

Chapter 16

Caring for Others: The Early Emergence of Sympathy and Guilt



Amrisha Vaish and Tobias Grossmann

Humans have evolved to be highly social and cooperative beings. Our survival and success depend on living and cooperating with one another, such as by helping people in need, working together to build shelters and find food, assisting each other with childcare, and so forth. This interdependence is argued to have come about in our evolutionary history in response to environmental pressures that required humans to band together, collaborate, and cooperate to achieve the most fundamental tasks (Tomasello, 2016). Our reliance on others meant, in turn, the need to ensure the well-being of those with whom we were – or could potentially be – interdependent.

Although this account explains human prosociality at the *ultimate level* (i.e., why prosociality emerged), it does not do so as the *proximate level* (i.e., what causes an individual to behave prosocially). After all, *prosocial behavior* involves a greater loss for the actor, who typically invests resources such as time, energy, or material resources, than for the receiver, who gains benefits without having invested their own resources. This raises a vital question: If individuals who act prosocially stand to lose more than the individuals whom they benefit, how can prosocial behavior be maintained? Why would an individual ever put aside their selfish interests to benefit others?

One part of the answer is that natural selection has favored a wide range of psychological adaptations that help us solve this dilemma at the proximate level. In particular, we have evolved emotional mechanisms that help us detect and respond prosocially toward those who need help or are suffering, thereby protecting the well-being of those whom we (might) rely on (Fessler & Haley, 2003; Frank, 1988). This view aligns with the functional approach to emotions more generally, wherein emotions are seen as adaptations that motivate us to behave in ways that help us solve challenges of adaptive and social import (Campos et al., 1989; Darwin, 1872;

A. Vaish (✉) · T. Grossmann

Department of Psychology, University of Virginia, Charlottesville, VA, USA

e-mail: vaish@virginia.edu; tg3ny@virginia.edu

© Springer Nature Switzerland AG 2022

S. L. Hart, D. F. Bjorklund (eds.), *Evolutionary Perspectives on Infancy*,
Evolutionary Psychology, https://doi.org/10.1007/978-3-030-76000-7_16

349

Keltner & Haidt, 1999; Nesse, 1990). We further propose that these emotional mechanisms appear early in ontogeny and, thus, allow even the youngest members of our species to promote others' welfare and thereby foster cooperation (Bjorklund, 2018; Vaish & Hepach, 2020).

Our focus in this chapter is on two emotional mechanisms that we argue are essential for this purpose: sympathy and guilt. *Sympathy* involves feeling concern for those in need or distress, and it motivates us to alleviate the need or distress of those individuals (Eisenberg et al., 2006). Thus, sympathy moves us to promote the welfare of those with whom we are or could be interdependent. We review recent evidence demonstrating that, in contrast to what has long been believed, infants experience sympathy for others from the very first postnatal year, and this sympathy motivates their prosocial behavior by the second year. Moreover, by the second year, children respond with sympathy that is flexible and appropriate to the situation, rendering sympathy a reliable and powerful prosocial mechanism from early on.

Guilt is prototypically experienced when one has *caused* another's need or distress and promotes reparative and prosocial behavior toward that individual (Hoffman, 2000; Vaish, 2018). Thus, guilt not only promotes others' welfare but additionally repairs ruptures in our cooperative relationships. We review evidence that guilt serves these critical functions by the third year of life, thereby enabling even young children to safeguard valuable relationships. We end the chapter with caveats to our account and open questions and predictions that emerge from the evolutionary account of early sympathy and guilt.

16.1 Sympathy

Perhaps the most foundational affective mechanism underlying prosocial behavior is empathic responding, which includes *empathy* (an affective response to another's emotional state and congruent with the other's emotional state) and sympathy (the feeling of concern about the welfare of another person in need or distress) (Batson, 1991; Eisenberg et al., 2006; Hoffman, 2000; Marsh, 2015). Though empathy and sympathy are related processes, they are separable, and it is sympathy rather than empathy that is linked to prosocial action (Bloom, 2017; Jordan et al., 2016).

One major proponent of empathic responding as an evolved altruistic motive is Martin Hoffman, who argued that such responding is a species-wide phenomenon that gives observers quick and direct access to the suffering of others and motivates prosocial behavior to alleviate that suffering (Hoffman, 2000, 2007). Hoffman further laid out an influential developmental account in which he proposed that empathic responding is rooted in the emotional contagion seen soon after birth, wherein infants automatically cry in response to other infants' cries (e.g., Sagi & Hoffman, 1976; Simner, 1971). Around 12–14 months of age, infants show “ego-centric empathic distress,” in which they respond to another's distress as if they themselves were in distress. This is argued to occur because, although infants at this

age can feel empathic distress, they still lack a clear differentiation between self and other (Hoffman, 2000). Hoffman proposed that true empathy emerges in the second half of the second year, when children more fully differentiate between self and other and thereby understand that others are separate beings (as evident in their capacity to recognize themselves in the mirror; Lewis et al., 1991). With this important cognitive development, toddlers realize that others have independent inner states, and they now begin to show not only empathy but also sympathy. Thus, toddlers often respond to those in distress with facial and verbal expressions of sympathy and prosocial actions such as helping and comforting, and their expressions of sympathy predict how prosocial they are (Bischof-Köhler, 1991; Eisenberg & Fabes, 1998; Svetlova et al., 2011; Zahn-Waxler et al., 1992).

Moreover, this early sympathy is genuinely prosocial: Young children's primary motivation appears to be to see the person in need be helped. For instance, a series of studies has used *pupillometry* to tap into toddlers' internal arousal upon seeing someone in need. Pupillometry is the measure of the dilation of the eyes' pupils. Systematic changes in pupil size reflect activation of the sympathetic branch of the autonomous nervous system and are indicative of experienced internal arousal (Bradley et al., 2008; Hepach & Westermann, 2016; Loewenfeld, 1993), and have recently been shown to index children's motivation to help. Specifically, by 1.5–2 years of age, children's pupils dilate in response to seeing others in need of help, and the greater the increase, the likelier and faster children are to subsequently provide help to that person (Hepach et al., 2012a, 2016, 2019). The striking finding relevant to children's prosocial motivation is that children's pupil dilation returns to baseline both when they are able to provide help and when they simply watch someone else provide help, indicating that their motivation is not to be the ones to help and, thus, receive credit for helping but rather to see the person receive help (Hepach et al., 2012a, 2017a). This is in line with the finding that toddlers help others anonymously and thus without any social recognition for helping (Hepach et al., 2017).

Toddlers' primary motivation is also not simply to see the physical order of things be restored. Recent findings showed that toddlers' pupillary arousal was only reduced in a social condition, in which a person received the object they needed to complete a task, but not in a nonsocial condition, in which the identical physical event occurred but without anyone present (Hepach et al., 2016). Moreover, both toddlers and preschoolers are more likely to hand a person the object they actually need rather than an irrelevant object or the object the person is reaching for but, unbeknownst to that person, is in fact broken and would thus not serve their purpose (Hepach et al., 2016, 2020; Martin et al., 2016; Martin & Olson, 2013).

Finally, there is evidence that acting prosocially is emotionally rewarding, even for very young children. For instance, cross-cultural research indicates that giving away treats makes toddlers happier than receiving treats, and, strikingly, costly giving makes them happier than noncostly giving (Aknin et al., 2015; Aknin et al., 2012). Further, toddlers' body posture is elevated as much after helping another person to achieve a goal as when toddlers achieve a goal themselves (Hepach et al., 2017b). This suggests that helping another person results in a positive and potentially rewarding emotional state in young children, which likely serves as a potent

motivator for future prosocial actions (see Aknin et al., 2018). All in all, there is now substantial evidence that by age 2 years, children are genuinely invested in and motivated to improve the welfare of others.

16.1.1 Sympathy in Infancy

Until recently, Hoffman's proposal that infants could not respond with true sympathy for others until about 1.5 years of age due to limitations in their self-other differentiation was widely accepted. As such, younger infants' responding to emotional expressions in others has generally been dismissed as "immature" emotional contagion. However, this pervasive view has recently been put into question, for a few reasons. First, cross-cultural work has not supported the universality of the association between mirror self-recognition and empathic responding (Kärtner et al., 2010). Second, although a conceptual, reflective self-awareness may not emerge until late in the second year, there is now substantial evidence that an implicit sense of self as distinct from others is present even in newborns (see Davidov et al., 2013). And finally, newer empirical work shows that sympathy for distressed others does not first appear during the second year; rather it is evident within the first few months after birth and increases only modestly with age, whereas prosocial behavior first appears only during the second year (Davidov et al., 2013, 2020; Roth-Hanania et al., 2011). Importantly, infants' sympathy in the first year predicts their prosocial behavior in the second year, suggesting that early sympathy does indeed signal a prosocial motivation, even if infants in their first year do not yet have the knowhow or skills to alleviate others' distress (Davidov et al., 2020; Roth-Hanania et al., 2011).

Researchers have also recently begun to explore other affective mechanisms beyond emotional contagion that may serve as foundations for early sympathy. In particular, the rich and growing body of research on emotion processing during infancy has proved fruitful. This research shows that infants competently detect, discriminate, and integrate emotional expressions from others' faces, voices, and bodies (Grossmann, 2012, 2015; Missana et al., 2015; Rajhans et al., 2016b). One emotional expression that is of particular interest with respect to sympathy and prosocial behavior is fear (Marsh, 2015). Facial fear displays are commonly classified and used as threat stimuli (Vuilleumier, 2006). However, research on the psychology of prosociality has shown that, in adulthood, the capacity to help and benefit others is intimately tied to processes that make us recognize and care about others' emotional displays of distress as exemplified in fearful faces (Marsh & Ambady, 2007; Marsh & Blair, 2008; Marsh et al., 2007; Marsh et al., 2014). In fact, there is evidence that extremely antisocial psychopaths and extremely prosocial individuals show substantial differences in fear processing and may thus represent opposite ends of a caring continuum (Marsh, 2015). Specifically, when compared to a control group, anonymous kidney donors show increased neural and behavioral sensitivity to seeing others in distress (fearful faces) (Marsh et al., 2014). In contrast, psychopaths exhibit decreased sensitivity to fearful faces when compared to control

individuals (Marsh & Blair, 2008). Moreover, research with a typical population of adults shows that better recognition of fear from faces is associated with higher levels of prosocial behavior (Marsh & Ambady, 2007; Marsh et al., 2007). Taken together, this line of research with adults strongly suggests that variability in responding to fearful faces is linked to variability in prosocial behavior, raising the question of when this link emerges in development.

One recent study demonstrated that heightened sensitivity to fearful faces is linked to enhanced prosocial behavior among 5-year-old children in two different cultures (Rajhans et al., 2016a). In this study, children in both India and Germany who were quicker to orient to fearful faces displayed greater prosocial behavior in a dictator game. Thus, the fundamental link between variability in responding to fear in others and prosocial behavior already exists in preschool-age children. Note, however, that the ability to detect and sensitively respond to various emotional facial expressions including fear emerges during the first year of life (Grossmann, 2012). Specifically, by around 7 months of age, human infants begin to show increased neural and behavioral (attentional) responses to fearful faces and distinguish them from other positive and negative facial expressions (Grossmann & Jessen, 2017; Jessen & Grossmann, 2014, 2016; Krol et al., 2015; Peltola et al., 2009). Given this evidence from behavioral and neuroscience research, infancy can be considered a sensitive developmental period during which fear processing skills come online. The question thus arises: Can understanding individual differences in responsiveness to fearful faces during this sensitive period in ontogeny provide insights into the foundations of sympathy and prosocial behavior in human development?

Recent research suggests it can. In one recent study, variability in neural responses (measured by functional near-infrared spectroscopy) and attentional responses (measured by eye tracking) to fearful faces at age 7 months predicted prosocial behavior at 14 months (Grossmann et al., 2018). Importantly, this association was selective: Only responsiveness to fearful faces – not to happy or angry faces – predicted prosocial behavior. This finding is noteworthy because it establishes a clear link to existing work with adults (Marsh, 2015), showing that fear processing is selectively linked to prosocial responding from early in ontogeny. More generally, this and the other recent findings on infants' fear processing critically extend the existing work on emotional contagion by supporting the idea that responsiveness to fear in others can be seen as a key marker and ontogenetic predictor of prosocial action among humans.

Taken together, the research with young infants described above shows that not just the precursors to empathic responding but also true sympathy for others is evident very soon after birth. Of note, although these findings contradict the specific developmental model proposed by Hoffman, they do support his broader and key argument that human infants come to the world prepared to care about the welfare of others and to become affectively involved in others' suffering (Hoffman, 1981, 2000, 2007).

16.1.2 *Flexible Sympathy*

A further crucial aspect of Hoffman's proposal was the idea that "natural selection requires an altruistic response system that is reliable and yet also flexible" (Hoffman, 1981, p. 127). In other words, the most effective and reliable prosocial motive from an evolutionary standpoint would be one that had a deep biological basis but was also flexible rather than automatic and fixed, and was amenable to cognitive control so as to differentiate when concern and prosocial behavior are feasible and warranted and when they are not. Research over the past several years bolsters this proposal, demonstrating that empathic responding is indeed flexible and amenable to control, even in early childhood (see Vaish, 2016).

First, empathy-related responses have been found to be multidetermined, that is, elicited in response to whatever cues are available, even in the absence of perceptible distress. Some early experiments tackled this question using assessments of pictures and stories (Iannotti, 1985). Preschool-aged children heard about protagonists in emotion-eliciting situations but were not given information about the protagonists' feelings. Because many of the children reported emotions that matched the protagonists' presumed emotions, they were believed to have empathized by taking the protagonists' perspective. However, children participating in these tasks may instead provide what they believe are the correct responses, or responses they believe the experimenter wants to hear (Eisenberg et al., 2006). Furthermore, because they require sophisticated cognitive and linguistic skills, they limit the ages that researchers can test.

More recent research addresses these problems. In one study, 1.5- and 2-year-olds saw one adult either harming another adult (e.g., tearing the other adult's picture) or behaving neutrally (e.g., tearing a blank paper). In both cases, the second adult observed the event neutrally, without displaying emotion. Nevertheless, children showed greater sympathy for the adult if her picture was torn (i.e., she was harmed), and subsequently behaved more prosocially toward her. Furthermore, individual children's sympathy correlated with their later prosocial behavior (Vaish et al., 2009; procedure adapted from Hobson et al., 2009). Children's sympathy could not have been elicited by affective resonance with the victim's distress because the victim showed no overt distress. Rather, children must have relied on a different, more top-down cognitive process such as affective perspective taking.

Extending this work, another study (Chiarella & Poulin-Dubois, 2015) examined 18-month-olds' responses to a victim displaying a neutral or sad expression. As in the work described earlier (Vaish et al., 2009), infants in this study showed sympathy for the neutral victim; however, they showed more sympathy for the sad victim, suggesting that although situational cues alone can generate sympathy, overt cues of distress intensify that sympathy. Although this is likely true, the critical point for our purposes is that 1.5-year-olds sympathized with a victim even in the absence of conspicuous distress. Whether this is true at younger ages remains unanswered.

Vaish et al. (2009) did also test 14-month-olds using the same procedure, but these younger infants did not fully grasp the situations presented. With simpler events, perhaps even younger infants could demonstrate multidetermined sympathy. However, current research suggests that this ability emerges around 18 months.

Second, research demonstrates that early empathic responding can be controlled based upon contextual information. In one study, 3-year-olds showed greater sympathy for an adult displaying justified distress (his hand was caught in a box) than unjustified distress (his sleeve was caught) (Hepach et al., 2012b). Children also helped the justifiably distressed adult more quickly, and the more sympathy children expressed, the more quickly they helped the adult. In more recent work, 18-month-olds also showed more sympathy for an adult who was justifiably distressed than for one who was unjustifiably distressed, whereas 15-month-olds did not react in this way (Chiarella & Poulin-Dubois, 2013). The 15-month-olds also did not look longer at the situations in which the adult displayed unjustified distress, suggesting that infants of this age do not yet engage in contextual appraisal. Alternatively, they may not have enough experience with the kinds of situations used in the study to appraise them relative to the emotional response. As with multidetermined sympathy, context-dependent sympathy based on appraising context may also emerge around 18 months.

In summary, humans appear to enter the world ready to be drawn into others' suffering and, as recent work shows, to feel concern for others' suffering. This concern has a genuinely prosocial flavor, as is evident in the emergence of prosocial behavior as soon as infants are motorically and sociocognitively capable of such behavior and in the satisfaction that toddlers seem to derive from seeing others receive the help they need. Furthermore, early sympathy meets the requirements that Hoffman argued natural selection would have for an altruistic response system: It is multidetermined and therefore reliable, yet also amenable to cognitive control and therefore flexible (Hoffman, 1981; Vaish, 2016). From very early in life, then, sympathy serves as a foundational and powerful proximate mechanism to promote humans' prosocial tendencies.

16.2 Guilt

Sympathy for another's distress can occur both when one is an uninvolved bystander who witnesses the other's distress (i.e., in a third-party interaction) or when one has caused the other's distress (i.e., in a dyadic context). In the latter case, sympathy for the person in distress combined with the awareness of being the cause of that distress can lead to the aversive emotion of guilt (Hoffman, 1976). Guilt focuses attention on the action and the harm done (or help not given) to the other, inflicts subjective discomfort on the actor due to its unpleasant valence, and crucially, motivates the actor to make amends by aiding or otherwise compensating the victim.

Thus, guilt is tuned to identifying and reversing the damage done to a cooperative relationship (Baumeister et al., 1994).¹

Guilt has long been shown to serve these functions among adults (e.g., Brock & Becker, 1966; Cunningham et al., 1980; Ketelaar & Au, 2003; Regan et al., 1972). For instance, college students who believed they had caused someone great harm (and, thus, presumably felt guilty) were later more likely to help that individual than students who believed they had caused only minor harm (Brock & Becker, 1966). Similarly, individuals in another study who were made to feel guilty after behaving uncooperatively in a decision-making game were more likely to behave cooperatively on subsequent rounds of the game than people who did not feel guilty (Ketelaar & Au, 2003). Guilt, thus, goes beyond the general prosocial motivation created by sympathy; it specifically increases the motivation to make amends or to otherwise compensate the person one has harmed, thereby helping to repair and sustain one's valuable cooperative relationships.

16.2.1 *Feelings of Guilt*

Guilt begins to serve these vital prosocial functions from remarkably early in ontogeny. Some work indicates that following minor transgressions (e.g., accidentally breaking someone's favorite doll), children as young as 2 years show signs of guilt such as accepting responsibility and attempting to repair the damage (Drummond et al., 2017; Kochanska et al., 1995; Zahn-Waxler & Kochanska, 1990). Though suggestive, these studies are inconclusive because it is unclear whether they tapped into guilt specifically or into related but distinct processes. In particular, guilt is composed of two critical components: sympathy for a victim of harm and the awareness that one has caused that harm (Hoffman, 1982). Neither component is by itself sufficient for guilt, yet each component separately can motivate repair. For instance, when children harm someone, their reparative behavior could either arise from sympathy alone – without any recognition that they caused the harm, or from the recognition that they caused the outcome and the desire to fix it – without any sympathy. Thus, to study the prosocial effects of guilt specifically, we must use controlled experiments that can tease these processes apart.

Toward this end, we recently compared 2-year-old and 3-year-old children's reparative behavior after they caused a harmful outcome (guilt condition), someone

¹Guilt is often confused with the related social emotions of shame and embarrassment. However, though all three emotions are elicited by transgressions, they are distinct in critical ways. Guilt pertains to one's harmful actions and motivates reparative behavior, which benefits one's relationships. On the other hand, shame involves feelings that the whole self is a failure and thus leads one to withdraw from social contact rather than to repair, and embarrassment generally follows transgressions of social conventions rather than moral transgressions (Keltner & Buswell, 1996). Guilt is thus considered the quintessential moral emotion – one that plays a critical role in restoring and maintaining cooperation (though see Sznycer, 2019).

else caused the harmful outcome (sympathy condition), or children or someone else caused the same outcome but in a nonharmful context (Vaish et al., 2016). Three-year-olds (but not 2-year-olds) showed greater verbal and physical reparative behavior in the guilt condition than in the other conditions. This design enabled us to isolate the effects of guilt from its component processes and to show that the reparative motivation created by guilt is greater than that created only by sympathy or only by the desire to undo an unwanted but nonharmful outcome. We thus demonstrated that early in development, guilt distinctly serves to motivate children's reparative behavior.

In a different approach to this question, we examined whether after harming someone, children are especially motivated to repair the harm themselves – because they recognize that they need to fix the relationship that they damaged. Using pupil dilation to measure internal arousal, we found that 3-year-olds' (and more weakly, 2-year-olds') arousal decreased when they were able to repair damage that they had caused, but remained high if someone else repaired damage that the children had caused (Hepach et al., 2017a). However, if children had not caused the damage, then their arousal was similarly reduced when they or someone else repaired it. Thus, as bystanders, children are primarily motivated to see a person in need be helped regardless of who provides the help (see also Hepach et al., 2012a). Guilt alters this motivation such that children not only want the harmed individual to be helped but also want to be the helpers – as a way of repairing and showing commitment to the disrupted relationship.

All in all, by 3 (perhaps even 2) years of age, children recognize when they have caused harm and are motivated to repair that harm and restore their ruptured relationships. Thus, there seems to be an early preparation to experience guilt after causing harm, which helps even young children maintain cooperation from early in development.

16.2.2 *Displays of Guilt*

Interestingly, guilt is also thought to serve crucial social functions when it is *displayed* by a transgressor (see Keltner & Haidt, 1999). A prevailing view is that guilt displays serve appeasement functions by communicating vital information to victims and bystanders. They communicate that the transgressor is also suffering (Keltner & Anderson, 2000; Leary et al., 1996), the transgressor did not mean harm and is not generally the kind of person that means harm (McGraw, 1987), and the transgressor intends to make amends and behave more appropriately in the future (Castelfranchi & Poggi, 1990). A remorseful transgressor is, thus, seen as self-policing, dependable, and cooperative, and elicits forgiveness, affiliation, and cooperation from victims and bystanders (Darby & Schlenker, 1982, 1989; Goffman, 1967). Among adults, guilt displays do serve these functions. For instance, victims positively evaluate and show reduced aggression toward an apologetic transgressor

(Ohbuchi et al., 1989), and bystanders state that remorseful transgressors need not make as many restitutions as unremorseful ones (O'Malley & Greenberg, 1983).

A sizable body of work shows that guilt displays also serve these functions in childhood. Some work has explored children's responses to apologies, which are admissions of blameworthiness and regret and, thus, a stand-in for guilt. When 4- to 8-year-olds hear stories about transgressions, they blame and punish the transgressor less, and forgive and like her more if she apologized than if she did not apologize (Darby & Schlenker, 1982, 1989; Smith et al., 2010). They also judge situations in which a transgressor apologized as more just and attribute improved feelings to a victim who received an apology (Irwin & Moore, 1971; Smith et al., 2010; Wellman et al., 1979). A similar pattern emerges when children are themselves the victims. For instance, 4- to 7-year-olds who suffered minor transgressions reported feeling better, rated the transgressor as being nicer, and were more prosocial toward the transgressor if she apologized (Drell & Jaswal, 2016; Smith & Harris, 2012). Apologies are, thus, effective elicitors of preschool-aged children's forgiveness and prosociality.

Note, however, that from an early age, children are heavily prompted to apologize, even when they might not feel sorry (Smith et al., 2017). Children's positive evaluations of apologetic transgressors may, thus, be based on hearing key words they expect to hear ("sorry") rather than on the remorse as such. To account for this, recent work has examined children's responses to transgressors' remorse in the absence of explicit apologies. In one study, 4- and 5-year-olds watched two videos of third-party transgressions. One transgressor was remorseful without explicitly apologizing ("I did not mean to do that. It's my fault."), whereas the other was neutral and unremorseful (Vaish et al., 2011). Five-year-olds preferred and distributed more resources to the remorseful than the unremorseful transgressor, whereas 4-year-olds showed no systematic preference or distribution pattern. In a follow-up study, when the transgressor apologized explicitly ("sorry"), 4-year-olds did prefer and distribute more resources to her. Very similar results emerged in a more recent study in which children were themselves the victims (Oostenbroek & Vaish, 2019). Thus, by age 5, children respond positively and with greater cooperation toward remorseful transgressors; a year earlier, children show a similar appreciation when transgressors provide conventional cues of remorse such as explicit apologies.

In sum, guilt serves vital prosocial functions from early in ontogeny. By 2–3 years, children experience guilt about causing harm: they show nonverbal and verbal signs of guilt and are motivated to repair the damage. By 4–5 years, children respond favorably to transgressors' displays of guilt: they positively evaluate and are more prosocial toward remorseful transgressors. At age 4, these responses hinge on the transgressor using conventional phrases such as "sorry," but by age 5, even remorse without such phrases elicits these responses.

Why might the experience of guilt motivate prosociality earlier than guilt displays? In part, this discrepancy might be a methodological byproduct. Since studies on children's responses to guilt displays involve asking children interview questions (which very young children find challenging), these studies have not generally assessed children younger than age 4. However, one study that included 3-year-olds

found that they did not evaluate apologetic transgressors more positively than non-apologetic ones (Wellman et al., 1979). Children's appreciation of guilt displays may thus only emerge around 4 years. Why might this be the case? One proposal is that as guilt has no single facial expression and is instead expressed through actions such as confessions, apologies, and repair (Keltner & Buswell, 1996; Zahn-Waxler & Kochanska, 1990), young children might have a hard time identifying it in others. By age 4, they have the capacity and sufficient experience to identify and respond to the most common sign of remorse (apologies), and by age 5, to other, less-common signs of remorse as well. Be that as it may, it is interesting to consider that the earlier emergence of children's own expressions of guilt may serve children well by appeasing others and lessening the negative consequences that children might otherwise receive for their transgressions. Thus, children might benefit from displaying their own guilt substantially earlier than they respond positively to such displays in others.

16.3 Conclusions, Caveats, and Future Directions

Human survival and success depends on banding together, collaborating, and cooperating with one another (Tomasello, 2016). This interdependence has meant, in turn, the need to ensure the well-being of our (potential) cooperation partners. We argue that natural selection has favored emotional mechanisms that, at the proximate level, help us detect and respond prosocially toward those who need help or are suffering. Moreover, these emotional mechanisms appear early in ontogeny and, thus, allow even the youngest members of our species to promote others' welfare and thereby foster cooperation (Bjorklund, 2018; Vaish & Hepach, 2020).

We focused in this chapter on two such mechanisms that are essential for this purpose: sympathy and guilt. Both mechanisms are evident remarkably early in development. Sympathy is seen as early as 3 months of age and seems to rest on multiple emotional processes including affective contagion and fear processing. Furthermore, early sympathy is both reliable and flexible, meeting Hoffman's requirements for an evolved altruistic response system (Hoffman, 1981). Building on this foundation of sympathy and a basic sense of causality or agency, a nascent guilt emerges between 2 and 3 years of age. Critically, both mechanisms serve the proposed prosocial functions, with sympathy predicting prosocial behavior (both concurrently and longitudinally) by 12–14 months of age and guilt motivating reparative behavior by age 3 years. Somewhat later in development, others' displays of guilt also serve important reparative functions by appeasing victims and observers and eliciting cooperation. Together, these early-emerging emotional mechanisms highlight the ways in which humans are prepared to be drawn into others' suffering, to act on others' behalf, to repair their valuable social relationships, and to identify who is or is not likely to be a good cooperative partner.

There are, of course, important caveats and supplements to this account, as well as important questions that remain open. We consider some of these in the remainder of this chapter.

16.3.1 Biases in Sympathy and Guilt

First, despite being early-emerging, reliable, and flexible, empathic responding does not necessarily work as an optimal moral guide. This is certainly true by school age, when children show more sympathy for peers of their gender than peers of the other gender (Feshbach & Roe, 1968) and for those in their “minimal” in-group (i.e., assigned arbitrarily by the experimenter) than their minimal out-group (Masten et al., 2010). Some evidence suggests that even infants can be selectively prosocial, such as by directing more help toward mothers than strangers (Davidov et al., 2020; Young et al., 1999). As such, empathic responding and the prosocial behavior it motivates is not foolproof and may even lead us astray from our presumed goal of transcending biases and behaving in more “rationally” prosocial ways (see Bloom, 2016; Wynn et al., 2018).

Important and compelling as these considerations are, they do not, to our minds, detract from the account of empathic responding as a naturally selected and early-emerging mechanism to link an observer’s affective state with another person’s and thereby create a vested interest in the observer to act on the other’s behalf. Indeed, the biases evident in empathic responding are precisely the kinds of biases one would expect for an evolved system whose purpose is not to create impartial “moral” beings but rather beings who behave in ways that ultimately benefit themselves (and/or their genes). This is entirely consistent with the proposal that social forces and rationality may capitalize on – or even work against – this foundational affective mechanism in order to shape prosocial behaviors and decisions according to the moral values of the particular group or culture (Bloom, 2016).

With that in mind, we can use the evolutionary framework to propose further hypotheses about the forms that early sympathy and guilt should take. First, if these mechanisms evolved to motivate prosocial behaviors toward those with whom we are likely to be interdependent, then they should, from early on, be biased in favor of such individuals. As reviewed above, such biases do exist in school-age children’s sympathy, but little research has examined whether this holds true among infants and toddlers. We do know that even within the first year, infants show a preference for familiar faces, the faces of those who belong to the race they encounter most often, and those who speak their native language rather than a foreign language or with a foreign accent (Bar-Haim et al., 2006; Bushnell, 2001; Kinzler et al., 2010). Further, by 9 months of age, infants’ processing of important social cues such as faces, voices, emotions, and pupil size primarily occurs in the context of own-race faces, not other-race faces (Kelsey et al., 2019; Vogel et al., 2012). Given the importance of attending to, parsing, and processing social stimuli for empathic responding, we may predict that these early-emerging biases should result

in biased sympathy even in infancy and early toddlerhood. Yet beyond the few studies that suggest greater prosocial behavior toward mothers than strangers (Davidov et al., 2020; Young et al., 1999), researchers have not seriously examined biases in infants' and toddlers' sympathy.

This applies to young children's guilt as well. If guilt has evolved, first and foremost, to repair our valuable relationships, then we may expect that from early in development children should feel more guilty after causing harm to - and should be more forgiving of - those who are like them or are in their group (see Vaish & Oostenbroek, [in press](#)). This will be an exciting direction for future work on early guilt and its reparative functions.

Equally, we can consider other, more complex functions of guilt beyond the repair of interpersonal, dyadic relationships. In particular, "collective guilt," that is, guilt about the transgressions of close others such as in-group members, motivates individuals to accept responsibility and compensate for the negative actions of in-group members, thereby reducing intergroup conflict and regulating group life (Doosje et al., 1998; Lickel et al., 2004). Though it seems unlikely that guilt evolved primarily to serve this intergroup function, it is nonetheless possible that as humans became more group minded a couple of hundred thousand years ago (due to competition from other groups), natural selection exapted the existing interpersonal guilt to serve intergroup reparative functions as well. Yet the developmental foundations of collective guilt remain largely unexplored. In one recent study, 5-year-olds reported greater willingness to accept responsibility for harm caused by an in-group than an out-group member (Over et al., 2016). However, children did not attempt to repair the damage caused by the in-group more than the out-group member, leaving open whether children's acceptance of collective responsibility translates into reparative behavior. Moreover, no research has examined collective guilt in children younger than 5 years. This is an important direction for future work.

16.3.2 *Other Prosocial Motives*

A second important caveat is that although humans are clearly prepared from early on to care about and for others, we also simultaneously harbor self-serving motives (see Eisenberg et al., 2016). We are less likely to help others when it would mean a large cost to ourselves, and we may behave selfishly if we believe no one will find out, to name just a few examples. Moreover, in addition to acting prosocially out of a genuine concern for others' welfare, we may also do so for *selfish* reasons, such as to enhance our reputations (Wedekind & Milinski, 2000). Recent work shows that reputational concerns motivate prosocial behavior as early as the preschool years, such that children act more prosocially when they are being watched - or are simply in the presence of an image of eyes - than when they are unobserved (Engelmann et al., 2012; Kelsey et al., 2018; Leimgruber et al., 2012). Moreover, as reviewed above, when they have caused someone harm, even 2-year-old children seem to want to be the ones to repair that harm, hinting that even toddlers may care about

being recognized for their prosocial actions under some circumstances (Hepach, Vaish, et al., 2017a).

It is worth noting that these more self-centered motivations do not seem to be the primary drivers of prosocial behavior in the first 2–3 years (Hepach et al., 2016), and perhaps even later in development. More critically, however, the presence of self-serving prosocial motives does not preclude the possibility of genuine regard for others' welfare; the two kinds of motives can coexist and even work in conjunction to promote prosociality. If we keep in mind that the “goal” of natural selection is to bring about behaviors of adaptive import, then it seems entirely reasonable to allow for multiple motivational forces that lead us to those adaptive behaviors (see Vaish & Tomasello, 2014).

Indeed, prosocial behavior can also be motivated by positive affective states. As reviewed above, acting prosocially increases happiness, even among very young children, and this happiness likely motivates further prosociality (Aknin et al., 2018; Hepach et al., 2017b). Beyond this, however, children recognize and respond positively to others' prosocial behaviors. Infants in their first year already differentiate helpful from harmful characters and prefer to interact with helpful ones (Hamlin, 2013; Krol & Grossmann, 2020), and toddlers and preschoolers selectively help prosocial over antisocial individuals (Dahl et al., 2013; Vaish et al., 2010).

Recent evidence also reveals the role of more complex positive emotions in motivating prosocial behavior (Vaish & Hepach, 2020). Specifically, receiving help elicits a nascent sense of gratitude among young children, which motivates them to act prosocially – seen both in their reciprocity toward the individual who provided help and, strikingly, in their “paying it forward” to new individuals (Beeler-Duden & Vaish, 2020; Hepach et al., 2019; Vaish et al., 2018). We may also expect that, like displays of guilt, displays of gratitude might serve important social and cooperative functions. Specifically, gratitude displays are thought to indicate that one appreciates the kindness and is likely to reciprocate, thus communicating one's commitment to the norms of reciprocity and to one's relationships (Keltner et al., 2006; McCullough et al., 2008). Gratitude displays should, thus, elicit affiliation and cooperation from benefactors and bystanders, perhaps even fairly early in development. One recent study provides initial evidence for this proposal (Vaish & Savell, 2018), but far more research is needed to fully understand the role of positive social emotions in early prosociality.

16.3.3 Uniquely Human?

Finally, we end with some speculative thoughts about the degree to which the emotional mechanisms we have focused on here are unique to humans versus shared with other species, particularly our closest living primate relatives, the Great Apes. There is now a great deal of evidence that chimpanzees (and bonobos, to the extent they have been studied) are sensitive to others' immediate needs and requests for help and respond by doing such things as supporting their allies, removing barriers

to provide conspecifics with access to food, providing conspecifics with tools that will help them fulfill their need, and so forth (e.g., de Waal & Suchak, 2010; Warneken et al., 2007; Yamamoto et al., 2012). Yet the motivations underlying their prosocial behavior remain contested – and challenging to study experimentally. Still, the evidence we do have to date suggests that chimpanzees' helping may not be motivated by a genuine concern for others' welfare. Thus, chimpanzees (and the other Great Apes) do not help a conspecific more after they have seen the conspecific being harmed (Liebal et al., 2014); this stands in contrast to toddlers, who show sympathy for and subsequently act more prosocially toward individuals who are harmed (Hepach et al., 2012b; Vaish et al., 2009). Further, whereas chimpanzees reliably help a conspecific by providing a tool that the conspecific is requesting, they do not help paternalistically. That is, if the tool being requested will not in fact fulfill the conspecific's need, chimpanzees do not correct the request and hand the tool that *would* fulfill the need (Hepach et al., 2020). This is again in contrast to toddlers and preschoolers, who consider what the other person needs rather than only what the other person is requesting (Hepach et al., 2020; Martin et al., 2016; Martin & Olson, 2013). Together, the existing evidence presents us with a picture in which prosocial behaviors are shared among humans and other Great Apes, but the undergirding other-oriented affective motivators are unique to humans. This further underscores the importance of studying the affective processes focused on in this chapter in order to arrive at a better understanding of the proximate mechanisms that enable and promote human cooperation. Moreover, it hints at the possibility that during human evolution, interdependence among group members may have indeed served as the breeding ground for the emergence of these affective processes.

In conclusion, based on the empirical evidence reviewed here, we suggest that human prosocial behaviors are rooted in other-oriented affective processes – sympathy and guilt – that emerge early in human ontogeny. These insights are based upon novel tasks that tap into infants' and young children's responses to others in need or distress, which have identified the affective predictors, motivators, and consequences of various forms of early prosocial behavior. These advances have not only opened the door to fostering a more mechanistic understanding of cooperative tendencies in early development but are also beginning to change how we view infants' and young children's abilities to engage with and care about others. Specifically, in recent years, the field has come a long way toward dismantling the long-held view of infants as immature social beings simply infected by another person's displays of need and distress. This view is being replaced by empirical evidence attesting to infants' and young children's competent navigation of their social environment and their genuine, affect-guided prosocial orientation toward social partners. Yet there is much to be learned about the early origins of human prosocial behavior and its affective bases. In our view, a promising path forward is to adopt an evolutionary perspective based on the interdependence hypothesis (Tomasello, 2016) and take an interdisciplinary approach combining psychophysiological and behavioral methods with the aim of uncovering the foundational affective mechanisms of early cooperative behaviors.

References

- Aknin, L. B., Hamlin, J. K., & Dunn, E. W. (2012). Giving leads to happiness in young children. *PLoS One*, *7*(6), e39211.
- Aknin, L. B., Broesch, T., Hamlin, J. K., & Van de Vondervoort, J. W. (2015). Prosocial behavior leads to happiness in a small-scale rural society. *Journal of Experimental Psychology: General*, *144*, 788–795. <https://doi.org/10.1037/xge0000082>
- Aknin, L. B., Van de Vondervoort, J. W., & Hamlin, J. K. (2018). Positive feelings reward and promote prosocial behavior. *Current Opinion in Psychology*, *20*, 55–59.
- Bar-Haim, Y., Ziv, T., Lamy, D., & Hodes, R. M. (2006). Nature and nurture in own-race face processing. *Psychological Science*, *17*, 159–163.
- Batson, C. D. (1991). *The altruism question: Toward a social-psychological answer*. Erlbaum.
- Baumeister, R. F., Stillwell, A. M., & Heatherton, T. F. (1994). Guilt: An interpersonal approach. *Psychological Bulletin*, *115*, 243–267.
- Beeler-Duden, S., & Vaish, A. (2020). The development and underlying mechanisms of upstream reciprocity. *Journal of Experimental Child Psychology*, *192*, 104785. <https://doi.org/10.1016/j.jecp.2019.104785>
- Bischof-Köhler, D. (1991). The development of empathy in infants. In M. E. Lamb & H. Keller (Eds.), *Infant development: Perspectives from German speaking countries* (pp. 245–273). Erlbaum.
- Bjorklund, D. F. (2018). A metatheory for cognitive development (or “Piaget is Dead” revisited). *Child Development*, *89*, 2288–2302.
- Bloom, P. (2016). *Against empathy: The case for rational compassion*. Ecco.
- Bloom, P. (2017). Empathy and its discontents. *Trends in Cognitive Sciences*, *21*, 24–31.
- Bradley, M. M., Miccoli, L., Escrig, M. A., & Lang, P. J. (2008). The pupil as a measure of emotional arousal and autonomic activation. *Psychophysiology*, *45*, 602–607.
- Brock, T. C., & Becker, L. A. (1966). “Debriefing” and susceptibility to subsequent experimental manipulations. *Journal of Experimental Social Psychology*, *2*, 314–323.
- Bushnell, I. W. R. (2001). Mother’s face recognition in newborn infants: Learning and memory. *Infant and Child Development*, *10*, 67–74.
- Campos, J. J., Campos, R. G., & Barrett, K. C. (1989). Emergent themes in the study of emotional development and emotion regulation. *Developmental Psychology*, *25*, 394–402.
- Castelfranchi, C., & Poggi, I. (1990). Blushing as discourse: Was Darwin wrong? In W. R. Crozier (Ed.), *Shyness and embarrassment: Perspectives from social psychology* (pp. 230–254). Cambridge University Press.
- Chiarella, S. S., & Poulin-Dubois, D. (2013). Cry babies and Pollyannas: Infants can detect unjustified emotional reactions. *Infancy*, *18*, E81–E96.
- Chiarella, S. S., & Poulin-Dubois, D. (2015). “Aren’t you supposed to be sad?” Infants do not treat a stoic person as an unreliable emoter. *Infant Behavior and Development*, *38*, 57–66.
- Cunningham, M. R., Steinberg, J., & Grev, R. (1980). Wanting to and having to help: Separate motivations for positive mood and guilt-induced helping. *Journal of Personality and Social Psychology*, *38*, 181–192.
- Dahl, A., Schuck, R. K., & Campos, J. J. (2013). Do young toddlers act on their social preferences? *Developmental Psychology*, *49*, 1964–1970.
- Darby, B. W., & Schlenker, B. R. (1982). Children’s reactions to apologies. *Journal of Personality and Social Psychology*, *43*, 742–753.
- Darby, B. W., & Schlenker, B. R. (1989). Children’s reactions to transgressions: Effects of the actor’s apology, reputation and remorse. *British Journal of Social Psychology*, *28*, 353–364.
- Darwin, C. (1872). *The expression of the emotions in man and animals*. Philosophical Library.
- Davidov, M., Zahn-Waxler, C., Roth-Hanania, R., & Knafo, A. (2013). Concern for others in the first year of life: Theory, evidence, and avenues for research. *Child Development Perspectives*, *7*, 126–131.

- Davidov, M., Paz, Y., Roth-Hanania, R., Uzefovsky, F., Orlitsky, T., Mankuta, D., & Zahn-Waxler, C. (2020). Caring babies: Concern for others in distress during infancy. *Developmental Science*. <https://doi.org/10.1111/desc.13016>
- de Waal, F. B. M., & Suchak, M. (2010). Prosocial primates: Selfish and unselfish motivations. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 365(1553), 2711–2722.
- Doosje, B., Branscombe, N. R., Spears, R., & Manstead, A. S. R. (1998). Guilt by association: When one's group has a negative history. *Journal of Personality and Social Psychology*, 75, 872–886.
- Drell, M. B., & Jaswal, V. K. (2016). Making amends: Children's expectations about and responses to apologies. *Social Development*, 25, 742–758.
- Drummond, J. D. K., Hammond, S. I., Satlof-Bedrick, E., Waugh, W. E., & Brownell, C. A. (2017). Helping the one you hurt: Toddlers' rudimentary guilt, shame, and prosocial behavior after harming others. *Child Development*, 88, 1382–1397.
- Eisenberg, N., & Fabes, R. A. (1998). Prosocial development. In N. Eisenberg (Ed.), *Handbook of child psychology, Vol. 3: Social, emotional, and personality development* (5th ed., pp. 701–778). Wiley.
- Eisenberg, N., Spinrad, T. L., & Sadovsky, A. (2006). Empathy-related responding in children. In M. Killen & J. G. Smetana (Eds.), *Handbook of moral development* (pp. 517–549). Erlbaum.
- Eisenberg, N., VanSchyndel, S. K., & Spinrad, T. L. (2016). Prosocial motivation: Inferences from an opaque body of work. *Child Development*, 87, 1668–1678.
- Engelmann, J., Herrmann, E., & Tomasello, M. (2012). Five-year-olds, but not chimpanzees, attempt to manage their reputations. *PLoS One*, 7, e48433. <https://doi.org/10.1371/journal.pone.0048433>
- Feshbach, N. D., & Roe, K. (1968). Empathy in six- and seven-year-olds. *Child Development*, 39, 133–145.
- Fessler, D. M. T., & Haley, K. J. (2003). The strategy of affect: Emotions in human cooperation. In P. Hammerstein (Ed.), *Genetic and cultural evolution of cooperation* (pp. 7–36). MIT Press.
- Frank, R. H. (1988). *Passions with reason: The strategic role of the emotions*. W. W. Norton & Company.
- Goffman, E. (1967). *Interaction ritual: Essays on face-to-face behavior*. Anchor.
- Grossmann, T. (2012). The early development of processing emotions in face and voice. In P. Belin, S. Campanella, & T. Ethofer (Eds.), *Integrating face and voice in person perception* (pp. 95–116). Springer.
- Grossmann, T. (2015). The early development of social brain functions in infancy. *Psychological Bulletin*, 141, 1266–1297.
- Grossmann, T., & Jessen, S. (2017). When in infancy does the 'fear bias' develop? *Journal of Experimental Child Psychology*, 153, 149–154.
- Grossmann, T., Missana, M., & Krol, K. M. (2018). The neurodevelopmental precursors of altruistic behavior in infancy. *PLoS Biology*, 16(9), e2005281. <https://doi.org/10.1371/journal.pbio.2005281>
- Hamlin, J. K. (2013). Moral judgment and action in preverbal infants and toddlers: Evidence for an innate moral core. *Current Directions in Psychological Science*, 22, 186–193.
- Hepach, R., & Westermann, G. (2016). Pupillometry in infancy research. *Journal of Cognition and Development*, 17, 359–377.
- Hepach, R., Vaish, A., & Tomasello, M. (2012a). Young children are intrinsically motivated to see others helped. *Psychological Science*, 23, 967–972.
- Hepach, R., Vaish, A., & Tomasello, M. (2012b). Young children sympathize less in response to unjustified emotional distress. *Developmental Psychology*, 49, 1132–1138.
- Hepach, R., Vaish, A., Grossmann, T., & Tomasello, M. (2016). Young children want to see others get the help they need. *Child Development*, 87, 1703–1714.
- Hepach, R., Haberl, K., Lambert, S., & Tomasello, M. (2017). Toddlers help anonymously. *Infancy*, 22, 130–142.
- Hepach, R., Vaish, A., & Tomasello, M. (2017a). Children's intrinsic motivation to provide help themselves after accidentally harming others. *Child Development*, 88, 1251–1264.

- Hepach, R., Vaish, A., & Tomasello, M. (2017b). The fulfillment of others' needs elevates children's body posture. *Developmental Psychology*, *53*, 100–113.
- Hepach, R., Vaish, A., Müller, K., & Tomasello, M. (2019). Toddlers' intrinsic motivation to return help to their benefactor. *Journal of Experimental Child Psychology*, *188*(104658). <https://doi.org/10.1016/j.jecp.2019.06.011>
- Hepach, R., Benziad, L., & Tomasello, M. (2020). Chimpanzees help others with what they want; children help them with what they need. *Developmental Science*, *23*(3), e12922. <https://doi.org/10.1111/desc.12922>
- Hobson, J. A., Harris, R., García-Pérez, R., & Hobson, P. (2009). Anticipatory concern: A study in autism. *Developmental Science*, *12*, 249–263.
- Hoffman, M. L. (1976). Empathy, role taking, guilt, and development of altruistic motives. In T. Lickona (Ed.), *Moral development and behavior* (pp. 124–143). Holt, Rinehart, & Winston.
- Hoffman, M. L. (1981). Is altruism part of human nature? *Journal of Personality and Social Psychology*, *40*, 121–137.
- Hoffman, M. L. (1982). Development of prosocial motivation: Empathy and guilt. In N. Eisenberg (Ed.), *The development of prosocial behavior* (pp. 281–338). Academic Press.
- Hoffman, M. L. (2000). *Empathy and moral development: Implications for caring and justice*. Cambridge University Press.
- Hoffman, M. L. (2007). The origins of empathic morality in toddlerhood. In C. A. Brownell & C. B. Kopp (Eds.), *Socioemotional development in the toddler years: Transitions and transformations* (pp. 132–145). Guilford Press.
- Iannotti, R. J. (1985). Naturalistic and structured assessments of prosocial behavior in preschool children: The influence of empathy and perspective taking. *Developmental Psychology*, *21*(1), 46–55.
- Irwin, D. M., & Moore, S. G. (1971). The young child's understanding of justice. *Developmental Psychology*, *5*, 406–410.
- Jessen, S., & Grossmann, T. (2014). Unconscious discrimination of social cues from eye whites in infants. *Proceedings of the National Academy of Sciences of the United States of America*, *111*, 16208–16213.
- Jessen, S., & Grossmann, T. (2016). The developmental emergence of unconscious fear processing from eyes in infancy. *Journal of Experimental Child Psychology*, *142*, 334–343.
- Jordan, M. R., Amir, D., & Bloom, P. (2016). Are empathy and concern psychologically distinct? *Emotion*, *16*, 1107–1116.
- Kärtner, J., Keller, H., & Chaudhary, N. (2010). Cognitive and social influences on early prosocial behavior in two sociocultural contexts. *Developmental Psychology*, *46*, 908–914.
- Kelsey, C. M., Grossmann, T., & Vaish, A. (2018). Early reputation management: Three-year-old children are more generous following exposure to eyes. *Frontiers in Psychology*, *9*, 698. <https://doi.org/10.3389/fpsyg.2018.00698>
- Kelsey, C. M., Krol, K. M., Kret, M. E., & Grossmann, T. (2019). Infants' brain responses to pupillary changes in others are affected by race. *Scientific Reports*, *9*(1), 4317. <https://doi.org/10.1038/s41598-019-40661-z>
- Keltner, D., & Anderson, C. (2000). Saving face for Darwin: The functions and uses of embarrassment. *Current Directions in Psychological Science*, *9*, 187–192.
- Keltner, D., & Buswell, B. N. (1996). Evidence for the distinctness of embarrassment, shame, and guilt: A study of recalled antecedents and facial expressions of emotion. *Cognition and Emotion*, *10*, 155–171.
- Keltner, D., & Haidt, J. (1999). Social functions of emotions at four levels of analysis. *Cognition and Emotion*, *13*, 505–521.
- Keltner, D., Horberg, E. J., & Oveis, C. (2006). Emotions as moral intuitions. In J. P. Forgas (Ed.), *Affect in social thinking and behavior* (pp. 161–175). Psychology Press.
- Ketelaar, T., & Au, W. T. (2003). The effects of feelings of guilt on the behaviour of uncooperative individuals in repeated social bargaining games: An affect-as-information interpretation of the role of emotion in social interaction. *Cognition and Emotion*, *17*, 429–453.

- Kinzler, K. D., Shutts, K., & Correll, J. (2010). Priorities in social categories. *European Journal of Social Psychology, 40*, 581–592.
- Kochanska, G., Casey, R. J., & Fukumoto, A. (1995). Toddlers' sensitivity to standard violations. *Child Development, 66*, 643–656.
- Krol, K. M., & Grossmann, T. (2020). Impression formation in the human brain. *Cerebral Cortex Communications, 1*, tgaa070. <https://doi.org/10.1093/texcom/tgaa070>
- Krol, K. M., Monakhov, M., Lai, P. S., Ebstein, R., & Grossmann, T. (2015). Genetic variation in CD38 and breastfeeding experience interact to impact infants' attention to social eye cues. *Proceedings of National Academy of Sciences of the United States of America, 112*, E5434–E5442.
- Leary, M. R., Landel, J. L., & Patton, K. M. (1996). The motivated expression of embarrassment following a self-presentational predicament. *Journal of Personality, 64*, 619–636.
- 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.
- Lewis, M., Stanger, C., Sullivan, M. W., & Barone, P. (1991). Changes in embarrassment as a function of age, sex and situation. *British Journal of Developmental Psychology, 9*, 485–492.
- Lickel, B., Schmader, T., & Barquissau, M. (2004). The evocation of moral emotions in intergroup contexts: The distinction between collective guilt and collective shame. In N. R. Branscombe & B. Doosje (Eds.), *Collective guilt: International perspectives* (pp. 35–55). Cambridge University Press.
- Liebal, K., Vaish, A., Haun, D., & Tomasello, M. (2014). Does sympathy motivate prosocial behaviour in Great Apes? *PLoS One, 9*(1), e84299. <https://doi.org/10.1371/journal.pone.0084299>
- Loewenfeld, I. E. (1993). *The pupil: Anatomy, physiology, and clinical applications*. Wayne State University Press.
- Marsh, A. A. (2015). Neural, cognitive, and evolutionary foundations of human altruism. *WIREs Cognitive Science, 7*, 59–71.
- Marsh, A. A., & Ambady, N. (2007). The influence of the fear facial expression on prosocial responding. *Cognition & Emotion, 21*, 225–247.
- Marsh, A. A., & Blair, R. J. R. (2008). Deficits in facial affect recognition among antisocial populations: A meta-analysis. *Neuroscience & Biobehavioral Reviews, 32*, 454–465.
- Marsh, A. A., Kozak, M. N., & Ambady, N. (2007). Accurate identification of fear facial expressions predicts prosocial behavior. *Emotion, 7*, 239–251.
- Marsh, A. A., Stoycos, S. A., Brethel-Haurwitz, K. M., Robinson, P., VanMeter, J. W., & Cardinale, E. M. (2014). Neural and cognitive characteristics of extraordinary altruists. *Proceedings of the National Academy of Sciences, 111*, 15036–15041.
- Martin, A., & Olson, K. R. (2013). When kids know better: Paternalistic helping in 3-year-old children. *Developmental Psychology, 49*, 2071–2081.
- Martin, A., Lin, K., & Olson, K. R. (2016). What you want versus what's good for you: Paternalistic motivation in children's helping behavior. *Child Development, 87*, 1739–1746.
- Masten, C. L., Gillen-O'Neel, C., & Brown, C. S. (2010). Children's intergroup empathic processing: The roles of novel ingroup identification, situational distress, and social anxiety. *Journal of Experimental Child Psychology, 106*, 115–128.
- McCullough, M. E., Kimeldorf, M. B., & Cohen, A. D. (2008). An adaptation for altruism?: The social causes, social effects, and social evolution of gratitude. *Current Directions in Psychological Science, 17*, 281–285.
- McGraw, K. M. (1987). Guilt following transgression: An attribution of responsibility approach. *Journal of Personality and Social Psychology, 53*, 247–256.
- Missana, M., Atkinson, A. P., & Grossmann, T. (2015). Tuning the developing brain to emotional body expressions. *Developmental Science, 18*, 243–253.
- Nesse, R. (1990). Evolutionary explanations of emotions. *Human Nature, 1*, 261–289.
- O'Malley, M. N., & Greenberg, J. (1983). Sex differences in restoring justice: The down payment effect. *Journal of Research in Personality, 17*, 174–185.

- Ohbuchi, K., Kameda, M., & Agarie, N. (1989). Apology as aggression control: Its role in mediating appraisal of and response to harm. *Journal of Personality and Social Psychology*, *56*, 219–227.
- Oostenbroek, J., & Vaish, A. (2019). The emergence of forgiveness in young children. *Child Development*, *90*, 1969–1986.
- Over, H., Vaish, A., & Tomasello, M. (2016). Do young children accept responsibility for the negative actions of ingroup members? *Cognitive Development*, *40*, 24–32.
- Peltola, M. J., Leppänen, J. M., Mäki, S., & Hietanen, J. K. (2009). Emergence of enhanced attention to fearful faces between 5 and 7 months of age. *Social Cognitive and Affective Neuroscience*, *4*, 134–142.
- Rajhans, P., Altvater-Mackensen, N., Vaish, A., & Grossmann, T. (2016a). Children's altruistic behavior in context: The role of emotional responsiveness and culture. *Scientific Reports*, *6*, 24089.
- Rajhans, P., Jessen, S., Missana, M., & Grossmann, T. (2016b). Putting the face into context: Body expressions impact facial emotion processing in human infants. *Developmental Cognitive Neuroscience*, *19*, 115–121.
- Regan, D. T., Williams, M., & Sparling, S. (1972). Voluntary expiation of guilt: A field experiment. *Journal of Personality and Social Psychology*, *24*, 42–45.
- Roth-Hanania, R., Davidov, M., & Zahn-Waxler, C. (2011). Empathy development from 8 to 16 months: Early signs of concern for others. *Infant Behavior and Development*, *34*, 447–458.
- Sagi, A., & Hoffman, M. L. (1976). Empathic distress in the newborn. *Developmental Psychology*, *12*, 175–176.
- Simner, M. L. (1971). Newborns' response to the cry of another infant. *Developmental Psychology*, *5*, 136–150.
- Smith, C. E., & Harris, P. L. (2012). He didn't want me to feel sad: Children's reactions to disappointment and apology. *Social Development*, *21*, 215–228.
- Smith, C. E., Chen, D., & Harris, P. L. (2010). When the happy victimizer says sorry: Children's understanding of apology and emotion. *British Journal of Developmental Psychology*, *28*, 727–746.
- Smith, C. E., Noh, J. Y., Rizzo, M. T., & Harris, P. L. (2017). When and why parents prompt their children to apologize: The roles of transgression type and parenting style. *Journal of Family Studies*, *23*, 38–61.
- Svetlova, M., Nichols, S. R., & Brownell, C. A. (2011). Toddlers' prosocial behavior: From instrumental to empathic to altruistic helping. *Child Development*, *81*, 1814–1827.
- Sznycer, D. (2019). Forms and functions of the self-conscious emotions. *Trends in Cognitive Sciences*, *23*, 143–157.
- Tomasello, M. (2016). *A natural history of human morality*. Harvard University Press.
- Vaish, A. (2016). Flexible concern: The development of multidetermined and context-dependent empathic responding. *Child Development Perspectives*, *10*, 149–154.
- Vaish, A. (2018). The prosocial functions of early social emotions: The case of guilt. *Current Directions in Psychology*, *20*, 25–29.
- Vaish, A., & Hepach, R. (2020). The development of prosocial emotions. *Emotion Review*, *12*, 259–273.
- Vaish, A., & Savell, S. (2018). *Young children prefer recipients who display gratitude*. Poster presented at the 30th convention of the Association for Psychological Science, San Francisco, CA
- Vaish, A., & Tomasello, M. (2014). The early ontogeny of human cooperation and morality. In M. Killen & J. G. Smetana (Eds.), *Handbook of moral development* (2nd ed., pp. 279–298). Taylor and Francis.
- Vaish, A., Carpenter, M., & Tomasello, M. (2009). Sympathy through affective perspective-taking and its relation to prosocial behavior in toddlers. *Developmental Psychology*, *45*(2), 534–543.
- Vaish, A., Carpenter, M., & Tomasello, M. (2010). Young children selectively avoid helping people with harmful intentions. *Child Development*, *81*, 1661–1669.
- Vaish, A., Carpenter, M., & Tomasello, M. (2011). Young children's responses to guilt displays. *Developmental Psychology*, *47*, 1248–1262.

- Vaish, A., Carpenter, M., & Tomasello, M. (2016). The early emergence of guilt-motivated prosocial behavior. *Child Development, 87*, 1772–1782.
- Vaish, A., Hepach, R., & Tomasello, M. (2018). The specificity of reciprocity: Young children reciprocate more generously to those who *intentionally* benefit them. *Journal of Experimental Child Psychology, 167*, 336–353.
- Vaish, A., & Oostenbroek, J. (in press). Preferential forgiveness: The impact of group membership and remorse on preschoolers' forgiveness. *Journal of Experimental Psychology: General*.
- Vogel, M., Monesson, A., & Scott, L. S. (2012). Building biases in infancy: The influence of race on face and voice emotion matching. *Developmental Science, 15*, 359–372.
- Vuilleumier, P. (2006). How brains beware: Neural mechanisms of emotional attention. *Trends in Cognitive Sciences, 9*, 585–594.
- Warneken, F., Hare, B., Melis, A. P., Hanus, D., & Tomasello, M. (2007). Spontaneous altruism by chimpanzees and young children. *PLoS Biology, 5*, 1414–1420.
- Wedekind, C., & Milinski, M. (2000). Cooperation through image scoring in humans. *Science, 288*(5467), 850–852.
- Wellman, H. M., Larkey, C., & Somerville, S. C. (1979). The early development of moral criteria. *Child Development, 50*, 879–873.
- Wynn, K., Bloom, P., Jordan, A., Marshall, J., & Sheskin, M. (2018). Not noble savages after all: Limits to early altruism. *Current Directions in Psychological Science, 27*, 3–8.
- Yamamoto, S., Humle, T., & Tanaka, M. (2012). Chimpanzees' flexible targeted helping based on an understanding of conspecifics' goals. *Proceedings of the National Academy of Sciences, 109*(9), 3588–3592.
- Young, S. K., Fox, N. A., & Zahn-Waxler, C. (1999). The relations between temperament and empathy in 2-year-olds. *Developmental Psychology, 35*(5), 1189–1197.
- Zahn-Waxler, C., & Kochanska, G. (1990). The origins of guilt. In R. A. Thompson (Ed.), *The Nebraska symposium on motivation 1988: Socioemotional development* (Vol. 36, pp. 183–258). University of Nebraska Press.
- Zahn-Waxler, C., Radke-Yarrow, M., Wagner, E., & Chapman, M. (1992). Development of concern for others. *Developmental Psychology, 28*, 126–136.