

Prosocial Arousal in Children

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ABSTRACT—*Children’s prosociality emerges early in life, which suggests that helping others is rooted deeply in human nature. At the same time, the motivation underlying young children’s instrumental helping poses a puzzle. Children do not express a specific emotion such as sympathy when removing physical obstacles for others. Instead of being motivated by a concern for others’ well-being, toddlers may act to tie up loose ends or engage in social interactions, or they may be motivated because their goals align with those of others. Recent research has addressed the underlying motivation of children’s helping by directly measuring children’s internal arousal via changes in the dilation of their pupils. In several studies, children’s arousal in response to others’ unfulfilled needs is genuinely prosocial and linked to the well-being of others. This prosocial arousal may lie at the heart of not only children’s instrumental helping but also their prosociality in general.*

KEYWORDS—*prosocial behavior; helping; motivation; arousal; pupil dilation; pupillometry*

Humans thrive in groups of benevolent, cooperative individuals. Children’s helping behavior emerges early in toddlerhood, suggesting that prosociality is rooted deeply in human nature. At

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the same time, when children help others, are they motivated by other-oriented concerns (for others’ well-being) or self-oriented concerns (e.g., that they be recognized for helping)? The underlying motivation of children’s helping cannot be inferred from behavior alone. Instead, we have to measure children’s internal states directly to investigate the more proximate mechanisms of their helping behavior (1). Such internal physiological measures provide a unique scientific lens through which the underlying motivation of behavior can be quantified and interpreted. As a consequence and to address the motivation underlying children’s helping, we must shift from asking, What are the situations in which helping occurs? to What is the source of children’s concern in the moment of helping?

Toddlers appraise situations in which others need help differently from situations that do not present a need, and they help significantly less if others misplace objects intentionally than if they lose them accidentally (2). Appraisals are triggered by an event (e.g., an adult drops an object and cannot continue his task) and involve forming a goal (e.g., to see that the adult gets help and continues his task), which are crucial elements to understanding the underlying emotions and motivation of behavior (3). Research on children’s instrumental helping has investigated either the goals involved in children’s appraisals or the specific emotion experienced when alleviating others’ needs. However, a more direct way to assess children’s motivation is addressing the source of the appraisal. One way we can determine whether children respond to others in need is by measuring whether their internal arousal increases (4) and inferring the event that has triggered such arousal. This allows us to tap into the process of children’s appraisals to directly assess the source of their emotional involvement and their intrinsic motivation to help others.

In this article, I summarize recent empirical work, the results of which extend research on children’s helping by measuring more directly the internal states and motivations that underlie young children’s prosocial behavior. This work reveals that in the context of others’ unfulfilled needs, children experience *prosocial arousal*. This arousal reflects the degree of children’s emotional involvement and the extent to which they concern themselves with another person’s unresolved situation. The

arousal is prosocial because it is triggered specifically by another person's need, and it motivates children to see the need resolved and maintain the relationship with the individual in need.

In the following sections, I first outline the debate over children's motivation to help and describe how to measure internal arousal. I also summarize research on children's prosocial arousal that integrated a physiological measure (pupil dilation) into an active helping paradigm. These studies focused on children's motivation to provide instrumental help because this form of helping occurs more often and involves fewer overt emotional expressions than other forms of prosocial behavior (e.g., comforting).

THE PHENOMENON AND THE DEBATE

During the 2nd year of life, toddlers help others in many ways, including sharing toys (5), comforting those in distress (6), and providing instrumental help (2, 7, 8). Children provide instrumental help more frequently than comforting help (9–11), and they express less overt emotional concern when responding to others' instrumental needs than they do when providing comfort (2, 7, 11; see 8 for a review). This makes it difficult to determine what motivates 2-year-olds to provide instrumental help (12). In studies (see 1, 12–14 for extensive reviews), toddlers help proactively and spontaneously (11, 15), their helping is not facilitated by parents' encouragement (16, though see 17 for different findings for children's helping at home), and material rewards undermine helping behavior whereas social praise does not (18).

Therefore, children possess a general prosocial, intrinsic motivation to help others (8, 11; see also 13). However, this interpretation of children's instrumental helping behavior has been questioned. Why do children help and is their helping behavior motivated by genuine prosocial concern (see 12, for a review)? One alternative explanation is that toddlers view others' incomplete goal-directed behavior as an opportunity to engage in a contingent interaction (19). Another explanation is that because seeing others' unfulfilled goals is contagious, children align their goals with those of others and thus want to see the goal completed while being less concerned about the well-being of the agent needing help (20, 21). Yet another explanation is that every instrumental need reflects a physical displacement of objects, and children are motivated to restore order or tie up loose ends. These explanations are relevant given that children are motivated to engage with others before the age at which their helping is robust. From as early as 6 months, infants seek social interactions with their peers (22) and, toward the end of the 1st year, are motivated to share attention and intentions with others (23). Furthermore, during the 1st year, infants selectively prefer to engage with those who help a third party rather than those who hinder a third party (24).

The ongoing debate—over whether young children's helping is motivated by a concern for others' well-being or is a response to other aspects of situations involving need—is in part a

consequence of focusing on one outcome variable: the rate of children's behavior. Children help significantly less often when an adult does not have an unfulfilled need but instead intentionally interrupts his or her activity (2, 9) or knows about the location of a misplaced object (25). However, we are limited in the conclusions we can draw from the presence and absence of behavior alone for three reasons: (a) A child who does not help does not necessarily indicate that he or she did not want to help (b), similar rates of helping do not indicate that underlying motivation is the same, and (c) the same behavior can have different underlying motivations. In other words, because we could infer the underlying motivation of children's instrumental helping only from the rate of their behavior, not their internal states, the evidence for a genuine concern motive was indirect (see 14 for an extensive review).

Measuring toddlers' and preschoolers' physiological responses in situations when others need help can help us understand more about children's prosocial motivation. Children differ in their physiological responses based on whether they are helping others (heart rate deceleration) or not helping others (heart rate acceleration; 26, see also 27). Nevertheless, researchers have assessed physiological measures and helping behavior in separate situations, relating individual differences in the physiological response to individual differences in helping. To learn more about children's underlying motivation to help others, researchers need to combine physiological and behavioral measures into the same experimental paradigm. In this way, we can tap into toddlers' psychological state in the moment before they carry out a helping behavior (see also Figure 1). This allows us to determine whether children are motivated by and concern themselves with others' needs, or whether the source of internal arousal in children is triggered by ulterior motives (i.e., tying up loose ends, social interaction, or because their goals align with those of others).

MEASURING PROSOCIAL AROUSAL

Children do not display overt emotional responses when helping others instrumentally. How, then, can we study children's underlying motivations and emotions to help others in need? Children do experience internal physiological changes in response to seeing others in need of help (26–28). One fundamental dimension of emotions is arousal (i.e., the level of activation; 29). The suggestion here is that prosocial arousal is the physiological manifestation of children's emotional involvement and the degree to which they occupy themselves with others' unfulfilled needs. Furthermore, this arousal resulting from unfulfilled needs creates psychological tension that intrinsically motivates actions to fulfill the need. Consider the three basic forms of tension systems: self-mediated tension toward one's own unfulfilled needs, other-mediated tension whereby others can fulfill an individual's need, and promotive tension where other's unfulfilled needs elicit one's own tension and motivate prosocial behavior (30).

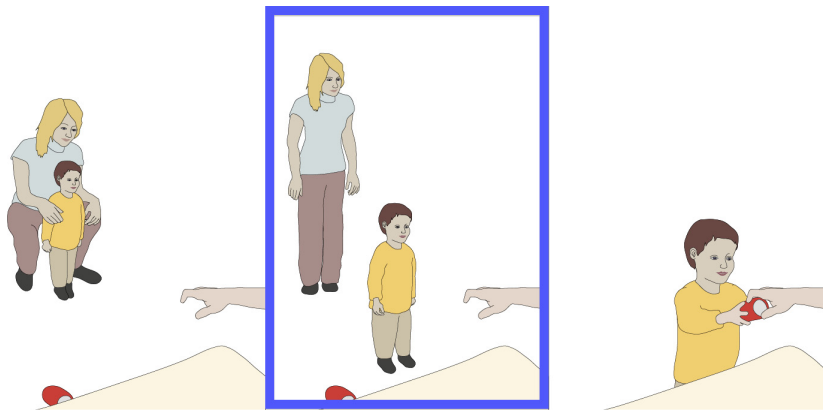


Figure 1. The prototypical situation of a child providing instrumental help. Left panel: The adult experimenter is reaching for an object. She is sitting behind an obstacle and cannot pick up the object himself. The child is observing the situation from a distance. Right panel: The child picks up the object. Most research on helping in children has investigated the rate of behavior as the dependent variable of interest. Center panel: The child has approached and appraises the situation but has not yet intervened. The study of prosocial arousal seeks to tap into these appraisal processes and measure the changes in children's internal arousal at that moment, and to investigate how these relate to the decision to help (or not). [Color figure can be viewed at wileyonlinelibrary.com]

Psychological tension can be measured when it yields sufficient degrees of physiological arousal. When young children appraise situations in terms of another individual needing help, the increase in elicited internal arousal reflects the measurable degree of their intrinsic motivation to help (see also 31).

Increases in physiological arousal result in changes in pupil dilation (for recent reviews, see 32–34). Similar to other physiological measures, including skin conductance and heart rate, the human pupil dilates in response to significant and emotionally arousing events that hold motivational significance (35, 36). Changes in pupil size do not appear to indicate the stimulus' valence, as both highly arousing negatively and positively valenced stimuli increase the diameter of the pupil (35). In recent work, researchers have integrated measures of pupil dilation into scenarios in which children's internal arousal was measured in response to their immediate helping behavior (see 31), providing insights into the nature of young children's intrinsic motivation to help others.

CHILDREN'S PROSOCIAL AROUSAL AND INTRINSIC MOTIVATION TO HELP

Seeing others in need of help increases children's internal arousal. Specifically, when children were presented with a helping situation, their internal arousal was measured both before the scenario began (baseline measure) and after the scenario was resolved (resolution measure). When children watched as an adult was forced to interrupt an activity because a relevant object dropped out of his or her reach, the dilation of children's pupils increased. In contrast, the dilation of children's pupils increased less in a nonsocial condition where objects moved seemingly magically and the sequence was interrupted in the same way (37). In addition, only in the social condition did

children look more to the relevant object than to an irrelevant one after both objects had dropped to the floor. In addition, children's pupil dilation, in response to the other's need, is linked to their own behavior. When given a chance to help the adult, children whose pupils increased more in size after seeing the problem were faster to help (31, 37). There was no relation between the latency to help and children's baseline arousal state (37).

One could suggest that children are motivated to pick up the displaced object because they expect to get credit or want to participate actively in the social exchange. However, children's internal arousal is similar whether they help or a third party helps someone in need; in both cases, they are less aroused than when the needy person receives no help. Therefore, children's helping is not motivated by a self-interest to get credit for their acts, but rather by a desire to see that others are helped (38). In cases in which children see another person provide help, their arousal subsides when the need is fulfilled appropriately but not if an irrelevant object is picked up. In a comparable nonsocial condition, children's internal arousal decreases without regard for how the situation is resolved (37). Overall, children appraise situations in which an adult needs help differently than nonsocial control conditions, and the source of children's arousal is the adult's unfulfilled need.

Children may not distinguish situations in which they provide the help from those in which someone else provides the help because both resolutions result in similarly low levels of arousal. However, more recent work shows that children's motivation to help is flexible and linked to the appraisal of the situation. Accidentally harming others changes both 2- and 3-year-olds' motivation to help. When children caused someone harm, their pupils dilated more when someone else repaired the situation than when they repaired it. In other words, their internal arousal

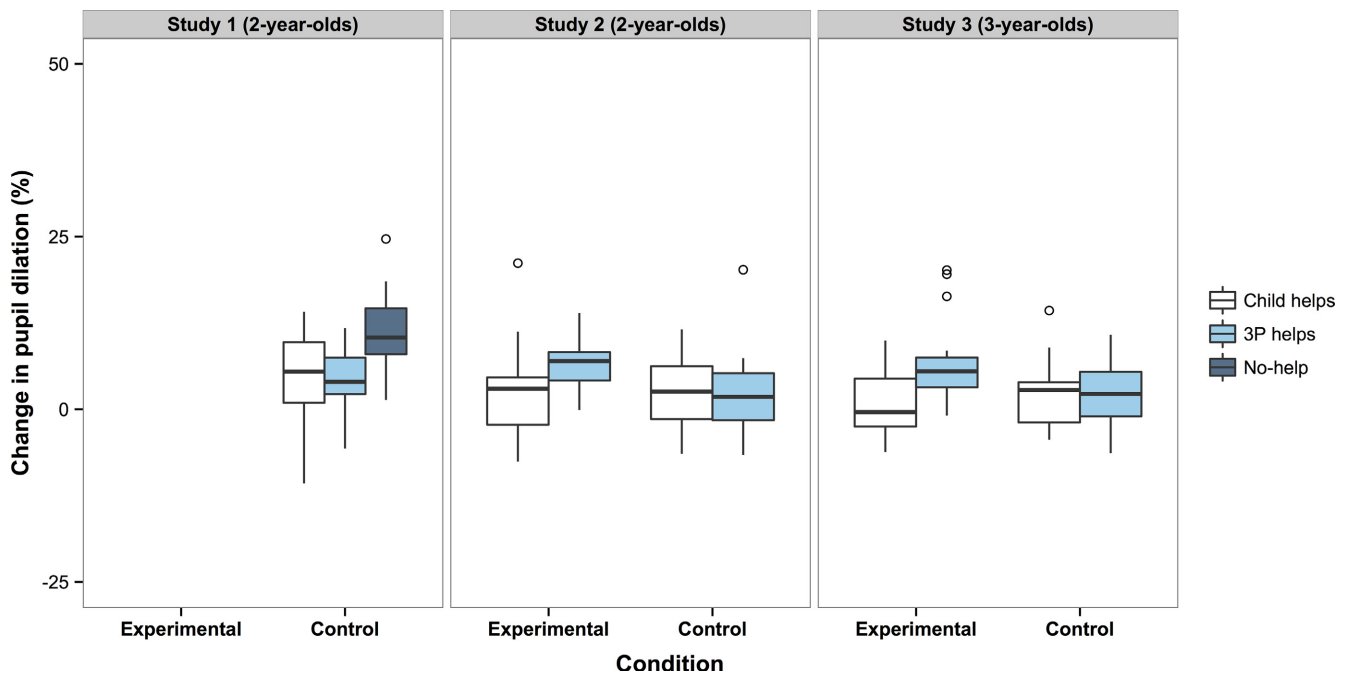


Figure 2. The results of three studies that assessed changes in children's internal arousal in response to seeing others being helped. In the control conditions of each study, children saw an adult needing help. In this case, children's pupil dilation was similarly low after they provided help (Child helps) and when they saw another adult provide the help (3P helps). In the control conditions of each study, children wanted to see the adult being helped. This was not the case in the experimental conditions of Study 2 and Study 3 (39), in which children accidentally caused the adult harm. In this case, children's pupil dilation decreased only if they could provide the necessary help (and thus potentially reconcile with the victim), but it remained increased if they merely saw another adult provide the help. In cases in which children were responsible for causing harm, they were motivated to actively provide the help themselves. Study 1 (38) did not include an experimental condition but presented a case in which children saw an adult needing help but they could not provide help and no other adult provided help (No help). In this case, children's internal arousal was more increased than when the adult in need was helped (whether by the child or by another adult). [Color figure can be viewed at wileyonlinelibrary.com]

remained high because they could not repair the situation. On the other hand when children were not responsible for the harm, their arousal did not differ between actively helping and seeing others provide the help. In situations that may involve antecedents of guilt, children's internal arousal remained increased if they could not provide help themselves and consequently lost an opportunity to reconcile with the person who needed help (39).

The results of these studies speak to various alternative explanations of children's instrumental prosociality. First, children may not be motivated to merely tie up loose ends: Their internal arousal increases more in response to incomplete social scenarios than incomplete nonsocial scenarios. Likewise, children remain aroused only if others' needs are not fulfilled appropriately, whereas in nonsocial scenarios, there is no expectation as to how the situations should be resolved. Second, children are not motivated to simply engage in a contingent social interaction: Their internal arousal decreases when they see another person fulfill the need instead of them—even when they were already in the process of helping (38, 39). Finally, children's instrumental helping is not motivated solely by the alignment of goals with others or goal contagion: When a child's actions have accidentally harmed another person, the victim's goal and the child's goal differ (the victim wants his need fulfilled, whereas

the child wants to be recognized for providing the necessary help). Consequently, children remain involved and their internal arousal is increased if someone else fulfills the need caused by the child's transgression.¹

In summary, these results suggest that children's motivation to help others is not only intrinsic but also inherently prosocial. When seeing others in need, children's internal arousal increases, which relates directly to how quickly they fulfill the need. Their arousal subsides once the initial motive is fulfilled (see Figure 2).

LOOKING AHEAD

The study of prosocial arousal has thus focused on children's instrumental helping. Researchers can now explore the underlying mechanism of toddler's motivation to comfort and share resources with others. Although various forms of prosocial behavior differ in their underlying cognitive demands (i.e., representing others' needs), the underlying motivation may

¹These studies fail to support the alternative explanations of children's motivation to help others instrumentally also when considering the interpretation that changes in pupil dilation could reflect increases in cognitive load (e.g., in response to loose ends; 33).

nevertheless be based on a concern for others' well-being and children's relationship with them (11). This conclusion is based on children's overt behavior. If this is the case, children's responses and changes in arousal to others in need will be similar and only the rate of behavior will differ across tasks. That is, children will become similarly involved in others' needs, whether material, emotional, or instrumental, but when sharing, their behavior will be tied more concretely to a cost and occur less often than instrumental helping.

Measuring children's internal arousal provides insights into two relevant processes that underlie helping. One is the degree to which children become involved (i.e., their internal arousal in response to seeing others in need of help). The other is the change in their arousal in response to the resolution of a situation. Investigating these processes may shed light on the development of children's prosociality. For example, across ages and cultures, children's sharing behavior changes significantly (40). By measuring pupil dilation, we can address whether this is because children's responsiveness to others' needs varies with age, or because children are similarly aroused but the motivation of how they want to see the situation resolved changes over development. Between ages 2 and 3, children's changes in internal arousal are similar after actively helping another and seeing others provide help. At the same time, young children's motivation appears flexible. In situations involving guilt (i.e., when children have accidentally caused others harm), their motivation is not merely to see the victims helped but to provide the help themselves. Given this early flexibility in motivation, children's motivation to help may change as they develop to incorporate many motives to engage prosocial behavior (see also 41). For example, although 2-year-olds appear motivated to see others helped whether they do the helping themselves or others help, older children may be more inclined to carry out the behavior, especially when others are watching (42). Finally, the study of prosocial arousal can be extended to investigate helping behavior in juveniles and adults. For example, we can explore whether children's arousal in response to others in need is similar to adults' empathy-driven altruistic helping (43).

CONCLUSION

The study of prosocial arousal reflects the idea that the underlying motivation behind prosocial behavior can be measured directly. The studies reviewed here complement research that has focused on manipulating children's goals in helping, and measuring the rate and likelihood of their helping. By assessing the internal arousal experienced by a child who is helping, we can determine that even though the rate of helping behavior may be similar between experimental conditions, the underlying motivation to help may differ. In the earlier example of 2-year-olds who helped less after accidentally harming others (44), their underlying motivation to help was affected, and they remained engaged and had increased levels of internal arousal

when they could not finish the helpful action themselves. This has implications for understanding the development of children's prosociality. Children's underlying motivation to help may vary before they are aware of the strategic consequences of their behavior. Only older children (i.e., starting at preschool age) may be sensitive to situations in which they can benefit directly from engaging and providing help thus increasing the rate of their prosocial behavior (42, see also 45).

The study of prosocial arousal can contribute to general psychology methodologically and theoretically. By measuring changes in the dilation of children's pupils, we can tap into the internal mechanism underlying prosocial behavior as well as *any other* behavior. With regard to helping, children concern themselves with the well-being of as well as with the relationship they have with others. In that sense, young children's intrinsic motivation to help is inherently prosocial.

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