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PROSOCIAL BEHAVIORS AND DEVELOPMENT

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Although scholars have long recognized the importance of prosocial behaviors (or actions intended to benefit others) to understanding morality, the field has continued to evolve in quite sophisticated ways. In part, the evolution of the study of prosocial behaviors stems from much more nuanced conceptions of these actions and their correlates. Prosocial behaviors include commonly exhibited acts such as comforting, sharing, helping, and kindness. However, prosocial behaviors can also be complex and less commonly exhibited, including heroism, altruistic acts, volunteerism, and other behaviors (e.g., civic engagement) that are costly and can invoke moral principles and sympathy (see Carlo & Padilla-Walker, 2020). In addition, helping behaviors can be induced by external pressures (e.g., parents, peers, social norms) and other forces that might have clear, practical benefits for oneself. In addition, it is important to note that prosocial behaviors can sometimes be enacted with selfish motives (e.g., to gain the approval of others), which can transform such actions into harmful actions (e.g., aggression and manipulation; Hawley, 2003). Because of the multidimensional and complex nature of prosocial behaviors, these actions have conceptual and empirical links to a wide range of person and environment correlates.

Carlo and Padilla-Walker (2020) presented a heuristic model of prosocial behaviors that delineates that prosocial behaviors can vary across contexts, recipients, and motives. For example, some scholars have noted the distinctions of helping toward different targets (e.g., strangers, friends, relatives; Padilla-Walker et al., 2018), others have demonstrated significant differences in selflessly versus selfishly motivated prosocial behaviors (Batson, 1998), and still, others have shown important distinctions based on situational factors (e.g., number of observers, physical attractiveness of victims; Latané & Darley, 1970). Carlo and Randall (2001) presented a typology of six prosocial behaviors (dire, emotional, anonymous, altruistic, compliant, public) that varied across situations and motives. This typology suggests distinct characteristics that yields a unique pattern of relations between prosocial behaviors and theoretically relevant constructs (McGinley et al., 2014).

Several researchers have begun to incorporate this relatively new multidimensional framework in important ways. For example, recent meta-analytic reviews demonstrate that gender differences in prosocial behaviors are nuanced (Xiao et al., 2019) and that distinct forms of prosocial behaviors are differentially linked to problem outcomes (e.g., depression, Memmott-Elison et al., 2020). In addition, a multidimensional conception of prosocial behaviors provides avenues to account for prior mixed or unexpected findings. For example, early research findings on the links between both perspective-taking and moral reasoning and prosocial behaviors were mixed, but such prior mixed findings could be due to a lack of specificity in linking sociocognitive traits and prosocial behaviors

(Carlo et al., 2010). For example, moral principles might be relatively more pertinent to predicting prosocial actions (e.g., altruistic) that require consideration of moral principles, but such principles might be less relevant to predicting prosocial actions that might be more motivated by external pressures (e.g., compliant helping; see Carlo, 2014).

This chapter provides a summary of contemporary theory and research on prosocial behaviors and development. We begin with a brief overview of major theoretical frameworks that have informed much of the developmental research on prosocial behaviors. The contemporary research on age- and gender-related differences, socialization and culture-related correlates, and intrapersonal traits linked to prosocial behaviors is then highlighted. Due to space limitations, the review emphasizes more recent work and developmental work that considers the multidimensionality of prosocial behaviors.

Theoretical Background

Evolutionary and Biological Perspectives

The substantial majority of mammalian species are characterized as being highly social with affiliative bonds to kin and non-kin members of their stable social groups and as having protracted periods of postnatal dependency of infants on caregivers (Rogers & Bales, 2019). In primates, including *Homo sapiens*, infants require years of near-constant attention to meet such fundamental needs as safety, nutrition, thermoregulation, and social stimulation. Thus, affiliative social groups can be seen as the evolutionary niche of humans, and the first such social group is the family (Hastings et al., 2006).

Parents allocate considerable resources to the care of their infants, often sacrificing their own needs for nutrition or sleep to ensure an infant's well-being; an infant's first social experiences could be seen as being the recipient of prosocial behavior (Miller & Hastings, 2019). Yet infants are not the passive recipients of this other-oriented care. Rather, they rapidly develop receptive and expressive visual, auditory, and behavioral competencies that make them active solicitors of positive engagement from caregivers and partners in the unfolding of their interactions. Before long, these competencies include the infant's own prosociality. Within the first year of life, infants are capable of expressing facial and vocal concern for others in response to cues that others are pained or distressed. As motor competencies like independent mobility increase in the second year, they also engage in situationally appropriate prosocial behaviors, like comforting someone who is sad or giving help to someone struggling with a task (Davidov et al., 2020; Zahn-Waxler et al., 1992).

These exchanges between caregivers and infants can be understood as the result of species-characteristic biobehavioral endowments that are reinforced and built upon throughout the extended developmental period of early childhood. Further, the expression of these capacities is not limited to caregiver-infant exchanges (Hastings et al., 2014). The family is the crucible for prosociality that continues to be expressed as children expand their social worlds and increasingly interact with peers, teachers, and others. The positive other-oriented behaviors of the family unit, therefore, are replicated and propagated in the cooperative and beneficent actions we direct toward community members; in turn, being the recipient of such actions from non-family members also enhances one's own positive other-oriented tendencies (Hastings et al., 2015). The many ways in which we express these capacities can be broadly characterized as prosocial behaviors. Further, these qualities of a nurturing family upbringing also contribute to children's development of moral emotions and internalization of moral principles (Gleason et al., 2016; Kochanska et al., 2010), suggesting an earlier origin for intricate links between prosociality and morality.

Numerous theories and frameworks have built upon this recognition that evolutionary forces have selected for neurobiological systems and behavioral tendencies that buttress the prosocial and

moral aspects of human nature (Miller & Hastings, 2019). For example, the oxytocinergic system is central to the tend-and-befriend model, which proposes prosociality as an alternate behavioral response system to the classic fight-or-flight reaction to threats, challenges, and other stressors (Taylor et al., 2000). As another example, Porges (2011) proposed that the parasympathetic branch of the autonomic nervous system plays critical roles in the social engagement system of mammals, supporting calm and affiliative responses toward conspecifics rather than defensive posturing, and thereby promoting prosocial behaviors.

Cognitive-Developmental Perspectives

One of the most influential perspectives on prosocial development is cognitive-developmental theory, which is firmly grounded in rationalistic philosophy (Kant, 1785/1993). Both Piaget (1932) and Kohlberg (1969) asserted that moral and prosocial development progress as a function of the development of sociocognitive skills—most notably, perspective-taking and moral reasoning (see also Gibbs, 2003). According to these theorists, as children mature in understanding the thoughts, feelings, and social situations of others, there are corresponding increases in the maturity of moral reasoning and greater facilitation of prosocial and moral behaviors associated with moral development. For example, Kohlberg (1969) asserted that strong, internalized moral principles, which are invoked at the highest stages of moral reasoning, can induce care-based and value-based forms of prosocial behaviors. Similarly, high-level moral reasoning often invokes universal values such as the *golden rule* (i.e., *do unto others as they would have done unto you*) or concern for the welfare of others, which can lead to altruistic and prosocial behaviors (Kohlberg & Candee, 1984).

Developments scholars have refined the definition of what constitutes a moral issue as distinct from psychological and societal issues (Turiel, 2006). Other cognitive-developmental scholars have proposed extensions of Kohlberg's theory to Hoffman's moral socialization theory (Hoffman, 2000; see the section below). Rest and colleagues' (1979) work is also strongly grounded in cognitive-developmental theory but has also linked moral reasoning to moral and prosocial behaviors. Although these latter scholars conceptualize moral reasoning advancements as gradual and continuous and question the existence of Kohlberg's stage 6 (universal principled), these researchers posit that high level, principled reasoning is most likely linked positively to prosocial behaviors (Kohlberg & Candee, 1984). Common to these approaches, however, is the notion that moral development is primarily the result of age-related changes in social cognition and that moral reasoning is central to understanding such changes. Moral emotions, such as empathy (i.e., feeling the same as another) and sympathy (or empathic concern; i.e., feelings of concern or sorrow for others), are traditionally relegated to secondary importance status or viewed as continually interacting with judgments (see e.g., Turiel, 2006; Turiel & Killen, 2010).

Socialization Perspectives

Although recent conceptualizations have evolved and acknowledged the influence of both moral cognitions and emotions, there are still differences in sources of influence and mechanisms between cognitive-developmental and moral socialization theorists. The first discrepancy is the emphasis on moral cognitions versus moral emotions. Whereas cognitive-developmental scholars traditionally focused on the role of moral cognitions, moral socialization scholars focus on the roles of moral emotions, such as empathy, sympathy, guilt (i.e., aversive, self-focused feelings that result from failing to meet one's own standards), and shame (i.e., aversive, self-focused feelings that result from failing to meet the standards of others; Eisenberg, 1986; Hoffman, 2000). Hoffman (2000) elaborates on how empathy develops across time as cognitive skills (such as self-other differentiation, perspective-taking, abstraction, self-reflection, symbolic representation) develop. Importantly, empathy and sympathy

motivate persons to inhibit harmful actions and facilitate prosocial behaviors. Similarly, guilt and shame can enhance the likelihood of prosocial behaviors for intrinsic (in the case of guilt) or extrinsic (in the case of shame) reasons. Moreover, both Hoffman (2000) and Eisenberg (1986) note that empathy and sympathy can be influenced by social cognitions (e.g., moral reasoning, perspective-taking) and that emotions can induce or evoke such social cognitions.

The second major difference between early cognitive-developmental and moral socialization approaches is the powerful role of socialization influences and experiences (Grusec & Goodnow, 1994; Hoffman, 2000, but see Jambon & Smetana, 2019). Moral socialization theorists emphasize the role of socialization agents (e.g., parents) and experiences as major influencers of moral and prosocial development. Parents, for example, engage in practices (such as disciplining) that can foster or mitigate prosocial behaviors. Specifically, power-assertive disciplining (i.e., use of harsh, corporal punishment practices) can undermine prosocial behaviors because such practices model aggression, do not teach moral messages, and foster emotion dysregulation (from overarousal), especially when such practices are combined with corporal punishment (Hoffman, 2000). In contrast, inductive disciplining (e.g., child-centered use of reasoning and encouraging role-taking practices) promotes prosocial behaviors because these practices provide moral reasoning, foster emotion regulation well, and induce perspective-taking (Hoffman, 2000). There are also parenting models that emphasize non-transgressive socialization contexts, such as when children act prosocially and parents apply social (e.g., praise) or material (e.g., gifts) rewards to encourage future prosocial behaviors. These and other (e.g., experiential learning, moral and emotion conversations) prosocial parenting practices are aimed at fostering prosocial behaviors by reinforcing desirable behaviors, teaching moral values, and inducing empathy (e.g., Carlo et al., 2007).

Integrative and Cultural Perspectives

A number of theorists advanced integrative approaches based on sociocognitive, social, psychological, socialization, and cognitive-developmental theories (Bandura, 1986; Eisenberg, 1986). These approaches acknowledged the influence of social cognitions, moral emotions, and socialization mechanisms and also highlighted the recursive and reciprocal processes that further our understanding of how socialization agents can influence children's prosocial development and also how children can influence socialization agents.

Although the various theoretical perspectives have significantly advanced our understanding of prosocial and moral development, scholars have consistently raised concerns about the ability of these various perspectives to account for prosocial and moral development across and within distinct cultures (Miller, Goyal, et al., 2017). Carlo and his colleagues (Carlo & Conejo, 2019) have postulated an integrative model that incorporates culture-related mechanisms into developmental and social psychological models. The framework specifies how exposure to background and antecedent influences (e.g., family socialization and immigration history, major life events, contextual characteristics) can result in individual and group differences in prosocial behaviors via the influence of person- and culture-based characteristics (e.g., ethnic/racial identity, cultural values, moral reasoning, sympathy) and perceptions (e.g., cultural stress, discrimination).

Individual Differences Research

Age-Related Differences in Prosocial Behavior

The type, quality, and frequency of prosocial behaviors change somewhat with age and as a function of development and socialization. Research on prosocial behaviors in young children focuses mostly on instrumental helping, comforting, and sharing (Laible & Karahuta, 2014), which become

increasingly sophisticated with age and also branch out in childhood and adolescence to include prosocial behaviors such as extended volunteering, including and defending others (e.g., those being bullied), and online behaviors such as activism for underrepresented groups. While specific types of prosocial behaviors have not often been studied longitudinally, the frequency of prosocial behaviors during the formative years is relatively stable (Flynn et al., 2015), with increases from infancy to childhood (Nantel-Vivier et al., 2014), slight decreases across childhood (Malti et al., 2016) and adolescence (Carlo et al., 2007), and positive rebounds during late adolescence and the transition to adulthood (Crocetti et al., 2016). This is somewhat dependent upon the type of prosocial behavior and the target toward whom the behavior is directed (see Padilla-Walker et al., 2018). Person-centered studies highlight that though prosocial behaviors are generally stable or slightly decreasing from childhood to adolescence, a substantial minority of teenagers (roughly 25%) display increasing levels of prosocial behavior over time (Flynn et al., 2015).

Gender Differences in Prosocial Behavior

Making definitive statements about gender differences in prosocial behavior and development is fraught with complexity given the strong influence of socialization (which may reveal gender differences that are not biological; Eisenberg et al., 2015) and the reliance on self-report measures that may reflect a typically feminine approach to prosocial behavior (Nielson et al., 2017). For example, when using physiological measures of empathy, there are few gender differences (Eisenberg et al., 2015), but self-reported and other-reported questionnaire measures of prosocial behavior nearly always find that females are higher on prosocial behaviors than males (Van der Graaff et al., 2018), with the exception of males being higher on prosocial behaviors that are motivated by one's desire to be noticed or seen being helpful (public prosocial behavior; Xiao et al., 2019). Recent research calls for attention to be paid to the type, target, and context of prosocial behavior when considering gender differences, as males may have been socialized to help in different ways than females. For example, there are less-clear gender differences when considering physical compared to emotional helping (Nielson et al., 2017) and prosocial behaviors toward strangers compared to friends or peers and when considering less-gendered contexts, such as anonymous compared to altruistic contexts (Xiao et al., 2019).

Socialization and Culture-Related Research

Family and Prosocial Behavior

While acknowledging the important role of temperament and sociocognitive skills in fostering prosocial behaviors, socialization agents, including parents, siblings, extended family members, peers, and media, all have been found to meaningfully influence prosocial development across childhood and adolescence. Research highlights the importance of maternal attachment in fostering young children's helping behavior, but less so comforting (Beier et al., 2019) or sharing (Gross et al., 2015) behaviors, suggesting the need to consider different types of prosocial behaviors across development. Similar constructs such as parental support, sensitivity, involvement, and warmth continue to positively influence prosocial development during both childhood and adolescence (Padilla-Walker, 2014) and across a variety of cultures (Landsford et al., 2018). Parental socialization is particularly important in fostering prosocial behaviors toward family members (Padilla-Walker et al., 2016) but also promotes prosocial behaviors more generally. This is likely because positive parental socialization fosters individual growth in children and adolescents' empathic responding (Carlo et al., 2018), self-regulation (Memmott-Elison, Padilla-Walker, et al., 2020), selection of prosocial peers (Laible et al., 2016), and internalization of cultural values (Davis et al., 2018).

There is significantly less research on how interactions with siblings and extended family members influence prosocial development, but interactions with siblings, in particular, are thought to create ideal conditions where children can learn cooperation, perspective-taking, and empathic responding, all of which foster prosocial behaviors such as comforting, sharing, and helping (Hughes et al., 2018). During early childhood, prosocial behaviors, such as sharing with a sibling, are especially fostered when parents provide structured interactions (Van Berkel et al., 2015), and early sharing with siblings is associated with later sharing toward unfamiliar peers (White et al., 2014). Research with adolescents has found that sibling affection is associated with higher levels of prosocial behavior even after controlling for parent and peer relationships (Harper et al., 2016; see also Streit et al., 2020b), which is in part due to sibling affection being associated with increases in sympathy and self-regulation (Padilla-Walker et al., 2010). Other work shows that emotional closeness with a grandparent was associated with prosocial behaviors toward family members, friends, and strangers, highlighting the importance of positive relationships with extended family members as a potentially important source of socialization of prosocial development (Yorgason & Gustafson, 2014). Such findings will likely vary as a function of culture, as prosocial behavior toward elderly family members is seen as a more central aspect of development in countries where independence is not as highly valued (Kumru & Yağmurlu, 2014).

Peers and Prosocial Behavior

Despite the salience of family during the formative years, research also suggests that social interactions with peers (or friends) play a role in the development of prosocial behaviors from an early age (Dahl & Brownell, 2019). Children as young as age 3 show preferential prosocial treatment of friends compared to unknown peers, a preference that has also been found in chimpanzees, suggesting that preferential prosocial behaviors toward friends occur early in development and may be grounded in evolution (Engelmann et al., 2019). Friendship support (Sebanck, 2003) and the display of positive emotionality with friends and peers (Lindsey, 2019) are associated with prosocial behavior in preschool-age children. In slightly older children, discussing moral issues with peers is associated with more positive emotions and prosocial intentions (Kleemans et al., 2017). As peers exert influence through example and real or imagined pressure, this may result in positive or negative moral and prosocial outcomes depending on the nature of the peer relationship and behavior.

As children transition to adolescence, peer influence and pressure become even more salient and are often related in a complex manner to social status. Peer pressure toward aggressive behavior is associated with adolescents' fighting and delinquency, while prosocial peer pressure (Farrell et al., 2017) and being treated prosocially by peers (Stotsky et al., 2020) are associated with prosocial behaviors. However, the role of peer pressure and influence is moderated somewhat by social status, with adolescents conforming to peers' prosocial behaviors, especially when that peer is perceived as having high social status (Closson & Hymel, 2016) or when the helper and helpee share the same high popularity status (Closson & Hymel, 2016). Generally, being popular during adolescence is different from being well-liked, as only those who are well-liked (but not necessarily popular) report being prosocial toward a wide variety of teens. Despite the complexities that arise as a function of social status during adolescence, it is still clear that having a strong positive relationship with friends is associated with higher levels of prosocial behaviors toward friends and that this is due in part to increases in sympathy (Padilla-Walker, Fraser, et al., 2015).

Culture-Focused Research on Prosocial Behaviors

Several scholars have examined cross-national group similarities and differences across a variety of types of prosocial behaviors and across distinct age groups. Studies of global prosocial behaviors show mixed evidence of cross-national group differences in levels of prosocial behaviors (e.g., House et al., 2013; Kärtner

et al., 2010; Mesurado et al., 2014). However, several other studies yield evidence of cross-national group differences in specific forms of prosocial behaviors (e.g., Carlo et al., 2018; Köster et al., 2016). These latter studies suggest that cross-national findings might vary as a function of the specific form of prosocial behavior and/or age group. In addition, distinct cultures emphasize different cultural values, expectations, and beliefs related to prosocial behaviors (Knight & Carlo, 2012), and there is evidence of culture-distinct patterns of prosociality (Shafer et al., 2015). For example, the emphases on familism and collectivism in traditional Latino/a cultures is associated with prosocial behaviors oriented toward the well-being of family and the broader group rather than the individual, which can manifest in relatively high levels of helping in emotional and dire circumstances and when requested (Knight et al., 2016).

Although comparative culture–group studies yield important evidence on the generalizability of models, studies of culture groups within societies are also informative on the generalizability of models and can advance our understanding of explanatory mechanisms of individual and group differences in prosocial behaviors. To date, much of this work has been conducted on Latino/a youth in the U.S. (Carlo & Conejo, 2019, but see Maiya, Carlo, Elison, & Landor, in press, for a recent study on African American youth). In general, the evidence suggests that U.S. Latino/a family and parents socialize their youth's specific types of prosocial behaviors via acculturative practices (teaching them about their ethnic heritage) that foster ethnic identity and traditional cultural values (e.g., familism) (e.g., Knight et al., 2016; Streit et al., 2020a). For example, Knight et al. (2016) showed that ethnic identity was positively associated with emotional, dire, compliant, and altruistic prosocial behaviors but unrelated to anonymous and public prosocial behaviors. Other socialization research yields evidence that no-nonsense fathering (akin to authoritarian parenting) had no significant effect on U.S. Mexican youth prosocial behaviors as compared to authoritative father parenting (Carlo et al., 2018). One study suggests that family and parenting influences were relatively more frequently linked to U.S. Latino/a youth prosocial behaviors in less acculturated youth, whereas peer influences were relatively more frequently linked to such behaviors in more acculturated youth (Streit & Carlo, 2020). Other researchers show that acculturative stress, economic stress, and discrimination are generally (though not always) negatively linked to specific forms of prosocial behaviors (especially altruistic prosocial behaviors) (e.g., Davis et al., 2016; Davis et al., 2018). Carlo et al. (2018) reported evidence that parental and peer support positively predicted emotional, compliant, and dire prosocial behaviors via perspective-taking, empathic concern, and prosocial moral reasoning in a sample of U.S. Latino/a youth.

Recently, a few studies have examined within-culture differences in undifferentiated forms of prosocial behaviors in other specific culture groups. Gülseven et al. (2018) showed that daily parental hassles were negatively linked to young Turkish children's prosocial behaviors via parenting practices. Another study demonstrated that African American parents' use of corporal punishment when children were toddlers predicted lower levels of prosocial behaviors nearly ten years later (Streit et al., 2017). There is evidence that non-culture-specific parenting (e.g., supportive parenting, parents' use of social and material rewards) and person-based mechanisms (e.g., moral reasoning, perspective-taking) also predict prosocial behaviors in ethnic/racial minority and low-income youth (Davis & Carlo, 2019). Finally, in a study of African American young adults, Maiya et al. (2021) showed evidence that ethnic/racial and religious identity mediated the relations between ethnic/racial socialization and prosocial behaviors. More studies of other specific culture groups (in addition to U.S. Latino/as), especially minoritized (e.g., sexual minorities, indigenous) populations are needed to further our understanding of positive youth development in these vulnerable and often-stigmatized children and adolescents.

Media and Prosocial Behaviors

Media content on network television for children is primarily fantastical and not particularly prosocial (Taggart et al., 2019), while media content for adolescents has high levels of violence and

profanity (Coyne et al., 2011). Despite these less-than-optimal statistics, research has consistently found that prosocial media can be a positive source of socializing prosocial behavior through increases in sympathy (Prot et al., 2014), as well as activation of prosocial scripts, schema, and attitudes (Padilla-Walker, Coyne, et al., 2015). However, these relations vary somewhat as a function of age and gender of the child, medium of media, and study design.

Preschool children who watch prosocial television display higher levels of emotional knowledge and regulation (Rasmussen et al., 2019), both of which are associated with prosocial behavior. Watching Disney Princess films (that are generally high in prosocial behavior) was only associated with prosocial behavior for boy preschoolers whose parents monitored their media by discussing media content openly (Coyne et al., 2016), and watching superhero programming (generally high in prosocial violence) was not longitudinally associated with prosocial behavior among preschoolers (Coyne et al., 2017). It is possible that being exposed to superhero programming is not consistently associated with prosocial behavior because any prosocial messages may be lost when paired with morally justified violence.

During childhood and adolescence, associations are somewhat more consistent, with exposure to violent media during grade school associated with lower levels of prosocial behavior later in the school year (Gentile et al., 2011) and prosocial video games associated with more prosocial behavior (Saleem et al., 2012). Exposure to prosocial television and video game content was associated cross-sectionally with prosocial behavior toward family and strangers during adolescence (Holmgren et al., 2019), but associations between prosocial television (Padilla-Walker, Coyne, et al., 2015) and prosocial music (Coyne & Padilla-Walker, 2015) are not as consistent longitudinally. The relation between prosocial media and prosocial behavior is somewhat less consistent than relations between violent behavior and aggression or prosocial behavior. This could be due in part to the way prosocial media and prosocial behavior are measured unidimensionally. Research also suggests that some children are more susceptible to media effects than others, so not accounting for the heterogeneity of susceptibility can lead to interpretation of small effects where moderation might reveal larger effects for certain groups of children and teens (e.g., based on temperament, risky social environment, etc.; Valkenburg, 2015). These findings highlight the dynamic interplay between socialization and intrapersonal influences in shaping prosocial behavior.

Research on Intrapersonal Mechanisms

Biologically Based Correlates

Recent advances in developmental psychobiology research are shedding light on the nuanced ways in which multiple neurobiological systems are associated with prosocial behavior and moral development in children and youth (see Howard & Decety, this volume). Here, we focus primarily on evidence for the ways in which prosocial behavior is underpinned by activity of the autonomic nervous system (ANS), which has been the target system of the majority of developmental psychobiology research on prosociality. Much of this work has been based on Porges' (2011) polyvagal theory and his identification of the parasympathetic (PNS) branch of the ANS playing a central role in coordinating brain-body regulation in support of cooperative interpersonal behavior (Porges, 2011). Stronger PNS influence suppresses tendencies for the sympathetic nervous system (SNS) to drive fight-or-flight reactions to social cues from others instead supporting calm and well-regulated social and emotional responsiveness. Conversely, modest withdrawal of PNS influence can allow for mobilization of somatic resources for active behaviors that are positive rather than aggressive and defensive (Hastings & Kahle, 2019; Miller & Hastings, 2016). Hence, greater PNS influence and less SNS influence have often been hypothesized to support prosocial behaviors (Hastings et al., 2014; Hastings et al., 2006).

Yet numerous inconsistencies across years of studying ANS activity and prosocial behavior in children and adolescents suggest that researchers had not captured the complex and subtle ways in which the ANS is important for prosocial development, for many reasons (Hastings & Miller, 2014; Hastings et al., 2014). Two such reasons pertain to overly simplistic approaches to conceptualizing, measuring, and analyzing the biobehavioral nature of prosociality. First, prosocial behavior might require moderate ANS activity, which would not be detected through analyses of linear associations, which presume greater prosociality would be associated with either more (positive association) or less (negative association) ANS activity. Second, physiological activity may change dynamically over the course of an individual engaging with a stimulus or situation that could elicit a prosocial response (Hastings & Kahle, 2019), with the patterns of change over time being important for prosocial behavior.

Evidence of non-linear associations between ANS physiology and prosocial behavior was first reported in adults by Kogan and colleagues (2014) and then demonstrated in three studies of preschool-age to elementary school-age children in three countries (Acland et al., 2019; Miller, Goyal, et al., 2017; Zhang & Wang, 2019). These studies examined individuals' baseline PNS activity, as indexed by average levels of respiratory sinus arrhythmia (RSA) while quiet and still, which reflects the typical level of PNS influence that individuals are likely to bring into the various situations they may encounter. Across the ages studied, individuals with moderate baseline RSA were more prosocial than individuals with either relatively lower or relatively higher RSA. In other words, these studies showed that there were non-linear associations, characterized as an inverted U-shaped curve, between baseline RSA and numerous aspects of prosociality. Preschoolers, children, and adults with moderate levels of PNS activity displayed more altruistic donations, empathic concern, and helpfulness in response to others' distress, as well as general prosocial tendencies (Acland et al., 2018; Kogan et al., 2014; Miller, Goyal, et al., 2017; Zhang & Wang, 2019). But why would moderate baseline RSA support greater engagement in prosocial behavior?

Higher baseline RSA is a robust correlate of greater emotional self-regulation (Hastings & Kahle, 2019), yet it also is a marker of higher thresholds for emotional arousal (Miller et al., 2019). Thus, when encountering such cues as another person looking sad or needing assistance, individuals with relatively low levels of typical PNS activity may lack sufficient emotional self-regulation to soothe their easily aroused vicarious emotional contagion, such that personal distress could interfere with mounting a positive other-oriented response. Conversely, individuals with relatively high levels of typical PNS activity may utilize their greater self-regulatory capacities to suppress any empathic arousal (Zaki, 2014), or they may not experience sufficient vicarious arousal to bring their attention to the needs of others and to respond accordingly (Miller, Goyal et al., 2017; Miller et al., 2019). Moderate parasympathetic enervation may place one in the prosocial "sweet spot" of (1) being sufficiently sensitive to cues of the need or opportunity for prosocial behavior and (2) having the physiological capacity to channel one's evoked arousal into well-regulated helpful or compassionate actions.

Importantly, though, baseline measures of typical ANS activity do not reveal the autonomic regulation that occurs in response to stimuli or situations or while behaving prosocially. As with baseline RSA, however, recent studies of reactive PNS responses to stimuli that may be evocative of prosocial engagement have revealed that there may not be straightforward, linear associations between prosocial behavior and changes in RSA. For example, Coulombe and colleagues (2019) found that elementary-school-age children who mobilized a PNS response to a sadness-inducing video, whether that reflected increased or decreased RSA relative to baseline, made larger altruistic donations to others and had greater parent-rated prosociality, compared to children for whom there was little RSA change from baseline to the sad video. The authors suggested that modest PNS responses of either RSA withdrawal (which would support orientation and attention to an evocative stimulus) or RSA augmentation (which would support calm engagement with an evocative stimulus) could support positive other-oriented behavior, whereas more extreme changes might promote withdrawal

or disengagement reactions (Coulombe et al., 2019). Intriguingly, four other studies also point to potential contributions of both RSA withdrawal and RSA augmentation to prosociality.

In an altruistic donation task conducted with the same children at age 4 (Miller et al., 2015) and 6 years (Miller et al., 2020), RSA was recorded while children listened to an examiner explain how they could choose to share some of their prize winnings with other needy children, and while the children were left alone to decide whether and how much to donate. RSA decreased from the listening period to the donating period, indicating that, on average, children were in a moderately more aroused state due to PNS withdrawal while donating, indicative of parasympathetically mediated mobilization of resources for action. Individual differences in both RSA while listening to the examiner and RSA change from the listening to donating periods predicted children's altruism. Children made larger donations at 4 years when they had higher RSA while listening to the examiner, indicative of calm social engagement (Porges, 2011), and at both 4 and 6 years when they had greater RSA withdrawal from listening to donating, indicating that their mobilization of resources was put toward actions that benefit others. Thus, the more altruistic children were those who matched their PNS activity to the changing demand characteristics of an ongoing social situation, a capacity that the authors called vagal flexibility (Miller et al., 2015, 2020).

In a study with kindergarten-age children (Miller et al., 2016), RSA was recorded while watching sadness-inducing videos, and responses of helpfulness and empathic concern to adults simulating accidents and injuries were observed concurrently and again two years later. Children tended to initially show RSA withdrawal (decreases) as the sad contents of the videos were introduced, then RSA augmentation (increases) as sadness intensified, suggestive of an initial orientation response to the novel content followed by calm attention. That non-linear slope of RSA change in response to sad scenarios predicted the children's prosocial development; compared to children with flatter slopes, those who evinced greater RSA increases followed by RSA decreases had larger increases in their helpful responses during accident simulations over the subsequent two years. Similarly, a study of adolescents (Cui et al., 2015) found that RSA decreases followed by RSA increases characterized youths' PNS activity while discussing a prior experience of anger with their parents, and youth who reported engaging in more prosocial behavior manifested stronger non-linear slopes of RSA change. Like the studies of RSA and altruistic donations, these studies reveal that the capacity to dynamically adjust PNS activity in response to evocative situations—vagal flexibility—appears to support the ability to engage in prosocial behavior.

The recent advancements in autonomic and other physiological systems suggest that these systems function in coordination with psychosocial processes in contributing to the development of distinct forms of prosocial behaviors. Researchers are just beginning to consider how non-linear and dynamic physiological processes may function in coordination with sociocognitive capacities and socializing relationships and contexts to shape prosocial development, but this is an exciting direction of future efforts.

Sociocognitive and Socioemotional Correlates

The two most commonly studied developmental social cognitions are perspective-taking (also referred to as theory of mind) and moral reasoning. There is continued supportive evidence for positive links between both moral reasoning and perspective-taking and prosocial behaviors (Carlo, 2014; Eisenberg et al., 2015). However, there is increased attention to examine these sociocognitive tendencies as they relate to specific types and targets of prosocial behaviors. For example, in one study (Carlo et al., 2018), perspective-taking was indirectly linked to altruistic prosocial behaviors but negatively indirectly linked to public prosocial behaviors via sympathy and prosocial moral reasoning. Streit et al. (2020b) showed positive (both direct and indirect effects through sympathy) relations between perspective-taking and prosocial behaviors toward family, friends, and strangers.

Moral reasoning and prosocial behaviors have been comparatively less studied, but the limited evidence supports significant associations between these constructs (Eisenberg et al., 2015; Hall et al., 2021; Villegas de Posada & Vargas-Trujillo, 2015). Recent research in this area has expanded to culturally diverse samples and studies of the relations to specific forms of prosocial behaviors. Across studies of U.S. Latino/a youth and diverse adolescents from low-income households, prosocial moral reasoning was linked positively to altruistic, but negatively to public, prosocial behaviors (e.g., Carlo et al., 2018). In a study of Turkish and Filipino college students, Gülseven et al. (2020) showed positive relations between prosocial moral reasoning and both anonymous and compliant prosocial behaviors but a negative relation to public prosocial behaviors.

Moral cognitions and emotions are integrally linked and possibly jointly contribute to prosocial behaviors. Several studies demonstrate relatively consistent links between both empathy and sympathy and prosocial behaviors (Eisenberg et al., 2015). In comparison, fewer studies focus on links between guilt and shame and prosocial behaviors. Interestingly, as compared to empathy, sympathy, and guilt, some scholars posit that shame might undermine moral development and, therefore, prosocial behaviors (Tangney & Dearing, 2002). However, though admittedly limited, evidence suggests that both guilt and shame are positively related to prosocial behaviors in adolescents (see Carlo, 2014), and there is evidence that shame might predict higher levels of moral development in Asian heritage children (Fung & Chun, 2001).

Behavioral and Psychological Health Correlates

There is growing recognition of the behavioral and health correlates of prosocial behaviors. The numerous associations between prosocial behavior and positive interpersonal (both peer and adults) relationships, good self-regulation, higher levels of sociocognitive and socioemotional functioning, positive self-conceptions (e.g., self-esteem, self-efficacy), interpersonal trust, educational achievement, and social competencies suggests that prosocial behaviors are markers of social well-being (Carlo, 2014). There is also increasing evidence on positive links between prosocial behaviors and physical health (Schreier et al., 2013) and psychological health (especially depression; see Memmott-Elison, Holmgren, et al., 2020). Furthermore, studies show negative associations between prosocial behaviors and illegal substance use and problematic alcohol use (Carlo et al., 2011), aggression, deviant peer affiliation, and delinquency (see Memmott-Elison, Holmgren, et al., 2020). Despite the increase in research examining the health correlates of prosocial behaviors, this area remains somewhat sparse, and more research is needed.

Conclusion

There have been several major advancements in our understanding of individual and group differences and correlates of prosocial behaviors. Some recent developments include the introduction of integrative approaches that incorporate biological- and culture-based mechanisms into traditional theoretical perspectives of prosocial development. There are also relatively new conceptualizations of prosocial behaviors that posit unique correlates to specific forms of prosocial behaviors. Much of the recent work has furthered our understanding of prior mixed empirical findings. Importantly, these new integrative approaches and the consideration of specific forms of prosocial behaviors (e.g., toward in-group/out-group members, selflessly motivated forms) provide exciting new opportunities for the development of efficient intervention efforts aimed at fostering kindness, benevolence, and moral development. Perhaps such efforts can cumulatively address major social challenges (e.g., reducing intergroup conflict, social injustices, and social inequities) that require cooperation and prosociality (Davis et al., in press; Taylor & Carlo, 2021).

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