An Evolutionary Model of the Environmental Conditions that Shape the Development of Prosociality

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Abstract: The current review presents a model for how prosocial development is driven by sociocognitive mechanisms that have been shaped by natural selection to translate critical environmental factors into locally adaptive levels of prosociality. This is done through a synthesis of two existing literatures. Evolutionary developmental psychologists have demonstrated a biological basis for the emergence of prosocial behavior early in youth, and work based on social learning theory has explored how social experiences can influence prosociality across development. The model forwarded organizes this latter literature in a way that is specific to how the biological mechanisms underpinning prosociality have evolved. This consists of two main psychological mechanisms. 1) A domain-specific program that is responsive to environmental factors that determine the relative success of different levels of prosociality. It uses the local prevalence of prosocial others (i.e., support) and expectations for prosocial behavior (i.e., structure) to guide prosocial development. 2) The domain-general process of cultural learning, by which youth adopt local social norms based on the examples of others. Implications and hypotheses are articulated for both the sociocognitive structure of the individual and the role of social contexts.

Keywords: evolutionary developmental psychology, prosociality, cooperation, social learning theory, gene-culture coevolution

Introduction

Prosociality is a defining characteristic of human behavior. Cooperation, sharing, and empathy are all common in daily life, and a vital part of societies both small and large. It is also something of an evolutionary paradox. By traditional models of individual selection, a behavior that benefits others at a potential cost to oneself appears to be at a clear disadvantage. This has inspired much work, both in how it might have evolved in humans, as well as how natural selection might have shaped it. One such line of research has focused on the development of prosociality during youth. Recent experiments show that a capacity for helping and sharing emerges during infancy that far outstrips the same
abilities in our nearest relative, the chimpanzee (Warneken and Tomasello, 2009). This work suggests that prosociality has a biological basis, and one that becomes increasingly sophisticated throughout development (House, Henrich, Brosnan, and Silk, 2012).

Development must occur in context, however, and a particular trait might not emerge the same way for all individuals. The conditions and experiences of youth are known to influence one’s tendency towards prosociality, particularly through the process of socialization. Though there is an extensive literature on this subject (Eisenberg, Fabes, and Spinrad, 2006), the way these inputs shape an individual’s proclivity for prosociality has not yet been studied by evolutionists. If, as Warneken and Tomasello (2009) contend, the presence of prosociality has a biological basis in humans, then it is likely that the process of development is biologically based as well, which holds important consequences for its structure. Developmental programs throughout the animal kingdom have a dynamic relationship with their environment, interpreting local information in order to generate an adaptive phenotype (West-Eberhard, 1989). This process is known as adaptive phenotypic plasticity, and is common in humans as well (e.g., Belsky, Steinberg, and Draper, 1991; Gluckman and Hanson, 2005). If applied to the current case, it would predict that prosociality as well would develop in response to the local conditions that indicate its potential to be effective as a social strategy.

The bulk of work to date has focused on the social relationships and processes that are active in prosocial development, primarily inspired by Bandura’s (1985) social cognitive learning theory. Bandura’s model codifies the various mechanisms by which socialization shapes human development, but these insights are about the structure of development in a general sense. They do not offer hypotheses about which particular social inputs would be most relevant for any single behavior. Looking at prosocial development as a biological process within the social environment grants us this specificity, however, as it guides us towards those conditions that determine the costs and benefits of being prosocial. Work based on socialization has identified dozens of factors that influence prosocial development—ranging from parenting techniques to peer behaviors to neighborhood context—and this new perspective would provide a theoretical structure for interpreting and interconnecting them.

The goal of the current manuscript is to advance a model for the developmental plasticity of prosociality that emphasizes its biological bases, and their origination through natural selection. Section 1 begins by summarizing the factors that are most influential during prosocial development, as discovered by research inspired by social learning theory. Section 2 then looks at how natural selection might have shaped prosocial development through human evolution, focusing both on the inputs that are most relevant, as well as the cognitive structures that are there to process and interpret them. Section 3 concludes by examining this proposed model within the actual context of human development, including the implications of this model for both individual behavior and the patterns of the social structure.

**Prosocial Development: A Summary**

The earliest scientific studies of prosocial development actually predated the term,
coming from the field of moral psychology. Piaget (1932/1965), and later Kohlberg (1969), saw moral reasoning as emerging in stages as sociocognitive development permitted more sophisticated perceptions of oneself and others. Hoffman (2000) fit this approach to the more contemporary concept of prosociality, proposing a model with four such stages: newborns, who are unable to conceptualize beyond the individual; toddlers, who can understand the needs of immediate others; children, who can think on behalf of someone who is not present; and adolescents, who are able to generalize their concerns to a more abstractly defined community. As cognition increases in complexity, other-oriented behavior develops in two ways: first, with greater understanding of the wants and needs of others, an individual can extend the intentions of her sentiments and actions to broader circles; second, with more self-awareness, the individual is able to internalize prosocial ideals and consciously incorporate them into daily life.

Over the course of the last decade, this line of research has been furthered by evolutionists, who have taken a distinctly experimental approach. A series of experiments by Warneken, Tomasello, and colleagues, for example, have compared the helping behaviors of infant children and young chimpanzees (Warneken, Hare, Melis, Hanus, and Tomasello, 2007; Warneken and Tomasello, 2006, 2007). This work has served two purposes. On the one hand, it validated previous models in showing that helping behavior emerges around 14 months of age, when toddlers are first able to conceive of the needs of others. It has also shown that young chimpanzees are inclined to help, but only when the need of the individual being assisted was made exceedingly clear. This has indicated an innate human tendency towards prosociality, bolstered by the sociocognitive complexity of its biology. Further, in keeping with Hoffman’s (2000) model, other work has found that young children (3 years) are less likely to help in anonymous situations than older children (8 years). This difference is no longer visible, however, if the children are face-to-face with the individual to be helped (see House et al., 2012), suggesting that young children cannot in fact conceptualize the needs of people who are not present.

Progressive models of this sort are species-specific, describing a single developmental blueprint that stands for all humans. On their own they say little about the role of inputs from the surrounding world. This latter question was not addressed in any real depth until the late ‘70s and ‘80s, when researchers like Nancy Eisenberg (e.g., Eisenberg-Berg, Cameron, Tryon, and Dodez, 1981) and others began to ask about the importance of external factors. Eisenberg, probably the most prominent researcher in this area, sought to modify Kohlberg’s cognitive developmental approach with insights drawn from Bandura’s (1985) social cognitive theory, which argued that social tendencies are shaped through social experience. Bandura argued that both elders and peers provide the “lessons” from which children learn their behavioral patterns. Their own actions are models to be imitated, and their reactions to the child can teach which behaviors are expected, and which are shunned. Children can also infer similar information by observing interactions between multiple others. As a child’s cognitive capacity for prosociality develops, these social inputs are critical to how the new abilities are implemented. This could include emphasizing certain forms of prosociality over others, or even one’s own characteristic level of prosociality.

This synthesis has inspired an extensive literature on the mechanisms by which
adults and peers in a child’s life can influence prosocial development. Before proceeding to this literature, however, it is important to note that this work makes fine distinctions between the various manifestations of prosociality, from empathy and sympathy, to moral reasoning, to different types of prosocial behaviors (e.g., caring, sharing, volunteering). For simplicity’s sake, the review here will refer to this work collectively, an approach that is validated by the fact that any single external factor is often associated with multiple such outcome measures (see Eisenberg et al., 2006 for a review). In addition, the literature is quite robust in some areas, with many studies replicating the same finding. For the sake of brevity, citations are limited to those articles that have been particularly influential, or reflect the current state of the field.

Much attention has been paid to the role of the parent-child relationship, with the most consistent finding being the value of a positive relationship between a child and her parents; whether measured as warmth, affection, connectedness, or otherwise, positivity predicts higher prosociality in youth (e.g., Bryant and Crockenberg, 1980; Carlo, McGinley, Hayes, and Martinez, 2012; Carlo, Mestre, Samper, Tur, and Armenta, 2011; Davidov and Grusec, 2006; Laible and Carlo, 2004). In one notable study, Knafo and Plomin (2006) investigated both environmental and genetic factors, and found that positivity in parenting predicted higher prosociality independent of genetic effects. This is important because without such evidence one might argue that parent positivity or warmth is itself a manifestation of prosociality, and that this could be passed on genetically rather than environmentally. Though only one study, the evidence here suggests it is the environmental effect that is predominant.

In addition to warmth, there are a number of other parenting techniques associated with prosocial development. Children tend to copy parents who model prosocial behavior for them, with examples including young children trying to assist in household chores (Rheingold, 1982) and adolescents adopting the volunteering habits of their parents (McLellan and Youniss, 2003). Children whose parents emphasize prosocial values also exhibit higher levels of prosociality (Hoffman, 1975; Pratt, Skoe, and Arnold, 2004), particularly when this emphasis is accompanied by social reinforcements, like praise and affirmation when the child behaves prosocially (Dunsmore, Bradburn, Costanzo, and Fredrickson, 2009; Hardy, Carlo, and Roesch, 2010). Work has also indicated that a parent’s approach to discipline plays an important role. Induction, for example, when parents guide a child’s behavior by reasoning through the consequences of a decision (Hoffman, 1970), is a particularly effective technique (e.g., Gustavo Carlo, Knight, McGinley, and Hayes, 2011; Laible, Eye, and Carlo, 2008). Hoffman (2000) argues that this is because inductions instill in children a sense of responsibility for the negative impacts that their lack of prosociality might have on others. Similarly, children tend to respond to parental directives and expectations for other- and group-oriented behavior (Hay and Murray, 1982; Janssens and Dekovic, 1997; Pratt et al., 2004). Experiments using one-time directives have even shown these effects to persist for days or weeks (e.g., Israel and Raskin, 1979).

Not all approaches to discipline are equal in these regards, however; when they take on a negative air they seem to have the unintentional effect of discouraging prosociality. For example, parental expectations lose their effectiveness if they are seen as being too
controlling (Eisenberg, Wolchik, Goldberg, and Ilene, 1992; Israel and Raskin, 1979). An even more common finding is that children whose parents are consistently punitive or authoritative are regularly found to have lower prosociality (Asbury, Dunn, Pike, and Plomin, 2003; Deater-Deckard et al., 2001; Dekovic and Janssens, 1992; Laible et al., 2008). Interestingly, a single punishment for a failure to act prosocially will redirect behavior in the given moment, but has no lasting effect once the threat of punishment is removed (Hartmann et al., 1976).

Socialization goes beyond the parent-child relationship, becoming a collaborative effort between parents, other family members, and even extrafamilial adults (Hrdy, 2011). A child passes through multiple ecologies in a single day, starting at home, traveling through the neighborhood, to school, and to home again, potentially with other stops along the way. Each of the social contexts that constitute this life will have its own effects on development (Bronfenbrenner, 1977), providing both influential individuals, as well as overall social patterns. Fittingly, research has demonstrated that siblings (e.g., Sawyer, Denham, Blair, and Levitas, 2002), peers (e.g., Fredricks and Eccles, 2005), teachers (e.g., Matsumura, Slater, and Crosson, 2008), and sports coaches (Rutten et al., 2011) can all influence a child’s inclination towards prosociality. Other studies have found contextual effects that cannot be easily traced back to specific relationships or adult figures. For example, a study on Indonesian Muslim adolescents found that those with greater religiosity exhibited higher levels of prosociality (Sallquist, Eisenberg, French, Purwono, and Suryant, 2010). Similarly, the work of Youniss and colleagues has shown how involvement in community activities during youth leads to more civic engagement and volunteering as an adult (see Youniss, McLellan, and Yates, 1997 for a review). Further, the overall social dynamics of a family (e.g., Romano, Tremblay, Boulerice, and Swisher, 2005), a neighborhood (e.g., O’Brien, Gallup, and Wilson, 2012), or a classroom (e.g., Matsumura et al., 2008) can also influence prosociality. Throughout this work, significant predictors of prosociality tend to parallel those in the parent-child literature, with factors like supportive relationships, consistent discipline, and modeling emerging as the responsible processes.

The common thread of social cognitive theory is readily apparent throughout this literature, as nearly every study articulates how the actions of adults and peers guide a youth’s social behavior. One will note, however, no mention of a subtheory that organizes these specific findings, or explains why they would contribute to the development of prosociality as opposed to any other social behavior. Without such a subtheory, there is also no basis for hypothesizing context-level factors (i.e., classroom social dynamics) that would encourage or discourage prosocial behavior, nor for interpreting those that emerge from exploratory research. That said, the comprehensive and robust literature that exists is fertile territory for developing and evaluating new models for the process of prosocial development. The remainder of the current manuscript takes up this task, following the argument that prosociality has a biological basis.

**A Model Based on Evolutionary Psychology**

The evidence summarized thus far speaks to the prominent role of socialization in
prosocial development. This is not to say, however, that children begin as empty vessels that are then filled with the social tendencies prescribed by others. As Warneken and Tomasello (2006) have argued, there is ample evidence that the emergence of prosociality during infancy indicates an innate predisposition towards such behavior, preceding the opportunity to learn social norms. This innateness would suggest the existence of a complex system that has evolved to modulate prosociality during development.

The expected structure of such a system was first forwarded by Belsky et al. (1991), who argued that development itself had been shaped by the forces of natural selection. They argued that humans are endowed with suites of psycho-biological mechanisms that aim to generate behavior that will be adaptive in the local environment. They do so by attending to those conditions that will determine the relative success of the different forms of a trait. This information is then translated into a phenotype that is most likely to be successful given the local context.

Humans are considered distinctive in the animal kingdom for having two different types of cognitive structures for using external factors to guide behavior. Like other species, we have domain-specific adaptations for modulating a single trait, or a few closely related traits (Gluckman and Hanson, 2005). These are interpretive mechanisms, and are oriented towards particular patterns in the local environment that are particularly informative regarding the costs and benefits for that trait. In addition, humans have a capacity for social learning and the adoption of cultural norms, something rare if not singular in the animal kingdom (Richerson and Boyd, 2004). During infancy, a set of sociocognitive mechanisms emerges that enables individuals to attend to and imitate the actions of others (Csibra and Gergely, 2011). In doing so, a child is copying habits that their conspecifics have found to be locally adaptive, as well as conforming to local social expectations.

Accounting for these two processes, one interpretive, the other imitative, the current section lays out the sets of social inputs that would be expected to influence prosociality. The first subsection uses research on the ultimate mechanisms that promote the evolution of prosociality to identify the environmental cues to which such a program should be sensitive. The second subsection then looks at the further contributions of social learning and culture.

**A domain-specific adaptation for prosocial development**

The evolution of prosociality is one of evolutionary biology’s oldest riddles, as it appears antithetical under traditional models of natural selection. Instead of helping an individual to outcompete his or her peers, prosocial actions have the immediate impact of benefitting others, typically at some cost to the actor. Prosociality, however, is still clear and present, and therefore has been successful via at least one mechanism. The consensus has been that benefits must accrue to the prosocial actor via the individuals or the group that he or she has helped, which might occur in a handful of ways. Individuals might exhibit prosociality only towards family members, thereby investing in those sharing some proportion of their genes (Hamilton, 1964a, 1964b), particularly those genes that are responsible for prosocial behavior itself. Individuals might establish prosocial relationships with others contingent on mutual reciprocity, benefiting each (Trivers, 1971). A more
sophisticated form of this is indirect reciprocity, wherein individuals express prosociality preferentially towards those known to be prosocial towards others (Nowak and Sigmund, 2005).

Moving beyond these dyadic models, there are benefits that might be derived from being a member of a group. Suppose that a set of individuals interacts with each other to the extent that they can impact each other’s fitness, what Wilson (1975) referred to as a “trait group.” The costs and benefits that accrue to the trait group as a unit are transmitted to the constituent members. For this to be net positive for a prosocial individual, there must be a certain proportion of group members also acting prosocially, thereby creating a substantial common good (e.g., Bowles and Gintis, 2004). The proportion necessary for this to be the case is dependent on the costs of prosocial behavior relative to the benefits gained by group membership.

A commonality across all of these scenarios is that the benefits accrued through prosocial behavior must be mediated in some way by the social context, specifically the prevalence of others who are prosocial. A prosocial individual surrounded by others with similar intentions can be successful, but surrounded by selfish individuals will have only costs and no benefits. That said, just because prosocial others can make prosociality a good strategy, they do not guarantee that prosociality will be the best strategy. Indeed, a selfish individual might benefit just that much more from the presence of many prosocial others, as they reap benefits without the offsetting costs. Punishment, however, provides a mechanism for eliminating such advantages, as gossip, reputation, and direct confrontation can create significant costs for selfishness. Such enforcement can make prosociality the most locally adaptive strategy, which presumably would be relevant to any program modulating prosocial development.

There are then two main conditions determining the success of prosociality: 1) the presence of prosocial others, and 2) negative consequences for selfishness. For the youth context, these might be translated as support and structure. Support speaks to the need for positive, supportive relationships with others, indicative of the local level of prosociality. Structure refers to expectations placed on an individual to act prosocially in certain social contexts. A psycho-biological adaptation for prosocial development would be most effective if attentive to the prevalence of each of these factors in the local environment.

Culture and the learning of prosocial norms

In a highly social species such as our own, youth can learn much about survival from other individuals, particularly those who are older or more accomplished than they. The has led to a sophisticated level of social learning in humans, one that Richerson and Boyd (2004) say underlies the societal-level patterns of culture. Indeed, the tendency to adopt the behaviors of others, or widespread cultural norms, plays a fundamental role in development, as indicated by the lasting-influence of Bandura’s (1985) work—a role that is so important that Nielsen (2012) has argued that the cognitive mechanisms that support social learning originally evolved to support development, and only later became common in adults.

Social learning is also believed to be critical in prosocial behavior, a consequence of aiding its evolution (e.g., Henrich, 2004; Richerson and Boyd, 2004). Propagating by the
transmission of ideas and practices from brain to brain, a cultural trait is able to proliferate through a population more quickly than a genetic trait. Like genetic traits, a cultural one might become more prevalent if it benefits those individuals who express it, and they then pass it on to their offspring. It can also be successful by facilitating its own transmission. One mechanism for doing so is conformity—once a trait has reached a certain prevalence, more people being to adopt it. This is particularly important in the current case because of the need prosocial individuals have for others with similar social habits. In addition, conformity can diminish the perceived temptation of selfishness, further stabilizing the continued presence of prosociality (Henrich and Boyd, 2001). Testing this concept in a seminal study, Henrich et al. (2004) recruited members of fifteen small-scale societies from across the world to participate in experimental economics games. They observed considerably more variation in tendencies to cooperate between societies than within them. Further, these cross-group differences were best explained by social factors, like market integration, rather than genetic similarities.

Parallel work in child development has uncovered similar results. Work by Madsen and colleagues in multiple countries found that children raised in urban settings were less prosocial and more competitive than those from rural areas (Graves and Graves, 1983; Madsen, 1967; Madsen and Yi, 1975). Whiting and Whiting (1975) compared children’s prosociality across six cultures, and found it to differ systematically across a handful of social dimensions, including living in extended families, less centralized government, and less specialized work. More recently, Carlo and colleagues (Carlo and Knight, 2008; Carlo, Knight, McGinley, and Hayes, 2011; Carlo et al., 2012) have been examining how patterns in personal relationships explain differences in adolescent prosociality between European and Mexican Americans. These various lines of evidence demonstrate that cultural factors are key in the development of prosociality, a relationship that is undergirded by the human tendency toward social learning.

**In summary: Two systems, three inputs**

To summarize, prosocial development is based on two sociocognitive systems that respond to three classes of input between them: a domain-specific developmental system that is sensitive to cues of support and structure; and the domain-general capacity for social learning that attends to the examples set by others (i.e., modeling) and plays a notable role in the development of prosociality. This structure is illustrated in Figure 1.

It is important to note that these two systems do not exist in isolation, but likely operate in concert. As culture and our capacity for social learning emerged during the last ~1-2 million years (based on Nielsen, 2012; Richerson and Boyd, 2004), a psychobiological system dedicated to the development of prosociality would have already existed. It could be argued that social learning then rendered the interpretive system obsolete, though this is something of a straw man. A more efficient solution, evolutionarily speaking, would be for the two to co-evolve, with social learning capitalizing on the preexisting systems intended for prosocial development, and these systems becoming sensitive to the inputs provided by social learning. This being the case, the depiction in Figure 1, which places these two systems as independently influencing development, is a bit reductionist. The larger point, however, is that this model articulates the three types of
inputs that we should expect to play the greatest role in prosocial development: support, structure, and modeling.

**Figure 1.** Illustration of the proposed model of the sociocognitive processes involved in prosocial development

![Diagram of the proposed model of the sociocognitive processes involved in prosocial development](image)

**Prosocial Development in Context: Implications and Hypotheses**

The current model organizes the factors and experiences that influence prosocial development according to the biological mechanisms that are responsible for processing them. In doing so, it also introduces the perspective that these mechanisms are adaptive in their function, having been structured by natural selection to generate levels of prosociality that are likely to succeed in the local environment. This holds implications for the development of the individual, as well as her intersection with the broader social context. The current section explores each of these. First, there is the need to evaluate the model’s claims about the way prosociality emerges through youth, and whether it is any more explanatory than existing perspectives. The second turns to the role of the social contexts that an individual’s life comprises (e.g., families, classrooms, neighborhoods), and the characteristics that determine their influence on prosociality—a question that has been explored by a number of authors in recent years (e.g., Romano et al., 2005), but without theoretical grounding.

**The individual**

A major distinction between this model of prosocial development and those popularized by social cognitive theory is the explicit reference to a biological basis that goes beyond the adoption of the norms that are taught and modeled by others. Testing this
assertion may be challenging, however. There is already considerable evidence that the elements that support, structure, and modeling comprise do influence prosociality, and they are often strongly correlated. Even if a simple comparison found that all three components independently contributed to prosociality, the interpretation would be ambiguous. A more definitive test will probably require a more complex study design that leverages other aspects of development.

One possibility might be to take a multilevel approach, distinguishing between the predominant group-level norms and the interpersonal experiences of specific individuals. Take, for example, work by O’Brien and colleagues (O’Brien and Kauffman, 2012; Wilson, O’Brien, and Sesma, 2009) comparing prosociality both within and between urban neighborhoods. They have found that average adolescent prosociality is higher in neighborhoods whose communities provide more support and structure, but that those who report stronger such relationships have higher prosociality than their neighbors. Similar work by Romano et al. (2005) found that family-level dynamics predict variations in prosociality, but that siblings differ based on the nature of their individual relationships with their mother. Neither of these studies gets specifically at the question here, but if such designs were utilized with carefully crafted measures of group-level norms—for example, what members of a family describe as the professed expectations surrounding prosociality—they might be able to tease apart imitative social learning from interpretive responses.

Another approach comes from Hoffman’s (2000) stages of prosocial development. With each stage, a child’s cognition gains a greater level of social complexity, presumably through biological processes, expanding from only being able to consider the self (infancy), to the ability to consider others (toddlers), to being able to consider those who are not present (childhood), to considering the abstract greater good (adolescence). The development of these cognitive capacities, however, does not guarantee that they will be used toward prosocial ends. For example, one can be aware of the needs of someone who is not present, but not be inclined to act on their behalf. Thus, a cognitive capacity might be described as having a level of prosocial orientation.

If the emergence of prosociality is embedded in these biological processes, then one might expect the experiences of a given stage to be instrumental in determining how the individual utilizes the cognitive capacity associated with it. For example, one might predict that individuals who experienced high amounts of support, structure, and modeling of prosocial behavior during early childhood would not just think about those who are not present, but be inclined to act on their behalf. The crucial test of this comes when the person is at a later stage in development. If social learning is sufficient to shift prosocial behavior writ large, then the ability to think about non-present others should be congruent with one’s social environment at that time. However, if this particular cognitive tendency continues to reflect the experiences of early childhood, then it seems that the biology of the individual has carried them across time.

**Prosociogenic contexts**

As discussed above, children are exposed to a diversity of social inputs. Infants and toddlers are raised primarily by their parents, but also by other trusted adults, and have
A model of prosocial development

formative relationships with siblings, and school-age children routinely move between home, school, neighborhood, and other activities, each one acting as a semi-bounded social context. This has led to a recent interest in the role these various social contexts play in prosocial development, with studies focusing on families (e.g., Romano et al., 2005), classrooms (e.g., Matsumura et al., 2008), religious groups (e.g., Sallquist et al., 2010), sports teams (e.g., Rutten et al., 2008), and neighborhoods (e.g., O’Brien and Kauffman, 2012). This literature has been largely exploratory, with little theoretical grounding for either predicting important factors, or interpreting those that emerge.

An instructive example comes from Romano et al. (2005), who measured prosociality in a sample that nested siblings within families, and families within neighborhoods. The intent of the study, as stated by the authors, was to “differentiate between effects associated with individual-level, family-level, and neighborhood-level variables...[and] to identify the independent contribution of selected variables between each level of analysis” (pp. 572, 574). Without a theoretical model there were no a priori hypotheses, and the significant findings were interpreted independently rather than part of a synthetic story about prosocial development.

The current model offers a potential remedy to such problems. It predicts that contexts that provide a child with support, structure, and models of prosocial behavior will encourage greater prosociality in children. This is similar to Biglan, Flay, Embry, and Sandler’s (2012) assertion that nurturing environments are vital to healthy physical, social, and cognitive development, though the focus here is solely on prosociality. In addition, if we consider nurturing to be equivalent to support, then this model is more specific as it includes the need for structure and differentiates between nurturing as a behavior directed towards a child from its role as a model to be imitated. Instead, the term prosociogenic might be more appropriate. The hope is that this model will give shape to existing findings, and will guide future research.

The concept of prosociogenic contexts might also be used to test the current model. If indeed prosocial development has evolved to be responsive to the sets of inputs that are proposed, then child-rearing practices have likely co-evolved to be oriented towards this reality. This gives rise to the hypothesis that practices that impart greater support (or structure or modeling) would cluster together as part of a coordinated strategy for child-rearing. For example, a parent who is affectionate toward a child would be more likely to be supportive of a child’s goals. Taking this logic a step further, it might be expected that support, structure, and modeling are also generally correlated across contexts, be they families, classrooms, or neighborhoods.

A particular way to explore this question revolves around discipline. Though punishment for a lack of prosociality seems to communicate an expectation for such behavior, it is not always as effective in encouraging an overall prosocial strategy. Though punitive threats might compel children to be prosocial in the moment, those same children

\[^{1}\text{It would be a stretch to say that any of these are fully independent of the others, as they are all embedded in the broader society, and are likely to not only share many of the same individuals and social norms, but also to intersect with each other in various ways.}\]
are less prosocial than their peers when the adult is not present (Asbury et al., 2003; e.g., Laible et al., 2008). Similarly, children are also less likely to respond to directives for prosociality if they perceive the request as overly controlling (Eisenberg et al., 1992; Israel and Raskin, 1979; Stewart and McBride-Chang, 2000).

Given this paradox, it is valuable to look at what punitive or anger-based discipline in fact communicates to a child. Although it does probably intimate some level of structure, it might also be perceived as an aggressive attack, diminishing the sense of support. This is often discussed in the literature as a deficiency in parenting or teaching, something that harms the child’s social development. However, the current perspective would suggest that it might be part of a coordinated process of child-rearing that also features little support or modeling of prosocial behavior. It may in fact be the disciplinary technique that most effectively endows the child with what would be the locally adaptive level of prosociality.

Conclusion

Evolutionary theory and models have done much to advance our understanding of prosocial behavior, including both hypothesizing and demonstrating a biological basis for its function. The present article has argued that this biological basis continues to be relevant throughout development, absorbing information from the local environment and translating it into locally adaptive levels of prosocial behavior. I have advocated here for a synthetic approach, one that acknowledges two different sociocognitive systems, and incorporates both social cognitive theory and models of the evolution of prosociality. The intent here was to present a theoretical perspective, and to suggest ways that research might proceed, but there are nontrivial implications for practice that deserve attention as well, albeit elsewhere. As others have recently argued, research on the evolved human psychology can often give rise to application (Kruger and Armenti, 2012; Roberts, van Vugt, and Dunbar, 2012), and it is my hope that the insights here, along with subsequent research, can lead to interventions and programs that more effectively promote prosociality during youth.

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