# The Emergence of Moral Responses and Sensitivity

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## Abstract and Keywords

Where does human moral sensitivity come from? In this chapter, the authors review research on the development of moral sensitivity in the first 2 years of life. Specifically, they present empirical evidence showing that infants are sensitive to third-party sociomoral interactions in the harm and fairness domains, and they examine the impact of sociomoral evaluations on infants' social preferences, social interactions, and social expectations. They further discuss mechanisms and factors shaping sociomoral development, alternative interpretations of infants' responses to sociomoral scenarios, and individual differences in sociomoral sensitivity and morally relevant behaviors. Future research should adopt a multicultural perspective and explore the implications of infants' sociomoral evaluations across the life span.

Keywords: sociomoral evaluation, infancy, social interaction, social expectation, moral behavior

One day in our lab, an infant watched a puppet show in which a puppet tried to open a plastic box holding a brightly colored toy. The puppet struggled to lift the lid several times, but continuously failed because the lid was too heavy. After several of these failed attempts, another puppet ran toward the box and jumped onto the lid, slamming it shut and preventing the struggling puppet from getting the toy. "Grrrr," the infant made a growling sound, scrunching up his face and raising his arms above him, looking to all involved like he disliked what he had just seen.

As this example helps to illustrate, human beings are highly sensitive to how individuals treat each other. Observing morally relevant actions such as interpersonal harm and violations of fairness norms elicits strong emotional reactions, negative evaluations of the actions and those who perform them, and concern for those who were victimized (Decety & Cowell, 2014; Greene & Haidt, 2002). These responses occur even when we observe interactions among strangers and can profoundly impact our behavior, shaping whom we choose to interact with and what those interactions consist of (e.g., care, reward, punishment). These responses also influence our social expectations, allowing us to predict how both perpetrators and victims of moral acts will behave in the future.

But why do we care so much about interactions between unknown others? Where does human moral sensitivity come from? (p. 268) One obvious possibility is that human moral sensitivity emerges and develops as a result of various environmental inputs, including explicit teaching from parents and other teachers (Grusec, 2006), imitation of behaviors common in one's environment (Bandura, 2011), and observing and experiencing consequences of moral and immoral behaviors (Skinner, 1990). Although decades of research point to the critical role of environmental inputs into moral development (for reviews, see Killen & Smetana, 2006), other forces may also play a role. For instance, evolutionary theories hold that human moral judgment and behavior is rooted, in part, in the cooperative nature of human societies (Haidt & Joseph, 2007; Joyce, 2006). Specifically, interdependence theory (Tomasello & Gonzalez-Cabrera, 2017; Tomasello, Melis, Tennie, Wyman, & Herrmann, 2012) notes that human beings are highly dependent on social partners for various aspects of survival and functioning, so that (1) helping group mates improves one's own survival chance and (2) individuals who are sensitive to how group mates treat each other will be able to select optimal (pro)social partners themselves and benefit from reciprocal positive interactions over time. Thus, individuals who are both prosocial and socially evaluative will be more successful than those who are not and may be more likely to survive and reproduce. In the long term, natural selection will promote cooperative relationships between group members and the emergence of moral norms.

A related evolutionary force that may have contributed to moral sensitivity has to do with human life history. The human species is characterized by a long juvenile period, during which young individuals are vulnerable and highly dependent on caregivers for food, protection, etc. In traditional societies, caregiving responsibilities are spread out across a network of group members, so that infants are cared for by parents as well as various non-parents (Hawkes, 2014; Hrdy, 1999, 2009). In such a variable caregiving environment, even very young humans may benefit from paying attention to how others behave: individuals who have previously helped others may be more likely to provide sufficient care, whereas those who have harmed others may be suboptimal. Given the high adaptive value of social evaluations early in life, then, natural selection may have favored the early emergence of this ability (Sheskin, Chevallier, Lambert, & Baumard, 2014).

Evolutionary theories like these suggest that sensitivity to morally relevant interactions may be present even in the absence of opportunities to acquire this sensitivity via experience, as occurs during the first months and years of life. But, how can we probe moral sensitivity in infants who cannot explicitly report their judgments? Indeed, previous tried-and-true methods for documenting moral development have used verbal interview methods (for review, see Killen & Smetana, 2006; Turiel, 2002); these methods are clearly ill-suited to infant subjects. Thus, in recent years a growing literature has examined infants' nonverbal reactions (e.g., looking time, preferential choice) to simple, visually presented morally relevant interactions.

In this chapter, we review evidence suggestive that preverbal infants are sensitive to morally relevant actions, and we discuss how this sensitivity manifests itself in different contexts. We first present evidence that infants prefer prosocial over antisocial others in

various domains, discuss theoretical and methodological concerns with these findings, and examine the breadth and richness of these evaluations and preferences. Next, we explore how sociomoral evaluations influence infants' first-party social interactions, including social transactions, social learning, and infants' own moral (p. 269) behaviors. We then investigate infants' expectations for others' morally relevant behaviors. Finally, we review studies exploring whether individual differences in moral sensitivity in infancy have implications for moral development later in life.

# Others' Sociomoral Actions Influence Infants' Social Preferences

Do others' moral acts influence infants' own social choices? Studies examining this possibility have presented infants with sociomoral events enacted via video, live human interactions, or puppet shows depicting prosocial or antisocial interactions between novel agents and have examined infants' social preferences for prosocial versus antisocial others by measuring their manual choice (which agent they reach for first) and/or their visual attention (which agent they look at longer). Using these paradigms, researchers have explored whether infants' preferences are influenced by others' helpful/harmful and fair/unfair behaviors.

## Help and Harm

The concepts of *help* and *harm* are multifaceted. One can harm by preventing others from achieving their goals (hindering) and help by assisting others in their goals; alternatively, one can harm by inflicting pain or distress on others (hurting) and help by relieving it (comforting). Past research suggests that infants are sensitive to agents' benevolent and malevolent actions in both helping/hindering and comfort/hurt contexts.

In one of the first studies exploring infants' social evaluations of those who help and hinder, Hamlin, Wynn, and Bloom (2007) showed 6- and 10-month-old infants live puppet shows in which a climber tried repeatedly but failed to reach the top of a hill. During his third attempt, the climber was either assisted by a helper who bumped him up the hill (allowing him to reach his goal) or thwarted by a hinderer who bumped him down the hill (preventing him from reaching his goal). After being shown helper and hinderer events repeatedly until a pre-set habituation criterion was reached, infants were presented with the helper and hinderer side-by-side and were asked to choose one; critically, the experimenter presenting the characters was not aware of which was the helper versus the hinderer. Both 6- and 10-month-olds reliably reached for the helper over the hinderer, suggestive that they positively evaluated the helper and/or negatively evaluated the hinderer. Further studies explored whether infants positively evaluate helping, negatively evaluate hindering, or do both by pairing either a helper or a hinderer with a neutral character (who showed the same uphill or downhill motion as did the helper or hinderer but did not interact with the climber). In these studies, infants reliably chose a helper over a neutral

character, but a neutral character over a hinderer. These results suggest that infants' social preferences consist of both positive evaluations of helping and negative evaluations of hindering.

Of course, instead of responding to the sociomoral meanings of the scenarios, infants may have chosen the helper simply because they prefer certain physical features of prosocial acts (e.g., upward motion) or dislike certain features of antisocial acts. To address this possibility, Hamlin and colleagues (2007) ran an additional condition in which the climber was replaced with an inanimate object that was pushed up and down the hill but displayed no agentive characteristics. They reasoned that if infants' choices were driven by perceptual preferences, infants should continue to prefer the pusher-up character over the pusher-down character in the inanimate condition, which retained many of the perceptual features of the original displays. Alternatively, if infants' choices were driven by social preferences, they should not show preferences (p. 270) in the inanimate condition as pushing an inanimate object has no social or moral meaning. The results supported the social preference account: infants chose randomly between the pusher-up and pusher-down character.

The effects found by Hamlin and colleagues (2007) were later examined in younger, 3-month-old infants (Hamlin, Wynn, & Bloom, 2010). Given 3-month-old infants' limited motor ability, infants' social preferences were examined using preferential looking rather than reaching. Results demonstrated that, similarly to older infants, 3-month-old infants looked longer at the helper than the hinderer but did not distinguish between a pusher-upper and a pusher-downer. Neutral comparisons revealed, in contrast to 6-month-olds, that 3-month-old infants' preference for helpers over hinderers may be driven primarily by an aversion to hinderers: 3-month-olds looked longer at neutral characters than at hinderers but equally between helpers and neutral characters. These results suggest that young infants are more sensitive to negative (vs. positive) sociomoral interactions, consistent with other demonstrations of negativity biases in development (Vaish, Grossmann, & Woodward, 2008).

Researchers have also assessed infants' sensitivity to prosocial and antisocial actions in helping and hindering scenarios other than the hill (Hamlin & Wynn, 2011; Scola, Holvoet, Arciszewski, & Picard, 2015; but see Salvadori et al., 2015). In an "opening a box" scenario, a protagonist puppet tries but fails to open the lid of a clear plastic box containing an attractive toy. The protagonist is alternately assisted in opening the box by a helper and prevented from opening the box by a hinderer. In a "retrieving a ball" scenario, a protagonist plays with, and then loses, a ball. He is then helped by a giver who returns the ball to him and hindered by a taker who steals the ball away. Preferential reaching and looking measures revealed that infants also respond differentially to the prosocial and antisocial characters in these new contexts, preferring helpers over hinderers. Furthermore, closely physically matched inanimate control conditions have demonstrated that infants' preferences are limited to situations in which opening/closing/giving/taking acts are directed toward animate agents, consistent with a social evaluation inter-

pretation. Together, these studies demonstrate that infants are sensitive to helping and hindering acts in a range of contexts.

Outside of the domain of helping versus hindering, research suggests that infants are also sensitive to acts of comfort versus physical aggression. In one study, Kanakogi, Okumura, Inoue, Kitazaki, and Itakura (2013) examined 10-month-old infants' choice between a physical aggressor shape who had repeatedly hit a victim shape and the victim shape. As the victim did not engage in goal-oriented behaviors, hitting in this scenario represented physical battery as opposed to hindering. Infants robustly reached for the victim over the aggressor, as well as for a neutral character over the aggressor, suggesting that infants negatively evaluate aggressors. In a control condition where shapes performed the same physical acts but moved independently without contacting each other, infants chose randomly between the two characters; these results suggest that here, too, it is the social aspects of events that drive infants' preferences. This conclusion is bolstered by the results of a related study in which infants preferred a human who comforted another human and aggressed against a backpack versus a human who aggressed against another human and comforted a backpack (Buon et al., 2014). That is, infants preferences were not based on the physical nature of actions alone, but depended on the social features of the situation. Taken together, (p. 271) these studies suggest that 10-month-old infants are sensitive to aggressive social interactions and tend to avoid aggressors.

Infants not only negatively evaluate characters who act aggressively toward others, but also positively evaluate characters who intervene in aggressive interactions. In a recent study (Kanakogi et al., 2017), infants were familiarized with third-party bystanders who did or did not intervene in an aggressive interaction between two other agents. During choice, 6-month-old infants reliably chose the interfering bystander over the noninterfering bystander, suggesting that they may have positively evaluated protecting victims from aggressors. In a control condition where the interacting characters showed no agency cues (e.g., had no eyes), and in another control condition where the interaction between agents was unaggressive, infants chose randomly between the two bystanders. Thus, infants' preference for the interfering bystander was driven by infants' perception of the protective nature of the intervention, as opposed to the physical features of the shows.

# Fairness

In addition to sociomoral norms dictating that one should help and not harm, humans abide by *fairness norms*, which dictate that resources should be distributed in accordance with principles of equality, equity, and need (Deutsch, 1975). Several studies have demonstrated that fairness considerations also influence infants' social preferences: infants prefer agents who distribute resources fairly (equally) over unfairly (unequally). For example, Geraci and Surian (2011) showed infants animations in which resources (disks) were distributed between two recipients. The fair distributor gave each recipient one disk, whereas the unfair distributor gave both disks to one recipient. In the test phase, infants were presented with pictures of the distributors placed on a foam board. Infants at 16

months, though not infants at 10 months, reliably reached for the fair over the unfair distributor. As in the helping/harming studies reviewed earlier, infants did not prefer equal distributors in a control condition where the animal recipients were replaced by inanimate objects, suggestive that infants' preference for fair distributors is based on social aspects of their behaviors.

Infants' preference for fair (vs. unfair) distributors has been demonstrated in other ways, including via the "Valenced Association Task" (DesChamps, Eason, & Sommerville, 2015). In this task, infants view still images of fair and unfair distributors while hearing audio recordings of either praise (e.g., "She's a good girl") or admonishment (e.g., "She is a bad girl"). Results showed that infants' visual attention shifted between the fair and unfair characters as a function of the valance of the statements (though the direction of the shift differed across age groups), suggesting that infants attribute positive and negative valence to fair and unfair distributors and potentially view them as deserving of praise and admonishment. Taken together, these studies demonstrate that infants evaluate social partners based on their past distributive behaviors, suggestive of a rudimentary sensitivity to distributive justice.

In sum, the research reviewed in this section suggests that infant evaluate potential social partners based on their morally relevant acts, preferring those who have helped and comforted versus harmed and hindered, as well as those who have distributed resources fairly over unfairly. Notably, these preferences apply to a variety of morally relevant acts directed toward unknown third parties from which infants themselves do not immediately gain or lose. Furthermore, the studies described earlier utilize a number of techniques to ensure that the results stem from social, (p. 272) rather than physical, aspects of the displays. These evaluations might enable infants to identify and approach potential helpers/caregivers and to avoid harmful others, and they are consistent with arguments for the evolution of cooperation and morality (Hawkes, 2014; Tomasello et al., 2012; Tomasello & Vaish, 2013).

# Alternative Interpretations

There has been lively debate about whether infants' reactions in the aforementioned studies truly reflect early social and/or moral sensitivity. First, in line with questions of whether rich interpretations can be attributed to infants' responses in general (Haith, 1998), scholars have questioned whether infants' prosocial preferences should be considered aspects of an emerging moral sense (Tafreshi, Thompson, & Racine, 2014). Second, some laboratories have failed to replicate infants' basic preference for prosocial over antisocial actors (Cowell & Decety, 2015; Salvadori et al., 2015; Scarf, Imuta, Colombo, & Hayne, 2012). In some of these cases, failures may have stemmed from discrepancies between the original and replication methodologies. For example, in one failed replication of the hill paradigm (Scarf et al., 2012), the climber's eye gaze was not fixed toward the top of the hill during his attempts, which may have rendered his goal unclear. Additional studies in which eye gaze was systematically manipulated confirmed this interpretation of in-

fants' failure (Hamlin, 2015). In another case, infants wore electroencephalogram (EEG) caps while they viewed fewer helper and hinderer events (e.g., Cowell & Decety, 2015); infants may have been somewhat distracted and less likely to produce a coherent behavioral response (see Filippi et al., 2016, for related evidence). Indeed, a recent meta-analysis (Holvoet, Scola, Arciszewski, & Picard, 2016) suggests that, despite some reported failures, infants' overall preference for prosocial others is robust. Either way, future study should continue to explore under what conditions infants do and do not prefer prosocial others.

# Moderators of Infants' Preferences

Helping someone to achieve their goals and distributing goods equally are typically positive social acts. Yet this is not a hard and fast rule. Indeed, there are many aspects of others' morally relevant behaviors that adults take into account when engaging in evaluation, including the behavior itself (is it generally a positively valenced act?), the outcome of the behavior (did it result in something positive or negative?), the intention that drove the behavior (was it inspired by prosocial or antisocial mental states?), and the context in which it occurs (who performed or received the act?). In what follows we review work suggestive that these considerations influence infants' preferences for prosocial versus antisocial others.

## Mental States

A basic aspect of evaluating prosocial and antisocial acts is recognizing that they are directed toward agents in possession of some need. As reviewed earlier, infants' evaluations in both the harm and fairness domains require that acts are directed toward animate agents worthy of being either helped/hindered or treated fairly/unfairly (Geraci & Surian, 2011; Hamlin et al., 2007); but do infants' evaluations require that an agent is actually in need? To explore this question, Hamlin (2015) showed infants two variations of the "hill" show. In one variation, the climber's eye gaze was fixed toward the top of the hill as he moved up and down, indicating a clear unfulfilled goal to reach the top. In the other variation, the climber's eyes were unfixed, meaning that he actually looked down the hill while moving up it, thus rendering his goal ambiguous. The actions of the helper and hinderer were (p. 273) identical across the two variations, though in some cases the climber bounced upon reaching the top of the hill during helper events, perhaps signaling happiness, and in others he stayed motionless. Results showed that infants preferred the helper over the hinderer in the fixed-gaze conditions only, whether or not the climber bounced at the top of the hill. These results suggest both that goal encoding plays an important role in infants' sociomoral evaluations and also that infants' preferences are not driven by a salient bouncing event.

In addition to considering the mental states of the targets of prosocial and antisocial behaviors, adults are also concerned about the mental states of the prosocial and antisocial actors themselves. Despite a host of research suggesting that young children often fail to

consider the mental states of those whose acts result in good and bad outcomes (Baird & Astington, 2004; Killen, Mulvey, Richardson, Jampol, & Woodward, 2011; Piaget, 1932/1965; Zelazo, Helwig, & Lau, 1996), recent research suggests that infants' social preferences do take mental states into account. For example, Kanakogi and colleagues (2017) found that 10-month-old (but not 6-month-old) infants preferred an active intervener of aggressive interaction (who showed a clear intention to protect the victim) over a nonactive intervener (who showed no protective intentions), even though the outcomes of the interventions were the same. These results suggest that infants' evaluations of third-party intervention are sensitive to the intention of the intervener.

What about when intentions and outcomes are pitted against each other? In a study directly pitting agents' intentions against the outcomes they cause (Hamlin, 2013), 5- and 8-month-old infants viewed variations of the "opening a box to get a toy" paradigm (Hamlin & Wynn, 2011). These included various combinations of actors who either succeeded or failed to carry out their helpful or unhelpful acts, leading to positive or negative outcomes for the needy protagonist; for example, a failed helper would try to help the protagonist (positive intent) but fail to do so (negative outcome), and a failed hinderer would try to hinder the protagonist (negative intent) but fail to do so (positive outcome). A developmental transition was observed: whereas 8-month-old infants demonstrated sensitivity to mental states, preferring a positively intended actor over a negatively intended actor regardless of outcome, 5-month-old infants showed no such sensitivity, preferring a positively intended actor over a negatively intended actor only when outcomes matched intentions. Intriguingly, infants in neither age group distinguished between puppets with the same intention but who were associated with different outcomes (e.g., a successful vs. a failed hinderer), suggestive that, by 8 months of age, infants evaluate others based on their prosocial and antisocial mental states.

Whereas the studies just described illustrate that infants' evaluations consider the mental states of both the agents and recipients of sociomoral actions, there is also evidence that, by 10 months of age, infants can consider the mental states of both parties at once. Hamlin, Ullman, Tenenbaum, Goodman, and Baker (2013) showed infants a scenario in which two agents lifted different doors on a wall, allowing the protagonist to grasp one of two different objects. The experimenters manipulated (1) whether the protagonist had previously expressed a clear preference for one object over the other and (2) whether the door-lifters were aware of the protagonist's preference by virtue of them having been present or absent when the preference was shown. The results showed that when the protagonist both expressed a preference and the lifters were aware of it, 10-month-olds preferred the (p. 274) lifter who gave the protagonist access to his preferred object. In contrast, in conditions where the protagonist's preference was unclear or the lifter did not know what it was, infants did not distinguish between the lifters. This study adds to the evidence that young infants generate social evaluations on the basis of mental state analyses.

## Contextual Information

An additional influence on adults' sociomoral evaluations comes from the broader context in which the actions occur. Indeed, although antisocial actions are generally negatively evaluated, these actions may be viewed as acceptable, or even necessary, in certain contexts. For example, there are certain goals that are viewed as inherently wrong and not worthy of being facilitated, such as robbing banks or bullying kids on the playground. Helpers of such acts are not viewed as praiseworthy. In addition, there are cases in which we view the recipient of a potential act as deserving of punishment for past antisocial behavior. How do infants evaluate antisocial actions in such contexts? To probe this question, researchers have shown infants scenarios in which prosocial and antisocial acts are directed toward a character who had himself helped or hindered a third party in a previous scenario (Hamlin, 2014; Hamlin, Wynn, Bloom, & Mahajan, 2011). The results revealed that, by 4½ months of age, infants preferred agents who helped (vs. hindered) prosocial others, but agents who hindered (vs. helped) antisocial others. This pattern suggests that infants' evaluations of prosocial and antisocial acts may differ based on the deservingness of a target. In a control condition designed to rule out the possibility that infants were merely responding based on simple valence-matching, infants chose between agents who had helped versus hindered a victim of hindering, rather than the hinderer itself. Given that both hinderers and victims are associated with negative events, a simple valence-matching account would predict that infants should also prefer a hinderer of a victim. This prediction was not supported: infants preferred the helper, as opposed to the hinderer, of the victim, suggesting that infants' preference for a hinderer of someone antisocial was not driven by simple valence-matching.

## Similarity

Although the principles of help/harm and fairness play a central role in how we evaluate others and their behaviors, humans' social preferences are also influenced by factors outside of the domains of help/harm and fairness/unfairness. For instance, we are particularly sensitive to whether potential social partners are similar to us; we tend to make friends with those who speak our language, share our music tastes, and hold the same political view as we do. Similar effects have been shown in the developmental literature: infants prefer individuals who share ethnic or language backgrounds with those in their environment, as well as those who share their own food and toy preferences (Kelly et al., 2005; Kinzler, Dupoux, & Spelke, 2007; Mahajan & Wynn, 2012).

Given infants' sensitivity to similarity, and given the effects of similarity on adults' social preferences, research has explored whether infants' social evaluations are biased by whether the agents and recipients of various morally relevant acts are similar to themselves. For instance, Hamlin, Mahajan, Liberman, and Wynn (2013) introduced infants to a "similar puppet" who preferred the same type of food as they did and a "dissimilar puppet" who preferred a different type of food. After learning the puppets' food preferences, infants watched social interactions in which the similar or dissimilar puppet was helped or hindered by other (p. 275) characters. By 9 months of age, infants reliably reached for

the actor who helped (vs. hindered) the similar puppet but reached for the actor who hindered (vs. helped) the dissimilar puppet. At 14 months of age, these evaluative biases appeared even stronger, in that infants showed effects in conditions contrasting helpers and hinderers with a neutral actor: When the target of helping and hindering was a similar character, infants preferred a helper over a neutral character; when the target was a dissimilar character, infants preferred a hinderer over a neutral character and a neutral character over a helper. These findings suggest that infants' sociomoral evaluations are contingent on how similar the targets of sociomoral actions are to infant themselves.

Infants' sensitivity to similarity also affects judgments in the fairness domain. For example, Burns and Sommerville (2014) found that when both fair and unfair distributors belonged to the same ethnic group as did infants, infants preferred a fair distributor over an unfair one. However, when the unfair distributor was same-race but the fair distributor was other-race (i.e., when fairness was pitted against similarity), infants chose at random, suggestive that infants' social preferences can include tradeoffs between fairness concerns and favoritism toward similar others (i.e., in-group favoritism). In a follow-up experiment, when fairness, the race of the distributor, and the race of the recipient were fully crossed, infants were particularly likely to choose the fair distributor when the unfair distributor favored a dissimilar recipient. Taken together, these results demonstrate that infants' evaluations of distributive behaviors may be biased by a tendency to prefer those who benefit similar others.

The findings of Hamlin, Mahajan, and colleagues (2013) and Burns and Sommerville (2014) suggest that infants' evaluations and preferences are sometimes driven by self- and/or group-related concerns. This idea is consistent with the hypothesis that sociomoral evaluations emerge from the selection pressure to survive oneself and to benefit one's group (Haidt & Joseph, 2007; Tomasello et al., 2012). Indeed, infants' social evaluations and preferences may be driven by several competing forces, including (1) norm-based moral concerns (e.g., choosing a puppet to endorse a moral action), (2) concerns for self-interest (e.g., choosing a resourceful puppet to benefit from the relationship), (3) concerns for group-interest (in-group favoritism; e.g., choosing a puppet as a favorable gesture to in-group members), and (4) and concerns for others' well-being (e.g., choosing a puppet out of sympathetic concern). Much more research is needed to determine if and when each of these forces plays a leading role in determining infants' preferences. Despite the ambiguity in just what drives infants' preferences, the studies described in this section suggest that social and moral sensitivities emerge extremely early in life, allowing infants to navigate and thrive in a complex social world.

# Sociomoral Evaluations Influence Infants' Social Interactions

The adaptive values of sociomoral evaluations are manifest throughout the course of infants' social life. When selecting social partners, infants can rely on social evaluations to identify potential caregivers and selectively build connections with those who will benefit

them in the long run. After relationships are established, sociomoral evaluations may exert further influences on just how infants choose to interact with their social partners and what infants may get out of those interactions themselves. In this section, we review studies showing the impact of sociomoral evaluations on infants' social transactions, social learning, and their own moral behaviors.

## (p. 276) Social Transactions

Social preferences affect our willingness to exchange resources with others. We tend to prefer business partners who are honest and kind and avoid business partners who are selfish and mean. There is evidence that infants' preference for prosocial others and aversion to antisocial others also affects how they evaluate and receive resources from others. Tasimi and Wynn (2016) had 12-month-old infants choose between a larger offering from an antisocial puppet (hinderer) and a smaller offering from a prosocial puppet (helper); that is, in order to interact with the helper infants would have to take a cost to themselves. When the contrast between the offerings was small (one vs. two crackers), infants sacrificed a resource and chose the smaller offering from the prosocial puppet over the larger offering from the antisocial puppet. However, when the contrast between the offerings was large (one vs. eight crackers), infants preferred the larger offering from the antisocial puppet. These findings imply that infants' willingness to receive resources is affected by the prosocial/antisocial history of the resource provider, but also that aversions to antisocial individuals can be overcome when the cost of rejecting the offering becomes very large. Together, these results illustrate that infants' social transactions may be influenced by concern for others, but also by concerns for the self. Notably, infants do seem to privilege other-oriented concerns over self-interest in some cases, particularly when the benefit of interacting with an antisocial character is low.

In addition to being sensitive to social partners' helping/hindering behaviors, infants' social transactions are sensitive to whether the social partner has previously inflicted physical pain on others. In a study conducted by Buon and colleagues (2014), 10-month-old infants showed preferences for toys offered by a prosocial agent (who comforted a conspecific and hurt an object) over toys offered by an antisocial agent (who hurt a conspecific and comforted an object), suggestive that infants' social transactions are also sensitive to partners' comforting and hurting behaviors.

## Social Learning

Infants acquire much of what they know from others. When deciding whom to learn from, infants pay attention to competence cues such as accuracy and confidence (Zmyj, Buttelmann, Carpenter, & Daum, 2010) and social cues such as similarity to the self and group membership (Kinzler, Dupoux, & Spelke, 2012; Shutts, Kinzler, & DeJesus, 2013; Shutts, Kinzler, McKee, & Spelke, 2009). Do infants take into account behavioral history when evaluating and selecting informants? There are two reasons to believe that infants' social learning may be influenced by their sociomoral evaluations. First, sociomoral evaluations help infants determine which individuals have positive intentions to provide useful knowl-

edge, as presumably prosocial individuals will be more willing to provide reliable and accurate information than will antisocial ones. Second, social learning may serve affiliative functions. By selecting prosocial others as a source of information, infants can build relationships with those who will potentially benefit them in the long term. Consistent with these ideas, Hamlin and Wynn (2012) found that 16-month-old infants selectively matched the food preferences of prosocial and neutral others but failed to match the preferences of antisocial others. Specifically, infants made food choices based on liking/disliking information provided by a previously prosocial or neutral agent, but not by an antisocial agent. These results provide evidence that infants may selectively avoid learning from those who were mean to others.

## (p. 277) Social Evaluations and Toddlers' Own Morally Relevant Acts

Adults' own social and moral behaviors tend to be influenced by their evaluations of the target of those behaviors. Perhaps most obviously, adults are motivated to reward individuals who were helpful to others and to punish individuals who were harmful (Mahdi, 1986; Wiessner, 2005). From an evolutionary perspective, third-party reward and punishment serve to promote and maintain cooperation between in-group members (Henrich, 2006; Sigmund, 2007). In addition to group-level adaptive values, rewarding prosocial others and punishing antisocial others may also benefit individuals by signaling one's prosocial tendencies to potential social partners and facilitating positive reciprocal interactions (Nowak & Sigmund, 1998; Sperber & Baumard, 2012; Wedekind & Milinski, 2000). Given the pervasiveness of rewarding and punitive behaviors in the adult world, rudimentary forms of these behaviors may be present early in life, as soon as infants possess the motor skills to engage in more complex social acts. To test this possibility, Hamlin and colleagues (2011) showed 19- to 23-month-old toddlers helping and hindering acts and then asked toddlers to either give a treat to or take a treat away from either the prosocial puppet or the antisocial puppet. When asked to give a treat, toddlers were more likely to choose the prosocial puppet than the antisocial puppet, but when asked to take a treat, toddlers were more likely to choose the antisocial puppet. A follow-up control condition demonstrated that toddler's behaviors could not be explained by simple valence-matching: when choosing between a beneficiary of helping and a victim of hindering, toddlers reversed their preferences and were significantly more likely to take a treat from the beneficiary as opposed to the victim. In sum, toddlers direct valenced behaviors toward agents based on the agent's behavioral history and deservingness; these tendencies may serve as precursors to more mature forms of reward and punishment.

Similar tendencies to reward prosocial others and punish antisocial others have been demonstrated by studies using other paradigms. For example, Dahl, Schuck, and Campos (2013) showed toddlers live human interactions in which an experimenter was alternately helped and hindered. In the following helping task adapted from Warneken and Tomasello (2014), infants were given a chance to help either the prosocial actor or the antisocial actor. The results showed that older (26-month-old) but not younger (17- and 22-month-old) children selectively helped the prosocial actor. In another study (Van de Vondervoort, Aknin, Kushnir, Slevinsky, & Hamlin, 2017), either a prosocial or an antisocial puppet

made an ambiguous toy request to 20-month-old infants (e.g., “Ooh! Can you give me one?” when two types of toys were possible to give). Critically, the puppet’s toy preference was inferable from past sampling acts performed by the puppet: she had chosen all of one kind of toy from a box containing mostly the other kind of toy (as in Kushnir, Xu, & Wellman, 2010). The results showed that toddlers were selectively nicer to prosocial puppets than they were to antisocial puppets: following prosocial puppet requests, almost all toddlers gave a toy, and those who gave were most likely to give a preferred toy. In contrast, a sizeable minority (about one-third) of toddlers interacting with an antisocial puppet gave nothing at all, and those who did give were equally likely to give a preferred and a not preferred toy. This study provides further evidence that infants’ own prosocial and antisocial acts are sensitive to whether or not their interaction partner has been prosocial or antisocial in the past.

## (p. 278) Social Evaluations and Social Expectations

Conceptually, social evaluations and social expectations are closely related to but distinct from each other. Whereas social—and particularly moral—evaluations derive from one’s understanding of injunctive norms (which specify what people ought or ought not to do), social expectations represent one’s understanding of descriptive norms (which describe what people typically do). In this section, we review evidence demonstrating that infants hold expectations about others’ prosocial and antisocial acts, as well as how others will react to those acts.

# Expectations About How Agents Will Behave

Although it has been shown that infants prefer individuals who help others and who treat others fairly, this work does not necessarily speak to whether infants expect others to behave in helpful and/or fair ways. Do infants expect individuals to be nice to each other? There are two possible ways to interpret this question: first, infants might hold baseline expectations that all individuals will help or treat fairly all other individuals; alternatively, infants may expect certain individuals to interact in certain ways. Recent studies suggest that infants, at the baseline level, expect individuals to treat others fairly but hold more context-specific expectations about whether individuals will help or harm each other.

### Fairness

Babies do show baseline fairness expectations in the realm of resource allocation, but findings to date suggest that these expectations may emerge somewhat later in infancy. In one study, Schmidt and Sommerville (2011) presented 15-month-old infants with movies of humans depicting fair (equal) and unfair (unequal) distributions of crackers or milk. Infants looked longer to movies depicting unfair versus fair distributions, suggesting that they expected resources to be distributed equally. A nonsocial control condition (with all actors removed from the scene when the outcomes were revealed) suggested

that differential looking patterns in the social condition were not due to a low-level visual preference for asymmetrical outcomes. Other studies have shown that 19-month-olds expect an experimenter to allocate food and toys equally among two puppets (Sloane, Baillargeon, & Premack, 2012) and that 10-month-olds expect an agent to distribute resources equally among two identical animated recipients (Meristo, Strid, & Surian, 2016; see also Geraci & Surian, 2011). Together, these studies suggest that infants expect resources to be distributed equally amongst two agents.

Recent evidence suggests that the development of fairness expectations may require environmental inputs. For example, Sommerville, Schmidt, Yun, and Burns (2013) found a developmental transition whereby fairness expectation was shown in 15-month-olds but not in 12-month-olds. A follow-up study revealed that when fair and unfair outcomes were contrasted more directly (i.e., outcome pictures were presented simultaneously on flanking monitors), fairness expectation was found in 12-month-olds, but not in 6- or 9-month-olds (Ziv & Sommerville, 2017). These developmental patterns suggest that social experiences over development may play a role in the development of fairness expectations, perhaps as infants acquire more and more observations of equal distributions in their daily lives.

As infants' understanding of fairness matures, they take into account even more complicated concerns. For example, 21-month-olds expected an experimenter to distribute resources equally between equally deserving recipients but unequally (p. 279) between someone who previously worked hard versus someone who slacked off (Sloane et al., 2012). These findings suggest that, like adults, toddlers come to expect resources to be distributed based on merit.

## Help and Harm

Despite infants' expectations that resources will be distributed fairly, to date there is little evidence that infants hold baseline expectations that others will help versus harm each other. That is, across various studies in this domain, infants have not looked longer following antisocial events than prosocial ones (e.g., Hamlin, 2013, 2014, 2015; Hamlin, Ullman, et al., 2013; Hamlin et al., 2007; but see Hamlin & Wynn, 2012, in which 16-month-olds looked longer following prosocial events, and Hamlin et al., 2011, in which toddlers looked longer following prosocial events). These data suggest that, without any contextual information, infants do not expect individuals to help each other.

Although infants do not expect all individuals to help each other, they do have expectations for how particular individuals will interact with particular others. Most basically, they are surprised when interactions between similar-looking objects change over time. In one study, Premack and Premack (1997) habituated 12-month-old infants to two identical self-propelled objects interacting in either positive (caressing or helping) or negative (hitting or hindering) ways. Afterward, infants viewed new scenarios in which objects engaged in a new negative interaction (a new kind of hitting). Infants who had previously habituated to a positive interaction took longer to process the new hitting interaction

than did infants who had previously habituated to a negative interaction. These results suggest that infants interpret distinct social interactions by their valence, which may support expectations that unique individuals will behave in valence-consistent ways over time and/or that relationships between individuals will remain stable over time.

Additional evidence that infants expect morally relevant behaviors to be consistent across contexts comes from a study exploring 12-month-old infants' understanding of giving and taking behaviors (Tatone, Geraci, & Csibra, 2015). In one condition of the study, infants were familiarized to a Giver who gave an apple to an agent and a Taker who took an apple from the same agent. In the subsequent test trials, both the Giver and the Taker performed either giving or taking actions toward the previous target. The results revealed that infants looked longer at novel actions (Giver taking or Taker giving) than familiarized actions (Giver giving or Taker taking), suggesting that infants expect moral agents to interact with the same target in a consistent fashion.

In addition to consistency, infants' expectations for social interactions are also influenced by whether individuals belong to the same groups. In a recent study (Jin & Baillargeon, 2017), 17-month-old infants viewed adults identifying themselves as belonging to the same group ("I'm a bem!" "I'm a bem too!"), to different groups ("I'm a bem!" "I'm a tig!"), or to unspecified groups ("I saw a bem!" "I saw a bem, too!"). In the test trials, infants expected one adult to assist the other when they belonged to the same group, but expected no assistance when the adults belonged to different groups or to unspecified groups. These findings demonstrate that infants expect individuals from the same social group to help each other, but may not hold these same expectations for unrelated others.

Indeed, infants can take into account *both* interaction history and group membership to generate expectations for how two individuals will interact (cooperate or conflict). For example, Rhodes, Hetherington, Brink, and Wellman (2015) showed 16-month-old (p. 280) infants interactions between two pairs of puppets. Puppets within each pair cooperated with each other to open a box, whereas puppets between pairs conflicted when one prevented the other from opening the box. Then, a new set of between-pair puppets who had not interacted previously either cooperated or conflicted. Infants looked longer when the new between-pair puppets cooperated, suggestive that infants expect social conflicts to generalize to group members who have not previously interacted.

# Expectations About How Recipients of Sociomoral Acts Will Behave

Although infants do not, at the baseline level, expect individuals to perform helpful or harmful action toward others, they do have expectations about how the recipients of prosocial and antisocial actions will subsequently behave. In a study conducted by Kuhlmeier, Wynn, and Bloom (2003), infants watched a cartoon version of the "climbing the hill" scenario that was later adapted to a 3-D puppet show (notably, in the cartoon, the climber, helper, and hinderer had no eyes and so showed fewer agentive cues) and

then viewed a new scenario in which the climber alternately approached the helper and the hinderer. The results showed that 12-month-old (but not 5-month-old) infants distinguished events in which the climber approached the helper versus the hinderer, suggestive that they reasoned about the climber's future actions based on his previous interactions with prosocial and antisocial others. Similar tendencies were shown in Hamlin and colleagues (2007), where 10- but not 6-month-old infants looked longer when the climber approached the hinderer versus the helper, and in Fawcett and Liszkowski (2012) where 12-month-olds generated anticipatory looks toward the helper as the climber approached the helper and hinderer. Together, these results suggest that infants expect someone who has been helped and hindered to subsequently avoid the hinderer. Finally, a recent study suggests that infants' expectations for how the climber will later behave toward a helper and a hinderer is based on mental states by around 12 months: Lee, Yun, Kim, and Song (2015) showed that 12-month-olds expect the climber to approach a helper even when no outcome information is available, and 16-month-olds expect the climber to approach a helper even when the helper failed to help and the outcome was negative.

Despite past research showing toddlers' tendencies to reward prosocial others and punish antisocial others (Dahl et al., 2013; Hamlin et al., 2011), there is evidence suggestive that infants do not expect the recipients of prosocial and antisocial acts to reciprocate in kind, at least not by the end of the first year of life. In Tatone et al. (2015), after viewing a Giver giving an apple to and a Taker taking an apple from an agent, 12-month-old infants did not look longer when the target returned a different versus the same (giving/taking) action to the Giver and the Taker.

# Expectations About Those Who Witness Others' Sociomoral Acts

Other studies have shown that infants have expectations about how independent third parties, who have not themselves been targeted by good or bad acts but who observed those acts being directed toward others, will interact with the prosocial and antisocial others they observed. In the fairness domain, Geraci and Surian (2011) found that 16- but not 10-month-old infants looked longer when a third-party character who had witnessed fair and unfair distributions approached the fair versus unfair distributor. Similarly, Meristo and Surian (2014) found that 10-month-old infants looked longer when a third-party agent directed antisocial actions toward an unfair (p. 281) versus fair distributor. These studies suggest that infants form expectations about how observers of fair and unfair distributions will respond to the distributors; however, future research should elucidate the directions of these expectations given that the effects are not always consistent across studies.

In the harm domain, infants also hold expectations about whether independent third parties will interact with agents who have harmed others or agents who have been harmed by others. In one study, Kanakogi and colleagues (2017) found that 6-month-old infants expected a third-party agent who had previously intervened in aggressive interactions to

punish the aggressor but help the victim: infants looked longer when the intervener hindered the victim (vs. the aggressor) and when the intervener helped the aggressor (vs. the victim). These results suggest that infants expect third-party interveners to treat aggressors and victims differently.

Infants' expectations about third parties' interactions with those who have helped or harmed others are also influenced by characters' mental states. In one study, Choi and Luo (2015) showed 13-month-old infants two puppets (A and B) interacting in a positive manner. Then, in a different scenario, one of the puppets (B) either intentionally or accidentally hit a new puppet (C). Importantly, the presence of puppet A was manipulated such that he was either aware or unaware of the hitting event. Following the hitting, infants viewed a new scenario in which Puppet A either continued to interact positively or stopped interacting with Puppet B. Looking time analyses revealed that, when Puppet B hit Puppet C intentionally, infants looked longer when A and B continued interacting positively, as though they expected that Puppet A would no longer wish to positively interact with B after seeing Puppet B be mean. In contrast, when Puppet B hit C intentionally but Puppet A was unaware of the hitting event, infants looked longer when Puppet A stopped interacting with B, as though they recognized that if Puppet A did not know Puppet B was bad that the positive interaction would probably continue. Finally, when Puppet A saw Puppet B hit Puppet C but the hitting was accidental, infants looked equally when Puppets A and B interacted positively and when they stopped interacting, as they held no strong expectations about how A and B would interact after Puppet A witnessed the accidental harm event. Thus, infants' social expectations for how observers of antisocial acts will respond can take into account both the knowledge of the observer and the intentions of the character who performed the negative act.

In sum, the results reviewed in this section suggest that, in some cases, infants hold differing expectations for others' prosocial versus antisocial acts (e.g., distributing resources equally rather than unequally) as well as expectations for how targets and observers of such actions will respond. But what, if anything, is the relationship between the social expectations described in this section and the social evaluations described in the first section? For infants, the relationship between social evaluations and social expectations could take several, non–mutually exclusive forms. First, infants' might use their own evaluations (e.g., a decision that something or someone is good or bad) to predict others' reactions to the same behaviors. Over time, this tendency might help infants to appreciate social norms more generally, along the lines of "everyone thinks it's not ok to do X." Second, through infants' emerging understanding of how others respond to particular actions, infants might come to evaluate new actions or morally relevant scenarios in light of how others react to them. Although we are aware of no research directly (p. 282) examining these possibilities, we view this as a topic ripe for future work.

# Individual Differences

As demonstrated in the previous sections, infants show a general tendency to prefer prosocial others over antisocial others, adjust their own behaviors based on how their social partners have treated others, and make predictions about how others will behave within and in response to prosocial and antisocial interactions. However, it is not necessarily the case that *all* infants in the studies cited earlier performed in the very same way; indeed, in all infant studies some infants tend to show an effect while others do not, and some infants may show an effect more strongly than others.

What are the implications of individual differences in the domain of sociomoral evaluation? Are infants who evaluate, anticipate, and perform sociomoral actions more sensitive to the moral aspects of social interactions than those who do not show such tendencies? Given that moral sensitivity and social and moral actions may be subserved by overlapping mechanisms, it is possible that infants who are more sensitive to moral scenarios are more likely to engage in prosocial behaviors. Indeed, several studies have provided evidence for this relationship. For example, Dahl and colleagues (2013) found that toddlers' selective prosocial behaviors are associated with social expectations: those who looked longer when the recipient of moral acts continued interacting with antisocial (vs. prosocial) actors were more likely to help the prosocial (vs. antisocial) actor in subsequent tests. In the fairness domain, Schmidt and Sommerville (2011) found that 15-month-olds' sharing behaviors were associated with their fairness sensitivity: Infants who shared preferred toys with others looked longer at the unfair versus fair distribution, whereas infants who shared nonpreferred toys looked longer at the fair versus unfair distribution. These results suggest that altruistic infants are more sensitive to the moral meaning of social scenarios than are selfish infants. A follow-up study with 9-month-old infants showed that the relationships between fairness expectations and sharing behaviors are not explained by individual differences in language or motor skills (Ziv & Sommerville, 2017), suggesting that the relationships are specific to the moral domain. Finally, Sommerville and colleagues (2013) showed that infants' fairness sensitivity was related to their sharing but not their helping behaviors, suggestive that the relationships between sociomoral evaluations and moral behaviors are relatively domain-specific.

Researchers have also found longitudinal relationships between infant sociomoral evaluations and subsequent social and moral functioning. Using survey methods, Bondü and Elsner (2015) found that justice sensitivity in childhood predicted prosocial behaviors and emotional and behavioral problems over a period of 1–2 years. In a recent study (Tan, Mikami, & Hamlin, 2018), researchers found that infants' (mean age = 12 months) performance on third-party evaluation studies predicts their preschool (mean age = 48 months) parent-reported social and behavioral adjustment: a stronger preference for prosocial agents as an infant was associated with parent reports of fewer callous-unemotional traits. These studies demonstrate that infants' sociomoral evaluations may have implications for social and moral functioning later in life.

# Conclusions and Implications for Future Research

To date, research on infant sociomoral evaluation to date has mostly focused on the principles of help/harm, fairness, and in-group favoritism. To broaden the scope of this research, future studies should investigate infants' sensitivity to additional (p. 283) candidate moral principles, such as authority and purity (Haidt & Joseph, 2007). For example, the *authority principle* dictates that subordinates must show deference to authority figures, who in return must provide protection to subordinates (Fiske, 1991). Given that infants use physical size as a cue to social dominance (Thomsen, Frankenhuis, Ingold-Smith, & Carey, 2011), it would be interesting to examine whether, for instance, infants expect that resource distributors will give more resources to a bigger character versus a smaller one (perhaps to show deference to authority) or that bigger characters will be more likely than smaller characters to intervene in moral transgressions (to offer protection). With respect to the *purity principle*, it has been proposed that a preference for cleanliness is subserved by the emotion of disgust and serves to protect individuals from microbes and parasites (Rozin, Haidt, & McCauley, 2000). Future studies might explore whether infants prefer clean or well-organized individuals to dirty or messy ones, and whether this preference is associated with infants' own tendency to express disgust.

It is also worth noting that most of the studies discussed in this chapter are based on infant samples drawn from Western societies (but see Kanakogi et al., 2013; Kanakogi et al., 2017; Lee, Yun, Kim, & Song, 2015). The restricted sample range is perhaps due to the fact that infant research requires carefully controlled research environments and several extensively trained research assistants, which makes collecting data across diverse cultures somewhat difficult. In the adult literature, it has been shown that Western participants do not necessarily represent human populations in other parts of the world (Henrich, Heine, & Norenzayan, 2010). Thus, the representativeness of the findings presented in this chapter remains unclear. On the one hand, given that infants have arguably received much less cultural input than do adults, cross-cultural differences may be smaller in infants. On the other hand, given the sensitivity and malleability of the infant cognitive system, it is possible that even small cultural differences may have strong impact on infants' capacities and tendencies early in life. Future research should address this problem by adopting a multicultural perspective and recruiting participants from diverse cultures.

As noted throughout the chapter, there are various ways to interpret infants' responses in sociomoral evaluation studies. Indeed, infants' preferences may be driven by multiple forces, including norm-based moral concerns, concerns for self-interest, concerns for group-interest, and concerns for others' well-being. Future study should investigate which sociomoral concerns play a major role in determining infants' social preferences. This question can be approached by presenting infants with social scenarios that involve competing concerns (e.g., choosing between a character who distributes resources equally vs. a character who distributes more resources to infants' in-group members) and ex-

amining whether infants' preferences reflect one concern overriding the other. Results from such a line of research would not only provide a more nuanced picture of the mechanisms underlying infants' social preferences than what is currently known, but would also shed light on how infants deal with competing incentives and social dilemmas.

Another way to elucidate the nature of infants' responses in sociomoral evaluation studies, from a bottom-up perspective, is to investigate the cognitive and biological mechanisms underlying infants' reactions. Infant sociomoral evaluation research will benefit from incorporating neural and physiological indices as outcome measures, which provide fine-grained measures of infants' mental processes. For example, (p. 284) eye-trackers provide a moment-to-moment assessment of infants' eye movements and pupil size, which provide important information about infants' attentional focus (e.g., fixations on characters), information integration (e.g., saccades between characters), and physiological arousal (e.g., pupil dilation during morally relevant events). In addition, EEG technology allows researchers to delineate the temporal structure of mental processes and identify brain regions sensitive to morally relevant events. Furthermore, by correlating these physiological measurements with infants' behavioral performance, researchers can help to elucidate which mental processes best predict individual differences in behavior. Ultimately, these technologies will allow researchers to ask questions that are unanswerable by traditional methodologies.

Human beings show a pervasive tendency to engage in sociomoral evaluations, judging others and their actions as right and good or as wrong and bad. The nature and developmental trajectory of sociomoral evaluation are long debated in the history of philosophy and psychology. In the past decades, a growing body of literature has provided insights into the origin of sociomoral evaluation and its impact on different aspects of infants' social life. Taken together, these studies suggest that infants prefer individuals who have helped/comforted versus hindered/hurt others and individuals who have distributed resources fairly versus unfairly. These evaluations and preferences are not explained by a simple preference for low-level features of the social scenarios and are sensitive to agents' mental states, behavioral history, and group membership. This early moral sensitivity exerts further influences on infants' social interactions, directing infants to exchange resources with, acquire information from, and perform valenced actions on others. Finally, infants expect resources to be distributed fairly and make predictions about others' behaviors based on past social interations. These abilitities enable very young children to make sense of their complex social world and pave the way for more complex social and moral skills which emerge throughout the life span.

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