotá, Colombia. All the materials and procedures were approved by the ethical committee of the Faculty of Social Sciences at the Universidad de los Andes, Colombia. Schools and parents gave written consent and children gave verbal assent before testing. One hundred and eighty children were tested, but six were excluded from analysis due to refusal to answer and/or lack of comprehension of the tasks. The final sample comprised 174 children aged 3 to 8 years, in three age groups corresponding to separate school grades: 3-4 years (31 girls, 20 boys), 5-6 years (32 girls, 29 boys), and 7-8 years (31 girls, 31 boys). The selection criteria for the age groups was based on the critical relations and changes in ToM and moral development at these ages, which could influence judgments of intentions and outcomes in moral situations (Cushman et al., 2013; Killen et al., 2011).

2.2 Study Design

We used a mixed experimental within-participants 2 (intention) x 2 (outcome) x 3 (age group) design, with intention and outcome varying within participants, such that each child heard four moral vignettes, one for each possible combination of intention and outcome, assigned in a random order. The dependent variables were judgment of an agent's goodness or badness, abstract deservingness of punishment, and number of behavioral reward points assigned. False-belief understanding was examined (replacing age group) in a similar design, and the relative effect of age and false-belief understanding was compared using regression analysis. The combination of a within-participants design and a relatively high number of participants (for this type of design) led to high power on the comparisons between experimental conditions: sensitivity power analysis using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) showed that the study had 80% power to detect a between-condition effect size f of .089 (an f value of between .1 to .25 is generally considered a small effect). The power for the age-based between-group comparisons was lower (80% power to detect a between-groups effect size f of .188) while still providing a good chance of detecting some small-to-medium-sized effects. For the critical action between age and condition, power was 80% to detect an effect size f of .118.

2.3 Materials

Instruments included an unexpected-location false-belief task (Wimmer & Perner, 1983) and moral vignettes set in four different contexts describing everyday norm violations familiar to children of these ages (see Ingram & Bering, 2010), such as breaking another child's toy, hitting someone with a ball, not sharing a toy with a friend, and throwing another child's food in the trash (see Figure 1).

Intention-positive / outcome-positive condition

M wants to help to put more blocks on **J**'s tower. He puts a block on top. Now the tower is bigger and it looks better.

Intention-positive / outcome-negative condition

M wants to help to put more blocks on **J**'s tower. He trips over a stone. Now the tower is destroyed.

Intention-negative / outcome-positive condition

M wants to destroy **J**'s tower. He throws a stone, but he misses. The tower remains standing.

Intention-negative / outcome-negative condition

M wants to destroy **J**'s block tower. He throws a stone and hits the tower. Now the tower is destroyed.

Figure 1. The “property damage” moral vignette (always the first vignette read to participants)

Each vignette had four versions with all possible combinations of intentions (positive and negative) and outcomes (positive and negative). Although in many experimental

manipulations of intention and outcome (e.g., Cushman et al., 2013) only the “critical” conditions of accidental negative outcome and failed negative intention have been considered, we compared all four possible conditions in order whether to establish whether children of different ages were taking outcome and intention into account at all, or prioritizing one over the other. Vignettes were created using the *Storyboardthat* app, showing the story in three separate images in which the main elements were the presentation of the characters, the intention of one of them, and the outcome of the situation. (see Appendix A, “Full vignette materials used”, and the example vignette in Figure 1 above). Two versions of each story, with different-gendered characters but the same basic content, were made for boys and girls. All stories were presented visually on a Toshiba tablet computer while the first author explained the tasks and read the stories to the children. For counterfactual questions related to these vignettes (see Appendix B for results), two images were designed for each story showing two possible outcomes.

Additionally, goodness/badness judgements were made by pointing to a 4-point scale ranging from a face with a big smile (very good), to a face with a big frown (very bad). For the behavioral reward task, a table of prizes was designed and presented in a PowerPoint slide, showing how many points were needed for the main character of the moral vignettes to get a prize. More points led to a better choice of prizes, and different potential prizes were presented to boys and girls in the slide. The participants were given “real points”, just like the ones shown on the slide, and after choosing how many to send, they put them in an envelope.

2.4 Procedure

After the informed consent of their parents or guardians had been received and they had given their own informed verbal assent, participants were tested individually in a room close to their classroom by the first author, within sight of one of the school teachers. The experimental session was audio-recorded and lasted 15 to 20 minutes. Participants were first given an introduction in which it was explained that they were going to hear five stories (the four moral vignettes and the false-belief story) about children who were around the same age and who studied in another school. They were told that questions would be asked at the end about the characters in the stories. They were also told that there were no right or wrong answers since the researcher was interested only in what they thought about the stories.

First, participants received the false-belief task. After they had heard the unexpected-location vignette, four questions were asked: (1) a test question, “Where will [character’s name] look for the toy?”; (2) a memory check question, “Where did [character’s name] put the toy at the beginning of the story?”; (3) a reality question, “Where is the toy now?”; and (4) a counterfactual question, “If [character’s name] had not moved the toy, where would the toy be?” After answering these questions, children were told how to use the goodness judgements scale. This was done by asking two questions about something that each participant liked and something they disliked (ice-cream and soup, for example; e.g., “How bad or good is it to get ice cream?”) and requesting that they point to the corresponding face.

Next, the four moral vignettes were presented to the participant according to a randomly assigned order of combinations of positive/negative intentions and outcomes. The order of the story topics was always the same: breaking a toy, throwing another child’s food in the trash, hitting someone, and not sharing with a friend. The experimenter read each vignette while the participant looked at the pictures on the tablet. After each story, children were asked, “Can you say what the story was about?” to check that they understood and remembered its main elements. They then answered 4 questions: (1) a control question, “Did

[the character's name] make this happen?" (2) a goodness question, "Is [character's name] good or bad?" answered with the face scale; (3) a punishment question, "Does [character's name] deserve to be punished?" (for children that answered, "Yes," a follow-up question, "A little or a lot?" was asked at this point); (4) a counterfactual question, "If [character's name] had not wanted to [intention] what would have been the outcome [specific for each story]?" This was answered by pointing to one of two images showing possible outcomes of the story.

Once they had answered these questions, participants were told that now they were going to select how many reward points could be used by the child in the story (who had performed the relevant action) to get a prize, and that the researcher would give these points to that child later. Participants saw a slide with the points needed for each prize, more points (from 1 to 10) leading to better prizes. Children were asked two questions to check their comprehension about the points and the prizes, both being about how many points the character needed to get a prize. In case of a wrong answer the slide was explained again. Then, children decided how many points to send and put these points in an envelope. The researcher looked to the side and pretended to do something else while children put the points in the envelope. After doing this for each of the four moral vignettes children were thanked and returned to their classroom.

2.5 Plan of analysis

Three different forms of statistical analysis were employed to test the hypotheses of this study. First of all, a series of three mixed 2 x 2 (repeated-measures) x 3 (fixed-factor) ANOVAs were run on the acceptability, punishment, and behavioral reward dependent variables to determine the main effects and interactions of the four intention-outcome combinations and three age groups. Secondly, post-hoc tests were run, split by age, to investigate relations between specific intention-outcome combinations and moral judgements, focusing on comparisons between the accidental harm combination (positive intention /

negative outcome) and the attempted harm combination (negative intention / positive outcome). Thirdly, regressions were run on judgements of goodness/badness, punishment and behavioral reward, to uncover the relative impact of age, ToM and counterfactual performance (see Appendix B, “Supplementary analyses” for the counterfactual results).

3. Results

3.1 Omnibus tests of the moral vignette conditions

The main analyses of this study concerned the influence of story outcomes (H2) and character intentions (H3) on children’s moral judgements, advocacy of punishment, and allocation of behavioral reward. We conducted a mixed 4 (positive/negative intention/outcome condition, repeated-measures) x 3 (age-group) MANOVA with three dependent variables: acceptability of a character’s action, disposition to punish them for it, and amount of reward shared.

Descriptive statistics for these three variables across the four experimental conditions are displayed in Table 1.

	Goodness judgement (0–3)	Punishment worthiness (0–2)	Reward points allocated (0–10)
Intention positive, outcome positive	2.67 (0.700)	0.190 (0.542)	6.02 (3.30)
Intention positive, outcome negative	1.23 (1.14)	0.989 (0.880)	3.75 (3.05)
Intention negative, outcome positive	0.287 (0.557)	1.67 (0.572)	2.89 (2.87)
Intention negative, outcome negative	0.224 (0.517)	1.74 (0.512)	2.78 (2.68)

Table 1. Means (with standard deviations in parentheses) for the three dependent measures across the four experimental conditions

There was a significant main effect of age-group, $F(6, 340) = 4.45, p < .001$, Wilk's $\lambda = 0.859$, partial $\eta^2 = .986$; a significant main effect of condition $F(9, 163) = 190, p < .001$, Wilk's $\lambda = 0.087$, partial $\eta^2 = .913$; and a significant interaction between condition and age group $F(18, 328) = 3.24, p < .001$, Wilk's $\lambda = 0.718$, partial $\eta^2 = .151$.¹ Follow-up univariate analysis using a series of 2x2x3 mixed ANOVAs (using outcome and intention as repeated measures and age group as a fixed factor) showed very similar patterns across the various dependent measures: for all three measures, there were significant main effects of outcome and intention, a significant interaction between outcome and intention, and a significant interaction between age group and intention. The main effect of age group bordered on significance (at the Bonferroni-corrected alpha level of .017) in the punishment and reward points measures, while the critical three-way interaction between age group, outcome and intention bordered on significance only for the reward points measure. The test statistics and effect sizes for these three measures are listed in Table 2.

	Goodness judgement			Punishment worthiness			Reward points allocated		
<i>N</i> = 174	<i>F</i>	<i>p</i>	η^2	<i>F</i>	<i>p</i>	η^2	<i>F</i>	<i>p</i>	η^2
Outcome	174	< .001	.090	101	< .001	.060	29.5	< .001	.032
Intention	828	< .001	.454	622	< .001	.380	86.2	< .001	.091
Age group	1.75	.177	.002	4.28	0.015	.009	4.83	.009	.016

¹ See Appendix B for omnibus and follow-up analyses comparing participants who passed the false-belief task with those who did not, which had very similar results to the age group analyses.

Outcome									
* intention	164	< .001	.074	61.3	< .001	.041	29.6	< .001	.025
Outcome *									
age group	0.298	.743	< .001	0.999	.370	.001	0.502	.606	.001
Intention *									
age group	9.57	< .001	.010	6.86	.001	.008	15.3	< .001	.032
Outcome *									
intention *	1.96	.145	.002	0.314	.731	< .001	4.35	.014	.007
age group									

Table 2. Test statistics and effect sizes for mixed 2x2x3 ANOVAs on within-subjects factors of outcome and intention, and between-groups factor of age group.

Given these results, we separated the analysis of the influence of outcomes and intentions to evaluate specific hypotheses for each dependent variable using post-hoc tests with pairwise comparisons, within the three different age groups.

3.2 Influence of action outcomes

To analyse the influence of action outcome (H2), we compared conditions in which intentions had the same value. We predicted that (i) stories in which outcome and intention were both negative should be rated as more acceptable and lead to less punishment and more reward points than stories with a negative outcome and positive intention ($I^+O^+ > I^+O^-$). Similarly, (ii) stories with a positive outcome and negative intention should lead to more positive ratings than stories in which both outcome and intention were negative ($I^-O^+ > I^-O^-$).

For agent goodness/badness ratings, converted to ordinal values in which scores ran from 1 (very bad) to 4 (very good), there were significant differences in comparison (i) ($p <$

.001), meaning that participants in all age groups judged situations with positive outcomes more favourably ($M \text{ I}^+ \text{O}^+ = 3.65$) than situations with negative outcomes ($M \text{ I}^+ \text{O}^- = 2.22$), when a character's intention was positive. On the other hand, comparison (ii) ($\text{I}^+ \text{O}^+ > \text{I}^- \text{O}^-$) did not show significant differences: when the intention was negative, irrespective of the outcome, acceptability judgements were about equally low ($M = 1.29$ for $\text{I}^- \text{O}^+$ vs 1.22 for $\text{I}^- \text{O}^-$, $p = .187$). For punishment ratings, which assumed three possible ordinal values (0 = no punishment, 1 = a little bit of punishment, and 2 = a lot of punishment), the pattern was similar to that of the acceptability ratings. There was an effect of outcome in stories that included a positive intention ($M = 0.19$ for $\text{I}^+ \text{O}^+$ vs 0.99 for $\text{I}^+ \text{O}^-$, $p < .001$), but assigned punishment did not differ when the contrast was between conditions with negative intentions ($M = 1.65$ for $\text{I}^- \text{O}^+$ vs 1.73 for $\text{I}^- \text{O}^-$, $p = .128$). The behavioral reward task (with scores from 1 to 10) reflected the same pattern of response: that is, across all age groups, when the intention was positive more points were assigned to characters whose actions led to positive outcomes than those who caused negative outcomes ($M = 5.97$ for $\text{I}^+ \text{O}^+$ vs 3.76 for $\text{I}^+ \text{O}^-$, $p < .001$), but the outcome did not have an influence on number of points assigned when intentions were negative ($M = 2.97$ for $\text{I}^- \text{O}^+$ vs 2.84 for $\text{I}^- \text{O}^-$, $p = .574$).

In general, this pattern of results only partially supported Hypothesis 2 about the influence of outcomes on judgements. We found that a negative outcome led to lower ratings of acceptability, more punishment and lower behavioral reward than positive outcomes across all ages when the intention was positive, but did not affect any of these response variables when the intention was negative.

3.3 Influence of agent intentions

To analyze the influence of intentions on judgements (H3), we compared stories that had a positive intention and positive outcome with those that had a negative intention and positive outcome (predicting that $\text{I}^+ \text{O}^+ > \text{I}^- \text{O}^+$), and stories that had a positive intention and

negative outcome with those that had a negative intention and negative outcome (predicting that $I^+O^- > I^-O^-$). Across all age groups the two comparisons for intentions showed the expected patterns for acceptability, punishment and behavioral reward. Situations where a character had a positive intention were judged as more acceptable ($M = 3.65$ for I^+O^+ vs 1.29 for I^-O^+ , $M = 2.22$ for I^+O^- vs 1.22 for I^-O^- , both $p < .001$); less deserving of punishment ($M = 0.19$ for I^+O^+ vs 1.65 for I^-O^+ , $M = 0.99$ for I^+O^- vs 1.73 for I^-O^- , both $p < .001$); and more worthy of behavioral reward ($M = 5.96$ for I^+O^+ vs 2.97 for I^-O^+ , $M = 3.76$ for I^+O^- vs 2.84 for I^-O^- , $p < .001$) than situations where they had a negative intention. This pattern of influence for acceptability and punishment judgements was true for all ages, and not only for the older age-groups as was predicted in Hypothesis 3A. In summary, intention affected judgements of acceptability and punishment in all children, such that stories referencing a negative intention led to lower levels of acceptability and behavioral reward and more punishment, irrespective of the story outcome.

3.4 Age differences

Looking at the data broken down by age group in Figures 2a and 2b, it is clear that there was little difference between the three ages with respect to the influence of outcomes and intentions on the abstract judgement and advocacy of punishment measures. However, the youngest group differed notably from the older two groups in the behavioral reward measure. For the youngest group there was a (marginally) significant difference in points assigned only when comparing the I^+O^+ and I^-O^- conditions ($p = .031$). On the other hand, the middle age group (5-6-year-olds) showed an additional difference between I^+O^+ and I^-O^+ , but showed no significant differences in points assigned when comparing the critical, accidental I^+O^- condition with the I^-O^+ ($p = .076$) or I^-O^- conditions ($p = .129$). The older group showed the same pattern observed for acceptability and punishment measures in all ages, meaning that these children apparently considered situations where the character had a negative

intention as equally unworthy of reward, irrespective of outcome (see Figure 2b), and also considered accidents as more worthy of reward..

Figure 2a. The data of the three age-groups for acceptability and punishments ratings across the four outcome-intention combinations. For all three age-groups and for both types of judgement there were significant differences between all conditions ($p < .01$), except for the negative-intention-and-positive-outcome ($I O^+$) versus negative-intention-and-negative-outcome ($I O^-$) comparisons ($p > 0.05$).

Figure 2b. The data of three age-groups for points assignment across the four outcome-intention combinations. For the younger group only I+O+ versus I-O- revealed a significant difference ($p < 0.05$). For 5-6-year-olds there was no significant difference between I+O- and the two negative intention conditions ($p > .05$).

3.5 Inter-measure correlations

To test Hypothesis 6, we ran a set of correlations between acceptability and punishment ratings and between points assigned in behavioral reward and punishment ratings according to age. Table 1 shows the significant correlations according to age group and conditions. Regarding the relations between acceptability ratings and worthiness of punishment, it is worth noting that across all ages, acceptability ratings were correlated significantly and negatively with punishment ratings in situations with positive intentions (all $r < -.34$, all $p < .05$), and in the I-O⁺ combination (all $r < -.37$, all $p < .01$) showing that more acceptability was associated with less punishment in these situations. However, for the I-O⁻ combination the relation of acceptability with punishment was significant only for the younger group. On the other hand, Hypothesis 6A was partially supported by correlations between age and behavioral reward. For conditions with negative intentions in the older age group there was less behavioral reward (see Figure 2b above), but for the other conditions there were no age-related patterns. Looking at the correlations between behavioral reward

and punishment measures we found very few significant associations of these measures by age group. For the younger group, assigning fewer points was related with more punishment in the I⁺O⁺ condition, for the older age group the same kind of relation applied in the I⁺O⁻ condition, and in the older group the relation was also significant for the I⁻O⁻ condition.

Age group	Acceptability-Punishment				Punishment-Points assigned			
	correlations				correlations			
	I+O+	I+O-	I-O+	I-O-	I+O+	I+O-	I-O+	I-O-
3-4	-.35*	-.74**	-.54**	-.31**	-.28*	-.09	-.03	.08
5-6	-.64**	-.43**	-.39**	-.01	-.08	-.32*	.00	-.01
7-8	-.81**	-.69**	-.37**	.01	-.10	-.39**	-.10	-.29*

*Correlation is significant at 0.05 level (bilateral)

**Correlation is significant at 0.01 level (bilateral)

Table 3. *Correlations between punishment and acceptability ratings (left) and punishment and behavioral reward (right) for each condition in the three age groups.*

3.6 Influence of ToM on judgements

Finally, although we had no hypothesis about whether age or ToM would be more important in determining changes in judgements on the moral tasks, we conducted an exploratory regression on the difference in performance on acceptability, punishment and points allocation questions between the theoretically critical conditions (accidental and attempted harm, i.e., I+O- and I-O+). To do this, we first computed a new variable with the results of the three measures in the accidental (I+O-) minus the attempted harm (I-O+) conditions and then ran a regression to find the predictors of performance in these conditions. The results showed that for acceptability only ToM was a significant predictor ($\beta = .488$, $p = .018$), while age was a significant predictor of the difference in punishment ratings ($\beta = -.097$,

$p = .044$) and behavioral reward ($\beta = -.522, p = .014$).

	Acceptability		Punishment		Points	
	difference		difference		Difference	
	β	t	β	t	β	t
ToM	.488*	2.40	-.122	-.857	-.090	-1.44
Age	.090	1.30	-.097	-2.03*	-.522	2.48*

Table 4. *Regression results for the difference between accidental and attempted harm conditions with ToM (false-belief understanding) and age as predictors*

4. Discussion

We found mixed support for the study hypotheses. Both outcome (H2) and intention (H3) clearly had an effect on most children's moral judgements (whether measured in terms of abstract acceptability, deservingness of punishment, or reward points allocated). These results follow a similar pattern to those of Van de Vondervoort & Hamlin (2018): in both their and our studies, children only used information about outcome when intention was positive. Failed attempts to harm were judged about as harshly as successful attempts, and accidental transgressions were judged more favorably than both the previous categories, but less favorably than positive actions with positive intentions. Over the four conditions and three age groups, intention had a much stronger effect on all dependent measures than outcome did. However, we disagree with Van de Vondervoort and Hamlin's interpretation of their own results as showing that even young children paid little attention to outcome (2018). This was the case for negative intentions, but not for positive intentions since accidental transgressions were still rated as reliably worse than successful prosocial behavior. Future longitudinal

research could investigate whether this pattern reflects a tendency of certain individuals to treat accidents as equivalent to successful helping behavior, while others are less forgiving.

Hypothesis H3A, about the greater influence of intention with age, was partially supported, since there was a weak interaction between these two variables for all measures. The same pattern applied to H3B which was concerned with the influence of theory of mind. However, there was no evidence of an outcome-to-intent shift in judgements of accidental transgressors as good/bad, nor of their deservingness of punishment. A shift was seen only in the reward points measure, such that 3–4 and 5–6-year-old children did not distinguish between accidental transgressions and negative intentions, whereas 7–8-year-old children handed out more reward points for accidents (though still less than for actions with positive outcomes and intentions). This mirrors the finding of a relatively late consideration of intentions—compared to their consideration in abstract moral judgements—in third-party punishment and ultimatum games (McAuliffe et al., 2015; Gummerum & Chu, 2014), as well as the finding of Smith and colleagues (2013) that abstract judgements correlated with actual sharing behavior only for older children. Another difference between abstract moral judgements and behavioral reward appeared in the relationship with theory of mind, which was implicated in whether children rated accidental transgressors as better than failed intentional transgressors on the abstract good/bad judgement, but not on the other two measures. Hypothesis H4 was also supported only partially: while the conditions with positive outcome and positive intention elicited more positive judgements than any other conditions, those with negative outcome and negative intention received almost exactly the same judgements as conditions with positive outcomes and negative intentions.

In addition to the broad similarities with Van de Vondervoort and Hamlin's (2018) results, the present study is comparable with that of Nobes and colleagues (2016), since we followed those authors' strategy of asking for moral evaluations of the agent rather than the

action. The absence of an outcome-to-intent shift for the abstract evaluation measure but not for the behavioral reward measure could thus reflect a greater tendency of young children—at least in certain contexts) to decide practical rewards based on situation (outcome) rather than disposition (intention). This idea is corroborated by the existence of a stronger correlation between reward points and the other measures in the oldest age group than in the other two groups (supporting our hypothesis H6). However, the fact that children gave few reward points to failed intentional transgressors shows that they were also taking intentions into account, at least when they were negative. More research is needed comparing both types of evaluation—of agent and action—in the same study (along the lines of Nobes et al., 2016), and especially investigating whether other variables such as ToM abilities have a differing influence on the two types of evaluation.

Despite the similarities just discussed between our results and those of other recent studies in this area, certain aspects of our findings are puzzling. As Nobes and colleagues (2016) point out in their discussion, the fact that their rephrased, agent-oriented question showed more effects of intention for younger children than the outcome-oriented questions of previous studies (Helwig et al., 2001; Zelazo et al., 1996) does not explain why other studies which also used agent-oriented questions (e.g. Piaget, 1932; Cushman et al., 2013) found that for their youngest participants only outcome was important. Therefore, it would be worthwhile undertaking a systematic review or meta-analysis of previous studies on the outcome-to-intent shift in order to reveal relevant methodological differences, which could then serve as basis for large-scale replication attempts with diverse participant groups. For instance, it is possible that a forced-choice method such as that originally used by Piaget (1932), asking children to directly compare an accidental violation that had major effects with an intentional violation that had minor effects, would show a different pattern from the independent evaluations of story situations solicited in the current study. Perhaps when young

children are asked to compare two harms directly their attention is drawn to the relative weight of the harms, whereas without this kind of “anchoring” in a context of quantitative comparison (cf. Forsyth, 1985), the intention behind the harm can seem more salient (though see Van de Vondervoort & Hamlin, 2018, for a forced-choice methodology that failed to show evidence of an outcome-to-intent shift).

At one level, our results might seem to support the interpretation of Cushman and colleagues (2013) that a child’s moral development involves the maturation and articulation of two separate processes, one responding more to intentions and influencing abstract judgements, the other responding more to outcomes and influencing behavioral reactions (see also Cushman et al., 2017). Like them, we found that young children took more account of outcomes for the more practical measure, while always paying more attention to intentions in the more abstract measures. However, certain aspects of our results complicate that picture. Firstly, on the abstract evaluation and deservingness-of-punishment judgements, although agents with positive intentions were rated higher than those with negative intentions at all ages, agents responsible for accidental transgressions (positive intention with negative outcome) were never rated as highly as those associated with a positive intention and a positive outcome. Secondly, reactions to negative intentions followed a completely different pattern, since in these conditions, outcome made no difference to either abstract or behavioral-reward judgements. Thirdly, on the behavioral reward points measure, the only difference in the youngest age group was not between positive and negative outcome conditions, but between the double-positive intention-outcome condition and the rest. Put together, these results show that even at early ages, neither outcome nor intention information is ignored in either abstract or behavioral measures. Depending on the specific combination of intention and outcome, young children can use outcomes to influence abstract judgements and intentions to influence behavioral rewards.

Therefore, from these results it does not seem that processes linking outcomes to punishment and intentions to abstract evaluations are kept strictly separate in younger children, before being “articulated” in some way in older children (Cushman et al., 2013). Instead, what seems to change most during development is tolerance of accidents, and in particular children’s behavioral reactions to accidents, rather than their abstract evaluations of them. A plausible explanation is that the youngest children simply match a negative response to any manifestation of negativity (whether in terms of intention or outcome) on the part of the character whom they are judging. Over time, their abstract evaluations of agents—which are influenced by ToM, as we have shown—may come to inhibit their behavioral responses. In this context it is worth noting that our punishment measure, which was closer to Cushman and colleagues’ punishment measure than our behavioral reward measure was, did not show any evidence of an outcome-to-intent shift, unlike either of the latter two measures. This could be because in our study, the punishment question was always asked after the abstract moral evaluation question, leading children to mirror their response for the first question, whereas in Cushman and colleagues’ study the order was randomly varied. Indeed, as shown in Table 1 the answers to these two questions were closely correlated.

Since the degree of behavioral inhibition on the reward points question seemed to be linked to age but not directly to ToM, a plausible candidate that could influence its development is executive functioning (cf. Margoni & Surian, 2016), perhaps linked to a kind of “symbolic distancing” (Carlson, Davis, & Leach, 2005) or “cognitive decoupling” (Toplak, West, & Stanovich, 2014) that might take place with increasingly abstract representations of morally relevant events (see also Ingram & Moreno-Romero, 2019, for an elaboration of this argument in relation to dual-process theories of cognition). This would also explain why a more prominent outcome-to-intent shift is seen in studies that ask for judgement of the action rather than the agent (Nobes et al., 2016), since cognitive decoupling

would be less easy to achieve in the former judgements (but see Nobes et al., 2017, for a different interpretation, based on developmental changes in conceptions of negligence). There are likely to be substantial individual differences in the extent to which processes of cognitive decoupling occur in moral reasoning, as can be seen from the finding of McNamara and colleagues (2019) that some adults from a small-scale Fijian society still included outcome information when making punishment decisions.

Indeed, another possible explanation for the lack of age differences in the acceptability and punishment judgements in our study is the cultural one that perhaps the older children in our study had never learned to be more forgiving of accidental violations. Although the background of these participants was urban background it was not “WEIRD” (Henrich, Heine, & Norenzayan, 2010), and so this explanation would be in line with evidence from small-scale societies suggesting that inhabitants of such societies continue treating accidental violations as harshly as intentional violations (Barrett et al., 2016; McNamara et al., 2019). The problem with this interpretation is that the usual pattern argued for small-scale societies, that of judging accidents harshly, is not what we found in the present study. Rather, children of all ages judged accidental transgressions as significantly more acceptable than intentional transgressions (or attempts at transgressions). Moreover, children treated failed intentional harm as just as bad as intentional harm that succeeded, suggesting that the term “outcome-to-intent shift” is a misnomer since even 3–4-year-old children are perfectly capable of taking intentions into account, especially when they are negative.² (This result reflects similar data found in the McNamara et al. study: in contrast to

² In this context it is worth noting that Piaget’s (1932) original study did not adequately control for action outcomes by comparing a fixed outcome with a negative intention behind it to the same outcome with a positive or neutral intention. This seems to be what led to a common misconception that young children do not take intentions into account in their moral judgements, even when intentions are negative.

these authors' interpretation that their adult participants in a traditional Fijian society were always weighing outcome over intention, these adults did in fact incorporate information about negative intentions, since they evaluated failed intentional transgressions more harshly than cases where there was neither transgression nor intent to transgress.) Furthermore, children of all ages judged agents in the double-positive intention-outcome condition more favorably than those in the positive-intention/negative-outcome conditions, suggesting that at least some children continue taking outcome into account until at least 7–8 years of age, and underlining the importance of running studies with multiple control conditions.

Our study had several important limitations. One of these has to do with certain details of the moral vignettes employed. Even though these stories covered mundane transgressions that were intended to reflect actual scenes in children's everyday life, the inclusion of more than two characters in one story or difficulties with the understanding of some outcomes (the concept of losing or gaining toys, or identifying which character was affected) may have influenced children's answers about the goodness or badness of the actors and the amount of punishment they deserved. Also, the length of each vignette in words was slightly different, which might have made it difficult for children to remember some important details from the longer vignettes when responding to the experimental questions. With regard to the dependent measures used, there were possible floor/ceiling effects in the good/bad evaluation and punishment-worthiness measures, which could explain why there was little difference between the two negative-intention conditions. For the youngest age group, the "points system" deployed in the behavioral reward task was certainly difficult to understand (reflected in the finding that this group showed no differences between conditions on that dependent measure, apparently selecting points more or less at random). A simpler

version, perhaps based on donating stickers (cf. Proft & Rakoczy, 2019), could be useful in order to explore children's use of behavioral punishment for moral transgressions.³

In terms of the relationship between theory of mind and moral judgement, this study covered ages from three to eight years, but explored relationships only between first-order ToM (false-belief) tasks and moral reasoning. In future research it would be interesting to use second-order ToM tasks with slightly older children and explore their role in moral reasoning and behavioral reward or punishment tasks, especially given the role that higher-order ToM has been postulated to have in children's developing understanding of reputation (Ingram, 2019). Such tasks might also be better integrated with test of counterfactual reasoning than was achieved in the current study. With younger children, a standard battery of ToM tasks (such as that introduced by Wellman & Liu, 2004) would provide more sensitivity and might help identify exactly which aspects of ToM are most important for intention judgements. This might also clarify the puzzling failure of some children even in the middle and older age groups to pass the standard false-belief task used in the current study, which possibly reflects some interesting cultural differences in the non-WEIRD population sampled. Also with regard to cultural factors, although participants were drawn from a low-income South American—and therefore non-WEIRD—population, they still comprised an urban sample that had received a fair degree of formal education. Given that previous work has suggested that people in small-scale societies may make less use of intentions in moral judgements, it would be useful to compare the current population with similarly-aged Latin American children from more rural or indigenous backgrounds, with less access to formal education (see Legare, 2017).

³ We did not use stickers in the current study because of difficulties in incorporating them into a repeated-measures design.

5. Conclusion

Our study adds to a growing body of recent evidence (Nobes et al., 2016; Chernyak & Sobel, 2016; Margoni & Surian, 2017; Woo et al., 2017; Van de Vondervoort & Hamlin, 2018; see Hilton & Kuhlmeier, 2019, for a review) that children can take intentions—especially negative intentions—into account in their moral judgements from a much earlier age than Piaget thought. In fact, they seem to do so from just about as early (3 years old) as we can feasibly use verbal vignettes with children. The high-powered, repeated-measures design revealed that while children from 3 to 8 years of age did take intentions into account, they also considered outcomes, evaluating perpetrators of accidental violations more harshly than those who are intentionally responsible for positive outcomes. However, the effect of intentions was stronger given that outcome information only appeared to be used when intention was positive. Using three different dependent measures also revealed interesting differences between the lack of an outcome-to-intent shift in the more abstract measures of goodness/badness and punishment-worthiness of the agent, and the presence of a (weak) shift in the behavioral measure of reward points. ToM ability was the best predictor of such evaluations on the agent goodness/badness measure, whereas age was a much better predictor on the reward points measure. Punishment-worthiness was somewhat intermediate, with age being a slightly better predictor of that measure.

The overall picture is that the developmental shift in moral reasoning towards putting more weight on intentions is very sensitive towards both the comparison conditions and the nature of the dependent variables used. Links with theory of mind may occur but they too seem sensitive to the phrasing of questions to children, and require more detailed investigation. Registered reports and meta-analytic studies, and ideally a large-scale cross-cultural replication effort (Duncan et al., 2014; Legare, 2017), are needed in order to clarify some of the subtle methodological differences, and perhaps also demographic factors, that

affect these theoretically interesting phenomena. In particular, rigorous cross-cultural comparisons are the only way of establishing whether only some groups of children learn to be more tolerant of accidents, or whether this is a universal that then becomes reversed in societies with strong “opacity of mind” norms (Luhrmann, 2011; McNamara et al, 2019).

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