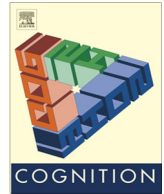




ELSEVIER

Contents lists available at ScienceDirect

Cognition

journal homepage: www.elsevier.com/locate/COGNIT

Brief article

Costly rejection of wrongdoers by infants and children

Arber Tasimi*, Karen Wynn

Yale University, United States



ARTICLE INFO

Article history:

Received 17 June 2015

Revised 13 November 2015

Accepted 8 March 2016

Keywords:

Social cognition

Cognitive development

Cooperation

ABSTRACT

How unappealing are individuals who behave badly towards others? We show here that children and even infants, although motivated by material rewards, are nonetheless willing to incur costs to avoid “doing business” with a wrongdoer. When given the choice to accept a smaller offering from a do-gooder or a larger offering from a wrongdoer, children and infants chose to accept the smaller offering. It was only when the difference between the offerings was very large that their aversion to the wrongdoer was overcome by personal incentives. These findings show that a willingness to forgo self-interests when faced with wrongdoers is a fundamental aspect of human nature.

© 2016 Elsevier B.V. All rights reserved.

1. Introduction

From infancy to adulthood, humans exhibit an aversion to individuals who treat others poorly. Even in the first months of life, infants reject agents who behave badly (Hamlin & Wynn, 2011; Hamlin, Wynn, & Bloom, 2007, 2010), and before their first birthday, not only avoid wrongdoers themselves, but expect others to do so as well (Kuhlmeier, Wynn, & Bloom, 2003). Such an aversion towards wrongdoers persists across development. For example, young children share less with wrongdoers (Kenward & Dahl, 2011), and are less likely to help them, too (Dahl, Schuck, & Campos, 2013; Vaish, Carpenter, & Tomasello, 2010). Among adults, there is an equally strong dislike of those who engage in negative behaviors (Cosmides, 1989; Hardy & Van Vugt, 2006; Kurzban & Leary, 2001). Here we ask about the strength of this aversion: Is it sufficiently powerful to lead people to resist one of the most alluring aspects of everyday life: profit?

In recent years, theorists have posited that wrongdoers may suffer decreased desirability as partners in social exchanges (Baumard, André, & Sperber, 2013; Bull & Rice, 1991; Raihani, Thornton, & Bshary, 2012); this may be an effective mechanism for promoting cooperation. Research has demonstrated numerous ways in which humans engage in selective partner choice (Barclay & Willer, 2007; Pradel, Euler, & Fetchenhauer, 2008; Sylwester & Roberts, 2010); however, studies have not examined whether people continue to avoid wrongdoers who afford them gain. The desire to optimize profit is a hallmark of human behavior

(Camerer, Loewenstein, & Rabin, 2003); do people willingly avoid wrongdoers even at personal costs?

In the current study, we examined children’s and infants’ partner choices, investigating the conditions under which they do and do not choose to deal with wrongdoers who afford them profit. Across two experiments, we investigated with whom children and infants choose to engage in a social exchange following previous work demonstrating that social partner preferences can be documented on the basis of whom young subjects accept an offering from (Buon et al., 2014; Herrmann, Keupp, Hare, Vaish, & Tomasello, 2013; Kinzler, Dupoux, & Spelke, 2007).

2. Experiment 1

In Experiment 1, we asked whether 5- to 8- year-olds sacrifice their self-interests when given the opportunity to profit from a wrongdoer. Previous research has shown that in their resource allocations, children 7 years of age and older prioritize moral considerations over personal incentives (Fehr, Bernhard, & Rockenbach, 2008; Sheskin, Bloom, & Wynn, 2014), while younger children prioritize their own material interests, suggesting a developmental change at age 7 in how heavily children weight their own benefits relative to the benefits of others. We therefore chose to examine children on both sides of this developmental shift to ask if children of these ages forego personal gains to avoid a wrongdoer, and, if so, whether such a tendency develops in tandem with their increase in moral concern (in which case we should observe it only in the older children in our sample), or, instead, reflects a cost–benefit analysis of children’s own individual gains and risks (in which case we might expect to see it in all ages).

* Corresponding author at: Department of Psychology, Yale University, 2 Hillhouse Avenue, New Haven, CT 06520, United States.

E-mail address: arber.tasimi@yale.edu (A. Tasimi).

2.1. Methods

2.1.1. Participants

One hundred sixty children (73 girls; mean age = 6.94 years; range = 5.12–8.52 years) were recruited from the greater New Haven, Connecticut area and were tested individually in a quiet room at their elementary school. The Human Subjects Committee at Yale University approved all study procedures. Parents gave written informed consent; children provided oral assent. All sessions were audio-recorded.

2.1.2. Procedure

Children were randomly assigned to a Baseline or a Character-Information condition. In the Baseline condition, an experimenter showed children photographs of two fictitious characters and asked whose stickers they wanted to accept (e.g., “This is Max. Max has one sticker and he wants to give you his one sticker. This is Craig. Craig has two stickers and he wants to give you his two stickers. Whose do you want?”). The experimenter looked at the child—not the photos—in order to avoid biasing the subject’s choice. Children were randomly assigned to one of the following four contrasts ($N = 20$ per contrast) in which they were encouraged to choose between: (A) one and two stickers; (B) one and four stickers; (C) one and eight stickers; (D) one and sixteen stickers. The following were counterbalanced across children: (1) name of character offering the larger amount (Craig or Max); (2) order of larger offering (first or second).

The procedure for the Character-Information condition was the same as the Baseline condition with one exception: Here, the character offering the larger amount was described as mean, whereas the character offering the smaller amount was described as nice (e.g., “This is Craig. Craig is always mean. The other day, he hit someone on the playground. This is Max. Max is always nice. The other day, he hugged someone on the playground. Craig has two stickers and he wants to give you his two stickers. Max has one sticker and he wants to give you his one sticker. Whose do you want?”). Again, the experimenter looked at the child—not the photos—in order to avoid biasing the subject’s choice. Children were assigned to the same four contrasts as the Baseline condition ($N = 20$ per contrast), and the following were counterbalanced across children: (1) name of mean character (Craig or Max); (2) order of mean fact (first or second).

Responses were audio recorded and the experimenter’s judgments were the ones used in all analyses. An independent coder blind to the experiment’s predictions coded a random 50% of subjects; the experimenter and independent coder reached 100% agreement on choice.

2.2. Results

As shown in Fig. 1, children reliably chose the larger offering in the Baseline condition (71 of 80 children, binomial probability, $p < .001$); the strength of this preference did not vary by contrast (Fisher’s exact, $p = .610$). However, in the Character-Information condition, choices differed among the contrasts (Fisher’s exact, $p = .045$). Children robustly accepted one sticker from the do-gooder rather than two from the wrongdoer (only 4 of 20 children took the larger offering, binomial probability, $p = .012$; this differed significantly from Baseline, Fisher’s exact, $p < .001$). Children showed no preference in the 1:4 or 1:8 contrasts (8 of 20 children in each took the larger offering, binomial probability, $p = .503$); these patterns differed significantly from Baseline (Fisher’s exact, $p = .002$ [1 vs. 4] and $p < .001$ [1 vs. 8]). Children showed an intermediate pattern when presented with the 1:16 contrast, tending toward choosing the larger number, albeit non-significantly (13

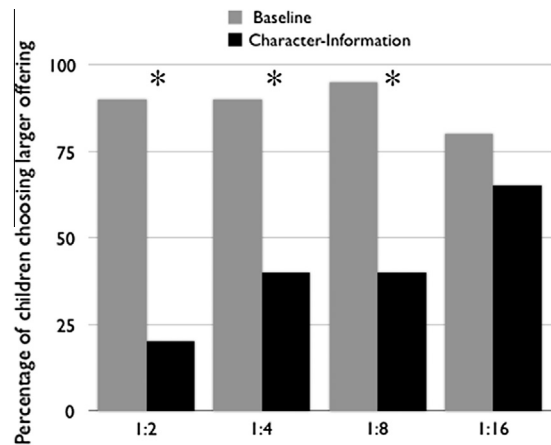


Fig. 1. Children’s choices in the Baseline and Character-Information conditions.

of 20 children, binomial probability, $p = .263$; this did not differ from Baseline, Fisher’s exact, $p = .480$).

Interestingly, there were no age differences in children’s tendency to reject the wrongdoer’s larger offering. In the three contrasts (1:2, 1:4, and 1:8) in which children’s choices in the Character-Information condition differed from Baseline, 5- and 6-year-olds rejected the wrongdoer’s offering ($M = 69%$) just as often as the 7- and 8-year-olds ($M = 65%$, Fisher’s exact, $p = .79$). In the 1:16 contrast, both age groups were equally likely to accept the wrongdoer’s offering (younger, 60%; older, 67%, Fisher’s exact, $p = 1$).

Taken together, these findings indicate that when the stakes are modest, children show a strong tendency to go against their baseline desire to optimize gain to avoid “doing business” with a wrongdoer; however, when the stakes are high, children show more willingness to “deal with the devil.”

3. Experiment 2

Why would children sacrifice self-interests when given the opportunity to profit from a wrongdoer? One explanation is that they wanted to impress the experimenter; children may not have wanted to appear as though they prioritized self-interests over moral considerations. Recent studies suggest that reputational concerns emerge between three to five years of age (Fu & Lee, 2007; Leimgruber, Shaw, Santos, & Olson, 2012). Accordingly, we tested infants on a task analogous to the one we gave children, as they are well below the ages at which children start to engage in reputation management.

3.1. Methods

3.1.1. Participants

Sixty-four 12- to 13-month-old infants (34 girls; mean age = 12 months, 25 days; range = 12 months, 1 day to 13 months, 30 days) were recruited from the greater New Haven, Connecticut area and were tested individually in a quiet laboratory room. Sixteen additional infants were tested but excluded from the final sample due to procedural error (one), fussiness (two), and failure to make a choice (13).

3.1.2. Procedure

Infants were randomly assigned to a Baseline or a Character-Information condition. In the Baseline condition, infants sat on their parents’ lap before a table, approximately 107 cm away from an experimenter. Parents sat quietly with their eyes closed

throughout the experiment. The experimenter brought out two rabbit puppets, one wearing an orange and one wearing a green shirt. Each puppet sat behind a plate (21 cm diameter) containing small squares of graham cracker (3.18 cm² each). The two plates were spaced 15 cm apart; crackers had 5 cm (1:2 contrast) or 2 cm (1:8 contrast) of space between them. The experimenter called the infant's attention to the puppets by saying, "Hi! Do you see these?" After the infant looked at both puppets, the experimenter asked, "Would you like a cracker? Whose do you want?" The puppets (manipulated by the experimenter) then simultaneously offered their crackers by pushing their plates forward until they were approximately 10 cm from the infant, creating the impression that they were offering their crackers (see [Movie 1](#)). For half the infants ($N = 16$), the plates held one and two crackers respectively; for the other half ($N = 16$), they held one and eight. Choice was coded as the plate with the first cracker that the infant touched with a visually guided reach (i.e., the first cracker the infant reached for while looking at it prior to touching it). The following were counterbalanced across infants: (1) shirt color of puppet offering the larger amount (orange or green); (2) position of puppet offering the larger amount (left or right).

In the Character-Information condition, infants sat on their parents' lap before a table, approximately 198 cm from a curtain that could be raised to reveal a puppet stage. Parents sat quietly with their eyes closed throughout. *Familiarization*: To familiarize infants with the stage, the curtain was raised and lowered twice. *Puppets introduction*: In the first phase, the curtain rose to reveal the two rabbit puppets wearing their distinctive orange and green t-shirts, each behind a white plate with crackers laid out upon it. Plates were positioned approximately 142 cm from the infant with 35 cm between them. Infants saw two trials in which each puppet, in turn, "ate" from their plate of crackers, saying, "Mmmm, yum!". These events lasted ~3 s each. *Helping and Hindering events*: Next, infants saw two alternating events, *helping* and *hindering* (see [Movie 2](#)), three times each, for a total of six trials. At the start of each trial, the curtain rose to reveal a clear box (35 cm wide × 26 cm deep × 10 cm high), containing a toy, placed 142 cm from the infant. Visible behind the box was a lamb puppet; the two rabbit puppets sat at the rear of the stage, one to the left and one to the right. At the start of each trial, the lamb approached the box from one side or the other and repeatedly attempted to open the box, but was unsuccessful in doing so. After four failures (i.e., during the fifth attempt), one of the rabbit puppets intervened. During *helping* events, as the lamb was attempting to raise the lid, one rabbit approached and helped lift it; the lamb then dove face down into the box grabbing the toy while the helper ran offstage. During *hindering* events, the other rabbit approached and slammed the lid shut; the lamb then dove face down next to the (closed) box while the hinderer ran offstage. These events took ~13 s each.

On both trial types, after the lamb dove down and the helper/hinderer exited, action ceased and infants' looking time to the now-motionless display was measured. Trials ended once infants looked away for 2 s or after 30 s elapsed. An online coder, peeking through a hole in the puppet stage on the infants' right side, measured looking time using the computer program JHab. The online coder could not see the puppet show.

Infants were then given the choice measure, in which the helpful and hindering puppets each offered the infant their plate of crackers (see [Movie 1](#)) as described for the Baseline condition. The online coder, who was blind to the puppets' identities, conducted the choice measure and ensured parents kept their eyes closed during choice. For half the infants ($N = 16$), the helpful puppet offered the infant one cracker while the hindering puppet offered two; for the other half ($N = 16$), the helpful puppet offered the infant one cracker while the hindering puppet offered eight. Crackers were arranged on the plates as in the Baseline condition.

The following were counterbalanced across infants: (1) shirt color of hindering puppet (orange or green); (2) order of hindering event (first or second); (3) position of hindering puppet during the puppet show (left or right); (4) position of puppet during choice (same side or different side as during the show). As in the Baseline condition, choice was coded as the puppet offering the plate with the first cracker the infant touched with a visually guided reach.

Infants' responses were videotaped and the online coder's judgments were the ones used in all analyses. An independent coder, blind to our hypotheses and predictions, recoded a random sample of 50% of subjects; online and offline coders reached 100% agreement on choice.

3.2. Results

As shown in [Fig. 2](#), infants reliably chose the larger offering in the Baseline condition (24 of 32 infants, binomial probability, $p = .007$), replicating previous findings that infants can detect numerical differences in food options and robustly prefer the larger option ([Cherries, Mitroff, Wynn, & Scholl, 2008](#); [Feigenson, Carey, & Hauser, 2002](#); [Feigenson, Carey, & Spelke, 2002](#)). Choices did not vary by contrast (Fisher's exact, $p = .685$).

However, in the Character-Information condition, infants' choices, like children's, differed between contrasts (Fisher's exact, $p = .011$). Infants robustly took a single cracker from the do-gooder rather than two crackers from the wrongdoer (only 3 of 16 infants took the larger offering, binomial probability, $p = .021$); this differed significantly from their preference for two crackers over one in the Baseline condition (Fisher's exact, $p = .011$). Infants showed an intermediate pattern when presented with the 1:8 contrast, tending toward choosing the larger number, albeit non-significantly (11 of 16 infants, binomial probability, $p = .210$; this did not differ from Baseline, Fisher's exact, $p = .685$).

4. Discussion

The current findings show that a willingness to pay personal costs to avoid transactions with wrongdoers is an early-emerging and fundamental aspect of human nature. Our study contributes to a growing literature uncovering the origins and nature of social preferences, and extends this work by highlighting the psychological significance of social assessments to young humans.

What might account for the current findings? As previously noted, children in Experiment 1 may have wanted to impress the experimenter by prioritizing moral considerations over self-interests. However, the responses in Experiment 2 of infants, who were well below the ages at which children first start to engage in reputation management, show that a willingness to take

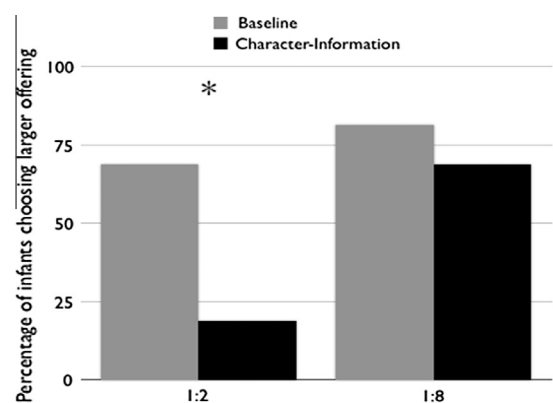


Fig. 2. Infants' choices in the Baseline and Character-Information conditions.

a cost to avoid wrongdoers is present even in the absence of reputational concerns. A different possibility is that infants and children simply feared the wrongdoer. However, children in Experiment 1 were not faced with the task of accepting or rejecting offers from wrongdoers who were physically present, so they were unlikely to be acting out of fear (moreover, it is possible that fearing a wrongdoer could cause children to accept their offer rather than reject it). A further reason to doubt that fear was a major motivation in our experiments is that even young toddlers will voluntarily approach wrongdoers—for example, to punish them (Hamlin, Wynn, Bloom, & Mahajan, 2011). We favor an alternative explanation, that our subjects disliked the wrongdoers, felt an aversion toward them, and did not wish to engage in an interaction with them.

While our findings show that children and infants willingly incur personal costs to reject a wrongdoer, they do not tell us why young humans preferred a smaller offering from the do-gooder instead of larger offering from a wrongdoer. There are three distinct interpretations for this finding: (1) the do-gooder is appealing; (2) the wrongdoer is unappealing; (3) the do-gooder is appealing and the wrongdoer is unappealing. Following previous work showing that a liking of helpers and a disliking of hinderers explain early social evaluations (Hamlin et al., 2007), it is possible that both processes underlie subjects' choices in the current study. Fortunately, a benefit of the method we have employed here is that it can enable a quantitative determination of the strength of preferences for different social partners, unlike previous designs that assess only relative preferences (Buon et al., 2014; Hamlin & Wynn, 2011; Hamlin et al., 2007; Kinzler et al., 2007; Mahajan & Wynn, 2012). Our method can thus provide insight into more precise questions such as: Is young humans' attraction to do-gooders stronger than, less than, or equal to their aversion to wrongdoers?

Moreover, researchers in psychology and behavioral economics can employ the paradigm used here to measure the exact price that people set to deal with individuals who have wronged others. We suspect that this is a rich avenue for future research, and that the answer will vary with context, the nature of an individual's bad action, the type of goods on offer, and the value of such goods in the moment. Future work can also identify whether the strength of this aversion changes over development, and how other factors (e.g., reputational concerns) might contribute to the magnitude of the costs that (young) humans are willing to incur.

Finally, a critical goal for future research involves an understanding of why infants and children are more willing to interact with wrongdoers when they offer substantial compensation. One possibility is that self-interests trump moral considerations when young humans stand to lose a considerable amount. Another possibility is that the amount on offer serves as a signal of the wrongdoer's future cooperative intent. Following recent work showing that toddlers' social evaluations take into account the size of the costs that agents are willing to incur (Jara-Ettinger, Tenenbaum, & Schulz, 2015), it may be that the larger the amount on offer, the more likely infants and children are to consider the wrongdoer's offering as a display of their remorse. Regardless of the outcome of that research, it is clear that partner choice decisions, even by very young humans, are not based solely on immediate personal gains but also on individuals' known social histories.

Acknowledgments

We thank the children, infants, and families who participated in this research, and the staffs of the following schools: Alcott, Kelley, Middlebury, and Pomperaug. We also thank the members of the Yale Infant Cognition Center, especially Shelley Mackinnon, for help with data collection. Finally, we thank Paul Bloom, Susan

Gelman, and Marcia Johnson for their input. This work was supported by NSF Grant BCS-0921515 and NIH Grant R01-MH-081877 to KW.

The authors would like to dedicate this work to the memory of Becky Chaplinski, a remarkable kindergarten teacher at Middlebury Elementary School with an infectious smile.

Appendix A. Supplementary material

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.cognition.2016.03.004>.

References

- Barclay, P., & Willer, R. (2007). Partner choice creates competitive altruism in humans. *Proceedings of the Royal Society of London. Series B: Biological Sciences*, 274, 749–753.
- Baumard, N., André, J. B., & Sperber, D. (2013). A mutualistic approach to morality: The evolution of fairness by partner choice. *Behavioral and Brain Sciences*, 36, 59–122.
- Bull, J., & Rice, W. (1991). Distinguishing mechanisms for the evolution of cooperation. *Journal of Theoretical Biology*, 149, 63–74.
- Buon, M., Jacob, P., Margules, S., Brunet, I., Dutat, M., Cabrol, D., & Dupoux, E. (2014). Friend or foe? Early social evaluation of human interactions. *PLoS ONE*, 9, e88612.
- Camerer, C. F., Loewenstein, G., & Rabin, M. (2003). *Advances in behavioral economics*. Princeton, NJ: Princeton University Press.
- Cheries, E. W., Mitroff, S. R., Wynn, K., & Scholl, B. J. (2008). Cohesion as a constraint on object persistence in infancy. *Developmental Science*, 11, 427–432.
- Cosmides, L. (1989). The logic of social exchange: Has natural selection shapes how humans reason? *Cognition*, 31, 187–216.
- Dahl, A., Schuck, R. K., & Campos, J. J. (2013). Do young toddlers act on their social preferences? *Developmental Psychology*, 49, 1964–1970.
- Fehr, E., Bernhard, H., & Rockenbach, B. (2008). Egalitarianism in young children. *Nature*, 454, 1079–1083.
- Feigenson, L., Carey, S., & Hauser, M. (2002). The representations underlying infants' choice of more: Object files versus analog magnitudes. *Psychological Science*, 13, 150–156.
- Feigenson, L., Carey, S., & Spelke, E. S. (2002). Infants' discrimination of number vs. continuity extent. *Cognitive Psychology*, 44, 33–66.
- Fu, G., & Lee, K. (2007). Social grooming in the kindergarten: The emergence of flattery behavior. *Developmental Science*, 10, 255–265.
- Hamlin, J. K., Wynn, K., & Bloom, P. (2007). Social evaluation by preverbal infants. *Nature*, 450, 557–559.
- Hamlin, J. K., Wynn, K., & Bloom, P. (2010). Three-month-old infants show a negativity bias in social evaluation. *Developmental Science*, 13, 923–929.
- Hamlin, J. K., Wynn, K., Bloom, P., & Mahajan, N. (2011). How infants and toddlers react to antisocial others. *Proceedings of the National Academy of Sciences*, 108, 19931–19936.
- Hamlin, J. K., & Wynn, K. (2011). Five- and 9-month-old infants prefer prosocial to antisocial others. *Cognitive Development*, 26, 30–39.
- Hardy, C. L., & Van Vugt, M. (2006). Nice guys finish first: The competitive altruism hypothesis. *Personality and Social Psychology Bulletin*, 32, 1402–1413.
- Herrmann, E., Keupp, S., Hare, B., Vaish, A., & Tomasello, M. (2013). Direct and indirect reputation formation in nonhuman great apes (*Pan paniscus*, *Pan troglodytes*, *Gorilla gorilla*, *Pongo pygmaeus*) and human children (*Homo sapiens*). *Journal of Comparative Psychology*, 127, 63–75.
- Jara-Ettinger, J., Tenenbaum, J. B., & Schulz, L. E. (2015). Not so innocent: Toddlers' inferences about costs and culpability. *Psychological Science*, 26, 633–640.
- Kenward, B., & Dahl, M. (2011). Preschoolers distribute scarce resources according to the moral valence of recipients' previous actions. *Developmental Psychology*, 47, 1054–1064.
- Kinzler, K. D., Dupoux, E., & Spelke, E. S. (2007). The native language of social cognition. *Proceedings of the National Academy of Sciences*, 104, 12577–12580.
- Kuhlmeier, V., Wynn, K., & Bloom, P. (2003). Attribution of dispositional states by 12-month olds. *Psychological Science*, 14, 402–408.
- Kurzban, R., & Leary, M. R. (2001). Evolutionary origins of stigmatization: The functions of social exclusion. *Psychological Bulletin*, 127, 187–208.
- Leimgruber, K. L., Shaw, A., Santos, L. R., & Olson, K. R. (2012). Young children are more generous when others are aware of their actions. *PLoS ONE*, 7, e48292.
- Mahajan, N., & Wynn, K. (2012). Origins of "us" versus "them": Prelinguistic infants prefer similar others. *Cognition*, 124, 227–233.
- Pradel, J., Euler, H. A., & Fetschenhauer, D. (2008). Spotting altruistic dictator game players and mingling with them: The elective assortment of classmates. *Evolution and Human Behavior*, 30, 103–113.
- Raihani, N. J., Thornton, A., & Bshary, R. (2012). Punishment and cooperation in nature. *Trends in Ecology & Evolution*, 27, 288–295.
- Sheskin, M., Bloom, P., & Wynn, K. (2014). Anti-equality: Social comparison in young children. *Cognition*, 130, 152–156.
- Sylwester, K., & Roberts, G. (2010). Cooperators benefit through reputation-based partner choice in economic games. *Biology Letters*, 6, 659–662.
- Vaish, A., Carpenter, M., & Tomasello, M. (2010). Young children selectively avoid helping people with harmful intentions. *Child Development*, 81, 1661–1669.