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BRIEF REPORT

Do Young Toddlers Act on Their Social Preferences?

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From preschool age to adulthood, most humans prefer to help someone who has treated others well over helping someone who has treated others badly. Researchers have recently made opposing predictions about whether such observation-based preferential helping is present when children begin to help in the second year of life. In the present study, 84 toddlers (16–27 months) observed 1 experimenter (*antisocial*) take a ball from, and 1 experimenter (*prosocial*) return a ball to, a neutral experimenter. In subsequent tests, children could help either the antisocial or the prosocial experimenter. Only the oldest children showed a significant preference for helping the prosocial agent first. Most children in all age groups were willing to help both experimenters when given multiple opportunities to help. Across age groups, children who looked longer at the continuation of the antisocial interaction were more likely to help the prosocial agent. These findings suggest that social evaluations do affect toddlers' helping behavior but that interactions between human agents may be difficult to evaluate for very young children.

Keywords: preferential helping, social evaluation, prosocial behavior

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Acts of helping are guided by social observation. Seeing that someone is helpful to a third party makes adults more willing to help that person (Milinski, Semmann, & Krambeck, 2002). This tendency—a form of *indirect reciprocity*—has great value to human societies: It helps build beneficial relationships with prosocial others, while protecting against exploitation by antisocial others (Nowak & Sigmund, 2005). Yet the ontogenetic roots of observation-based preferential helping have been a matter of controversy in recent years. The present study investigated whether young toddlers exhibit a preference for helping people who have acted prosocially, rather than antisocially, toward a third party.[1]

Observation-based preferential helping is a largely unstudied topic in early childhood. It is well established that children help familiar and unfamiliar adults from early in the second year (Rheingold, 1982; Warneken & Tomasello, 2007). However, in most studies on infant and toddler helping, children see a *single* person in need of help, often someone reaching for an out-of-reach object (Svetlova, Nichols, & Brownell, 2010; Warneken & Tomasello, 2006, 2008, 2012; for an exception, see Dunfield & Kuhlmeier, 2010). In contrast, in a study of 3-year-olds, Vaish, Carpenter, and Tomasello (2010) gave children a choice of helping either a prosocial or antisocial person after observing them interact with a third person and found that children avoided helping the antisocial person. Studies on resource distribution have also found that 3½- and 4-year-olds prefer to distribute resources to prosocial rather than antisocial dolls (Kenward & M. Dahl, 2011; Olson & Spelke, 2008). When taken together, findings from infancy to early preschool age raise a developmental question: How does observation-based preferential helping emerge in early childhood?

Two competing hypotheses have been put forth about the emergence of observation-based preferential helping: One proposal is that observation-based preferential helping is present when children first begin to help (Wynn, 2009). The opposing hypothesis states that infant helping behavior at first is unaffected by how the potential recipients have treated a neutral person (Warneken & Tomasello, 2009).

The first hypothesis is rooted in work showing preferences for prosocial puppets and geometric-shape agents in the first year of life (Hamlin & Wynn, 2011; Hamlin, Wynn, & Bloom, 2007, 2010; Hamlin, Wynn, Bloom, & Mahajan, 2011; Kuhlmeier, Wynn, & Bloom, 2003). In one paradigm (Hamlin & Wynn, 2011, Experiment 2; Hamlin et al., 2011), infants are shown two scenarios. In the "prosocial" scenario, a neutral puppet rolls a ball to the

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[1] Consistent with previous literature on early social evaluation (e.g., Hamlin & Wynn, 2011), we use the words *prosocial* and *antisocial* to refer to agents who act in a manner conducive or obstructive to the third party's expressed goal (e.g., having her ball returned to her). In doing so, we are not assuming that the children possess adult-like concepts of prosociality and antisociality.

side and another puppet returns the ball to the neutral puppet. The "antisocial" scenario is identical, except that the intervening puppet keeps the ball for itself instead of returning it. In a subsequent test, Hamlin and Wynn (2011) found that 5-month-olds were more likely to reach toward the prosocial puppet than toward the antisocial puppet and that 3-month-olds looked significantly longer at the prosocial puppet than the antisocial puppet. Relatedly, Hamlin et al. (2011) found that 19- to 23-month-olds preferred to distribute resources to prosocial rather than antisocial puppets (though it should be noted that Kenward & Dahl, 2011, found no such tendency in 3-year-olds).

The opposing hypothesis states that very young children do *not* prefer to help agents who have acted prosocially toward a third party. In this view, the adult concern with rewarding altruistic acts and punishing cheaters may simply not be relevant in early childhood (Warneken & Tomasello, 2009). Most young children find themselves surrounded by adults who wish them well, even when those same adults are unfriendly toward other adults. For instance, spouses who quarrel may still act lovingly toward their children. In this context, children's behavior may be guided by an intrinsic desire to help (Warneken, Hare, Melis, Haus, & Tomasello, 2007; Warneken & Tomasello, 2008), not by evaluations of how the helpee has treated another adult. Hence, although 21-month-olds prefer to help agents who wanted to share a toy with them over agents who did not (Dunfield & Kuhlmeier, 2010), young toddlers may not show a corresponding helping preference after observing agents acting prosocially or antisocially toward a third party.

A third, rarely considered possibility is that the emergence of observation-based preferential helping is delayed because children have particular difficulties evaluating human interactions. A limitation of past work on early social preferences has been the use of puppets and geometric-shape figures as substitutes for human agents. Given the complexity of social interactions involving human agents, it is possible that young children find it more difficult to detect the valence of human interactions than to detect the valence of interactions between puppets or geometric-shape figures (see Kenward & Dahl, 2011, for an alternative view). Thus, even if preferential looking and reaching indicate social preferences in 3- and 5-month-olds (Hamlin & Wynn, 2011), children may initially be incapable of applying these preferences to interactions between peers or adults. According to this third view, children's observation-based preferential helping would increase with age in concert with an improvement in their ability to evaluate human actions.

In addition to the nature of the agents, the nature of the observed prosocial and antisocial actions is likely to affect when children show a preference for helping prosocial others. The norm violation used in studies of infant social preferences involves an antisocial figure preventing a neutral figure from reaching a goal, such as climbing a hill or playing with a ball (Hamlin & Wynn, 2011; Hamlin et al., 2007, 2011). In contrast, the 3-year-olds in Vaish et al. (2010) observed an experimenter attempting to damage the property of another. To allow for a more direct comparison between preferential helping in our study and preferential looking and reaching in past studies, we adopted a familiarization scenario for the present study highly similar to the one used by Hamlin and Wynn (2011, Experiment 2; Hamlin et al., 2011): Children observed the neutral experimenter repeatedly rolling a ball to two other experimenters. Contrary to the neutral experimenter's expressed desire, the antisocial experimenter consistently kept the ball for herself. In contrast, the prosocial experimenter always rolled the ball back to the neutral experimenter when prompted to do so.

The present study tested children in three age groups between 16 and 27 months, covering the period following the youngest age at which helping behavior has been demonstrated (Warneken & Tomasello, 2007). Like Vaish et al. (2010), the present study required children to engage in spontaneous preferential helping of human experimenters. The main research question was whether observation-based preferential helping would be present in all age groups, be absent from all age groups, or show an increase with child age. A second question was whether children in the three age groups would *avoid* helping the antisocial experimenter or merely *prefer* to help the prosocial experimenter.

Our third question was whether children's looking behavior during the familiarization scenarios would predict their helping preferences. In particular, are children more likely to help the prosocial agent when their looking behavior indicates that they have detected the valence of the preceding interactions? If looking time is a valid index of social evaluation—an assumption underlying much research on early social cognition—one would expect the answer to be "yes." However, no previous studies have tested for such a predictive relation. One way of using looking time to assess children's social evaluation is to test whether they look longer when the neutral agent seeks interaction with the previously antisocial agent (an unexpected event) than when she seeks interaction with the previously prosocial agent (an expected event). Indeed, Hamlin et al. (2007) found that infants looked longer when the neutral figure approached the antisocial figure than when the neutral figure approached the prosocial figure.[2] In the present study, we tested whether greater looking time differentiation (antisocial minus prosocial looking time) when the neutral agent *continued* the interactions with each agent predicted greater likelihood of helping the prosocial experimenter.

Method

Participants

Three groups of 28 toddlers participated: a 17-month-old group (13 girls, M_{age} = 17.6 months; range: 16.6–18.2 months), a 22-month-old group (15 girls, M_{age} = 22.0 months; range: 20.9–23.2 months), and a 26-month-old group (16 girls, M_{age} = 26.1 months, range: 25.0–27.2 months). These ages were selected so as to cover the periods before, around, and after the age at which children show a preference for helping those who have offered them a toy over those who have not (21 months; Dunfield & Kuhlmeier, 2010). Eight additional children were tested but ex-

[2] In a study similar to that by Hamlin et al. (2007), Kuhlmeier et al. (2003) found that infants looked longer when the neutral figure approached the prosocial figure than when it approached the antisocial figure. In general, infants look longer toward the unexpected outcome when the task is easier and longer toward the expected outcome when the task is harder (Kagan, 2008). As the figures used in Hamlin et al. (2007) had eyes, whereas the figures used in Kuhlmeier et al. (2003) did not, a possible explanation for this apparent discrepancy is that the presence of eyes made the task easier for the infants (J. K. Hamlin, personal communication, October 3, 2010).

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cluded from the final sample: five because of failure to see the experimental manipulation, two because of experimenter error, and one because of parental interference. Participants were recruited from a participant database at the University of California, Berkeley (UC Berkeley) Infant Studies Center. All testing was conducted at the Infant Studies Center on the UC Berkeley campus. Among caregivers, 62% were White, 15% were Asian, 10% were African American, 8.5% were Hispanic, 2.5% were Native American, and 2% either reported "other" or did not report ethnicity; 82% of caregivers had college or graduate degrees.

Procedure

Warm-up. The children were first introduced to the main experimenter (E) and then to the two additional experimenters, who would later be the prosocial experimenter (P) and the antisocial experimenter (A). To prevent experimenter expectations from influencing how they interacted with the children, P and A did not know their experimental roles at the time of the warm-up. E did not interact with P and A during the warm-up to keep the children from forming an expectation about the relationship between E and the two other experimenters prior to the experiment. The children played with the experimenters for approximately 30 min in order to make them comfortable with the experimental setting.

Familiarization phase. Children were seated on their caregiver's lap across the table from the three experimenters, with E sitting between P and A. The game was initiated when E asked either P (*prosocial interaction*) or A (*antisocial interaction*) whether she wanted to play; P or A would always exclaim, "Yes!" In the prosocial interaction, E rolled a ball to P three times. Each time, P picked up the ball, played with it, and said, "Ooh, wow" at a specified time. E then exclaimed, "Roll it back," clapped her hands, and placed her hand on the table to convey that she wanted the ball back. P subsequently rolled the ball to E, who picked up the ball and looked at it. The antisocial interaction was identical to the prosocial interaction, except that A, instead of returning the ball, always put the ball in an apron around her waist. After A had taken the ball, E alternated her gaze between her own hand and A's hand, as if she was expecting to receive the ball back. Each interaction of three ball rolls lasted 45 s.

There were two reasons for having E repeatedly roll a ball to P and A. First, we wanted to increase the children's exposure to the prosocial and antisocial interactions. Second, we wanted to test if the children would find it more unexpected that E continued the game with A than that she continued the game with P after her first interaction with them (as indicated by differential looking time during the second ball rolling with each experimenter).

When E was interacting with P, A silently watched the interaction and vice versa. All children observed both interactions. The order of presentation (*prosocial* or *antisocial* interaction first) and the position of P and A (*left* or *right* side of E) were counterbalanced across participants.

The emotional expressions of the experimenters were the same in the prosocial and the antisocial interactions, being neutral to positive throughout the experiment (Vaish, Carpenter, & Tomasello, 2009). A coder blind to the purpose of the study and to experimental condition assessed the emotional valence of P and A for six children in each age group (21% of the participants) during the first familiarization phase. Facial expressions were coded continuously as either *highly negative*, *mildly negative*, *neutral*, *mildly positive*, or *highly positive*. No instances of negative facial expressions were coded. Neutral and mildly positive expressions proved difficult to distinguish; these categories were therefore collapsed. Agreement for highly positive versus neutral/mildly positive expressions was good (event alignment kappa for 22% of the coded data: $\kappa = .83$; Bakeman, Quera, & Gnisci, 2009). As expected, there were no significant differences in proportion of time displaying highly positive emotion between A and P, $t(17) = 0.549$, $p = .591$. A quadratic transformation was applied to the data to correct for positive skew.

The coder also classified the emotional tone of each of A's and P's verbalizations as *negative, neutral,* or *positive* for the same 18 participants. Five out of 107 coded vocalizations were coded as neutral while the rest were coded as positive (agreement: $\kappa = .87$). Three neutral utterances came from a prosocial experimenter and two came from an antisocial experimenter, binomial test: $p = 1.00$. In sum, there was no evidence for differences in emotion displays between P and A.

Helping test. During the helping test, the child was placed on the floor, and the caregiver started reading a magazine. The child observed E first give two bean bags to P and A. Then E placed a single bean bag on the edge of the table and "accidentally" pushed it onto the floor, where it fell to a location equidistant from P and A. Both P and A reached and looked toward the bean bag without being able to grab it. The child was given 30 s to help one of them. During the first 15 s, P and A looked and reached toward the bean bag, and during the second 15 s, they alternated their gaze between the child and the bean bag while saying, "the bean bag" (Warneken & Tomasello, 2008).

The combination of one familiarization phase and one helping test was repeated two additional times, giving each child a total of three opportunities to observe the prosocial and antisocial interactions and then help. The familiarization and helping phases were the same on each of the three repetitions, except that the child remained on the floor during the second and third familiarization phases.

Control trial. If a child had only helped one of the two experimenters during the three ordinary helping tests, a control trial was administered after the main experiment. The control trial was identical to the ordinary helping tests, except that only the experimenter (P or A) who had *not* already been helped reached for the bean bag. The purpose of the control trial was to test whether these children (a) simply had a *preference* for helping one experimenter or (b) *refused* to help one of the experimenters.

Coding, Data Reduction, and Analysis

Child helping and looking behavior were coded from video recordings. Helping was coded when the child either placed the bean bag in the hand of P or A *or* placed the bean bag on the table next to P's or A's arm while looking directly at the recipient. When analyzing children's preferential helping behavior, we were primarily interested in which experimenter children helped on their first instance of helping ("initial helping"), pooling across the three ordinary helping tests. We also report analyses of the total number of helping acts toward P and A. To assess whether children simply preferred to help one experimenter or whether they refused to help the other experimenter, we also analyzed data on children's help-

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ing of one or both experimenters, pooling across the three ordinary helping trials and the control trial.

Looking time was coded during the first of the three familiarization phases when the child was still sitting on the caregiver's lap. As noted, we were interested in whether children would look longer at E continuing the interaction with A than at E continuing the interaction with P after E's first interaction with them. Thus, we only analyzed looking behavior for the second time that E rolled the ball to P or A (we did not include looking during the third roll, as some children could by then have come to expect that E would roll the ball to A and P, no matter what). None of the age groups showed significant looking time differentiation between prosocial and antisocial trials during the first ball rolling ($ps > .14$).

As a measure of children's preferential attention to the antisocial over prosocial interaction, we calculated the *difference in proportion of trial duration* that the child paid attention to the ongoing interaction. We analyzed looking time *in proportion of trial time*, rather than in seconds, to minimize the effect of any variation in trial duration.

All videos were coded by the second author, who was also the main experimenter and thus not blind to conditions. In addition, a coder blind to condition coded 20% of the videos to allow for reliability assessment. Intercoder agreement was high for both looking ($r = .97$) and helping ($\kappa = 1.00$) behavior.

Data analysis. Since our primary question was whether helping preference increased with age, we entered age group as a linear contrast to capture monotonic age trends. The principal analyses were conducted using three types of generalized linear models (Dobson, 2002): logistic regression (dichotomous variables), Poisson regression (count variables), and ordinary least squares (OLS) regression (continuous variables). We investigated main effects and interactions (all having 1 degree of freedom) by testing whether the relevant regression coefficient, *b*, differed from 0, using Wald (*z*) tests and *t* tests. When interaction effects were not significant, estimates and test statistics from models without the interaction term are reported. Residuals were examined using quantile–quantile plots. Unless otherwise noted, no measures were deemed necessary to make the data satisfy the test assumptions. Preliminary analyses revealed no effects of child gender, so data from male and female children were pooled. All analyses were conducted using *R*.

Results

Helping Behavior

Forty-three of the 84 children helped at least once, which is comparable to rates of helping found in other studies of children at this age (Dunfield & Kuhlmeier, 2010; Warneken & Tomasello, 2006). The likelihood of helping did not depend significantly on age group, logistic regression: $b_{Group} = 0.07$, $z = .267$, $p = .789$. Among children who helped, the number of ordinary helping trials (i.e., excluding the control trial) in which they helped also did not depend on age group, Poisson regression: $b_{Group} = 0.011$, $z = .085$, $p = .932$ (mean helping trials: 17-month-olds: 2.23, 22-month-olds: 2.44, 26-month-olds: 2.29). The majority of children who helped did so on the first helping trial (34/43; see Table 1).

Table 1
Helping Behavior by Trial

Age group/helping test	*N*	Prosocial	Antisocial
17 months			
Trial 1	28	4	6
Trial 2	28	8	2
Trial 3	28	5	4
Control: Prosocial	3	1	—
Control: Antisocial	6	—	4
22 months			
Trial 1	28	9	3
Trial 2	28	8	6
Trial 3	28	5	8
Control: Prosocial	5	4	—
Control: Antisocial	4	—	3
26 months			
Trial 1	28	11	1
Trial 2	28	6	4
Trial 3	28	7	3
Control: Prosocial	2	1	—
Control: Antisocial	9	—	7

Note. *N* = number of participants in each trial who helped the prosocial and the antisocial experimenter. "Control: Antisocial" refers to control trials in which only the antisocial experimenter was reaching, and "Control: Prosocial" refers to control trials in which only the prosocial experimenter was reaching.

Helping preference. The preference for helping the prosocial experimenter first increased with age group, logistic regression: $b_{Group} = 0.94$, $z = 2.08$, $p = .038$ (the analysis included only children who helped at least once). Further analyses revealed that only children in the oldest age group showed a significant preference for helping the prosocial experimenter first. Twelve out of the 14 helpers in the 26-month group helped the prosocial agent first, binomial test: $p = .013$, whereas there was no significant preference for helping the prosocial agent first in the middle, binomial test: $p = .455$, or youngest, binomial test: $p = 1$, age groups (Figure 1). There was no relation between familiarization order and initial helping preference, nor between initial helping preference and trial number in which a child first helped ($ps > .15$).

Analyses of the total number of acts of helping showed similar trends as the analyses of initial helping preference. The older children tended to help the prosocial experimenter on more trials ($M_{prosocial} = 1.71$ trials) than they helped the antisocial experimenter ($M_{antisocial} = 0.57$), paired Wilcoxon test: $V = 63.5$, $p = .050$, whereas the middle and younger age groups did not (22-month-olds: $M_{prosocial} = 1.37$, $M_{antisocial} = 1.06$, Wilcoxon: $V = 63$, $p = .499$; 17-month-olds: $M_{prosocial} = 1.31$, $M_{antisocial} = 0.92$, Wilcoxon: $V = 56.6$, $p = .429$).

Helping of both experimenters. Despite the older children's preference for helping the prosocial agent, the majority of helpers in all age groups were willing to help both experimenters on at least one trial (as in Vaish et al., 2010, see Table 1). Overall, 34 out of 43 helpers helped both experimenters at least once, either during the three ordinary trials ($N = 14$) or during the control trial ($N = 20$). The tendency to help both experimenters was unrelated to age group, logistic regression: $b_{Group} = 0.190$, $z = 0.374$, $p = .709$, initial helping preference, $b_{preference} = 0.413$, $z = 0.511$, $p = .610$, and the interaction between the two, $b_{Group \times Preference} = 0.657$, $z = 0.633$, $p = .537$.

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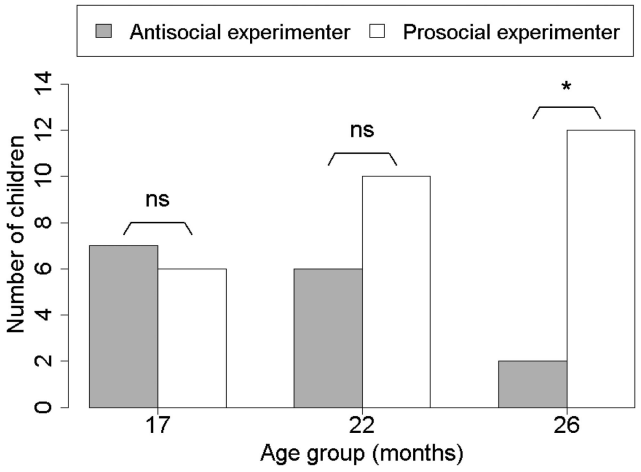

Figure 1. Initial helping preference by age group. Bars show the number of children in each age group who helped the antisocial (gray bars) and prosocial (white bars) experimenter first. *ns* = not significant. * $p = .008$.

Looking Time Differentiation

There was a significant Age Group × Presentation Order interaction in predicting looking time differentiation during the second ball rolling, OLS regression: $b_{Group \times Order} = 0.134$, $t(80) = 2.041$ $p = .045$. Further analyses revealed that the presentation order effect was significant for the 17-month-olds, $t(26) = 2.59$, $p = .015$, but not for the 22-month-olds, $t(26) = 1.31$, $p = .200$, or the 26-month-olds, $t(26) = 0.098$, $p = .923$.

The 26-month group looked significantly longer at the antisocial game, $t(27) = 2.777$, $p = .010$, while the 22-month group did not show differential looking time, $t(27) = 0.531$, $p = .600$. In the oldest age group, there were more children who looked the longest at the antisocial interaction than there were children who looked the longest at the prosocial interaction, binomial test: $p = .035$, whereas this was not the case in the middle age group, binomial test: $p = .834$. In the youngest age group, the mean looking time was (nonsignificantly) longer for whichever game was shown first, prosocial game first: $t(16) = -2.055$, $p = .057$; antisocial game first: $t(10) = 1.75$, $p = .111$. In other words, the 17-month-olds showed no sign of looking systematically longer at the antisocial game. Table 2 shows mean proportional looking times during the second ball roll by condition.

The residuals from the OLS regression had a slightly leptokurtic distribution, due to the fact that some children paid attention during the entire second ball rolling for both P and A. We substituted differential looking time score from the second ball rolling with differentiation score from the third ball rolling for the affected participants and performed the analyses of the looking time data again. The reason for this substitution was that children whose looking times were at ceiling during the second ball rolling presumably needed to observe additional ball rolls before showing differential looking toward the two interactions. These additional analyses yielded the same findings as the initial analyses.

Relation to initial helping preference. Our final question was whether children who showed greater looking time differentiation were more likely to help the prosocial experimenter first. To partial out the effect of presentation order and age group on looking time differentiation, we regressed looking time differentiation onto presentation order and age group, as well as their interaction. The resulting residuals, $\text{LookDiff}_{\text{resid}}$, were used to predict helping preference among children who helped at least once.

As hypothesized, greater looking time differentiation predicted higher likelihood of helping the prosocial agent first, logistic regression: $b_{LookDiff\_resid} = 3.919$, $z = 2.006$, $p = .045$, when controlling for age group, $b_{Group} = 1.144$, $z = 2.220$, $p = .026$. There was no interaction between age group and $\text{LookDiff}_{\text{resid}}$, $b_{Group \times LookDiff\_resid} = -3.084$, $z = -1.309$, $p = .190$. A similar relation between $\text{LookDiff}_{\text{resid}}$ and initial helping preference was found when helpers were divided into three ordered groups based on their $\text{LookDiff}_{\text{resid}}$ scores: *low* $\text{LookDiff}_{\text{resid}}$ (<–1 *SD*, 0/3 children helped prosocial first), *intermediate* $\text{LookDiff}_{\text{resid}}$ (–1 *SD* − 1 *SD*, 21/32 helped prosocial first), or *high* $\text{LookDiff}_{\text{resid}}$ (>1 *SD*, 7/8 helped prosocial first). In line with our hypothesis, children's ordinal $\text{LookDiff}_{\text{resid}}$ classification was significantly positively associated with helping the prosocial experimenter first, Kendall's test for ordinal association: $\tau_b = 2.339$, $p = .019$ (Figure 2).

Discussion

The present study shows that children are capable of observation-based preferential helping already around the second birthday. Among the 26-month-olds who helped, nearly all helped the prosocial experimenter first. However, our findings also indicate that observation-based preferential helping is a highly complex phenomenon. Among the 17-month-olds and 22-month-olds, there was no significant tendency to help the prosocial experimenter first. Moreover, most children in all age groups were willing to help both experimenters in at least one trial.

These findings have important implications for proposals made about the development of preferential helping. Consistent with Wynn's (2009) hypothesis, we did find evidence for observation-based preferential helping in very young children. Yet, consistent with Warneken and Tomasello's (2009) hypothesis, children's willingness to help is not entirely subordinated to their social evaluations. Even the children in our older age group, who appeared to detect the violation, were willing to help the antisocial

Table 2
Proportional Looking Time

Age group/ interaction	Prosocial first		Antisocial first	
	M	*SD*	*M*	*SD*
17 months				
Prosocial	.86	.19	.81	.20
Antisocial	.71	.30	.94	.12
22 months				
Prosocial	.91	.15	.87	.12
Antisocial	.88	.16	.95	.09
26 months				
Prosocial	.87	.24	.84	.22
Antisocial	.98	.08	.96	.05

Note. Descriptive statistics for proportion of trial time that children looked at the interaction, as a function of age group, type of interaction (prosocial vs. antisocial), and presentation order (prosocial or antisocial first). The reported analyses were performed on differential looking time (i.e. antisocial looking time minus prosocial looking time).

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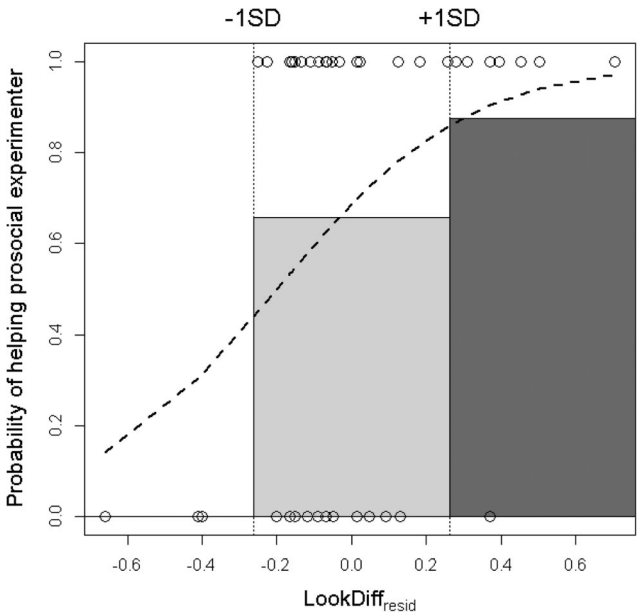

Figure 2. Initial helping preference as a function of looking time. The bars show proportions of children helping the prosocial agent first among helpers with LookDiff$_{resid}$ classified as low (<-1 *SD*, left, $N = 0$), intermediate ($-1SD - 1$ *SD*, light gray in the center), and high (>1 *SD*, dark gray bar on the right). The broken line shows the fitted probability of helping the prosocial experimenter first using a logistic regression model with LookDiff$_{resid}$ and age group as predictors of helping preference (no interaction term). The model included data from children who helped at least once. Only the line for the middle age group is shown to simplify the display. Circles show observed instances of initially helping the prosocial ($y = 1$) or antisocial ($y = 0$) experimenter plotted against the helpers' LookDiff$_{resid}$ scores.

experimenter as well as the prosocial experimenter. The present study thereby highlights the importance of studying the operation of early social evaluation in a social and interactional setting.

Our looking time data suggest that age differences in the ability to detect the prosocial and antisocial actions may underlie the age differences in preferential helping, consistent with the third hypothesis outlined in the introduction. Findings on looking time differentiation matched findings on helping preference in that only the oldest age group looked proportionally longer at the continued antisocial interaction than at the continued prosocial interaction. It is therefore possible that only in the oldest age group did children reliably detect the valenced nature of the interaction between the three experimenters. Insofar as the younger children failed to detect the prosocial and antisocial nature of the interactions, they would have no apparent basis for preferring to help the prosocial experimenter.

Looking time differentiation during the familiarization phase predicted helping preference, further supporting the above interpretation. Across age groups, children who looked proportionally longer when the neutral experimenter continued the game with the antisocial experimenter, compared to when she continued the game with the prosocial experimenter, were more likely to help the prosocial experimenter. Thus, helping and looking data were remarkably coherent in the present study. Relatedly, Schmidt and Sommerville (2011) found that 15-month-olds who looked longer at scenarios displaying unfair, rather than fair, resource distribution were more likely to share a desired object with an adult. Along with the study by Schmidt and Sommerville, the present study provides evidence that the abilities assessed in looking time paradigms are indeed connected to infants' social behavior.

The lack of differential looking in the younger age groups may seem surprising, given that studies using a similar familiarization scenario involving geometric-shape figures found differential looking around the first birthday (Hamlin et al., 2007; Kuhlmeier, Wynn, & Bloom, 2003; though see Keen, 2003, for analogous discrepancies between infant and toddler research). One likely explanation for this discrepancy is that children in the present study observed interactions between human agents rather than nonhuman figures. First, like the interactions in the present study, most social interactions do not involve a habituation phase where infants observe the same event repeatedly until they reach a habituation criterion. Second, more than geometric-shape figures, humans possess a multitude of features that children could possibly attend to, the status as prosocial or antisocial agents being only one such feature. Our findings illustrate the importance of studying young children's social skills in contexts involving human agents.

One limitation of the present study is the reliance on a single scenario for distinguishing between prosocial and antisocial agents. Insofar as children perceived the antisocial experimenter's action as a violation of a norm for how to treat others, they should show observation-based preferential helping in response to other types of transgression as well (e.g., aggression or property destruction; Vaish et al., 2009). Moreover, they should be able to integrate multiple pieces of information across different scenarios, for instance, by preferring to help a person who has engaged in a less important transgression (e.g., being rude) over one who has engaged in a more serious transgression (e.g., stealing).

This study represents one important step toward understanding the early forms of observation-based preferential helping. Our data suggest that children's ability to detect transgressions as they observe social interactions is a key determinant of observation-based preferential helping. The social function of preferential helping in early childhood is another likely factor, yet one to which our study can only speak indirectly. One possibility is that, for young children, helping behavior serves the function of establishing relationships with or getting recognition from adults (Rheingold, 1982). Thus, they may *prefer* to initiate an interaction with a prosocial adult, but their dominant objective remains to establish new relationships, even with people who have acted antisocially toward a third party. In line with this idea, most children in all three age groups were willing to help both experimenters in the present study. Further research is needed to investigate these and other determinants of observation-based preferential helping and its development in early childhood.

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