


Helping, Sharing, and Comforting in Young Children: Links to Individual Differences in Attachment

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Although attachment theory has long posited a link between early experiences of care and children's prosocial behavior, investigations of this association have not embraced the multifaceted nature of prosociality. This study is the first to assess associations between child attachment and independent observations of helping, sharing, and comforting. Attachment quality in 3- to 5-year-old children ($N = 137$) was linked to all three prosocial behaviors. Additionally, bifactor analyses revealed distinct associations between attachment and children's general prosocial dispositions and their specific abilities to meet the unique challenges of helping and, marginally, comforting. These findings underscore the importance of considering multiple explanations for links between attachment and prosocial behavior and provide novel insights into sources of variation in children's prosociality.

Prosocial behavior is a vital part of human group life. Acting to support others strengthens relationships and establishes a foundation for further cooperative activity. Even by early childhood, prosocial behavior is associated with less loneliness (Cassidy & Asher, 1992) and with improved friendship quality, peer acceptance, and school performance (Asher & McDonald, 2009; Ladd, Birch, & Buhs, 1999). Consequently, describing the individual differences associated with variation in children's prosocial tendencies is critical for understanding healthy development.

Attachment theory (Bowlby, 1969/1982) offers several mechanisms through which early experiences may influence prosocial development. Secure children have responsive caregivers who provide behavioral models of sensitive, effective care. These experiences guide the formation of scripts that specify the sequence that caregiving events typically follow: from the beginnings of an individual's negative state, through the compassionate response of a caregiver, to the resolution of the situation (Waters & Waters, 2006). These scripts become components of broader internal working models that incorporate positive views of others and of the self

as a valued and capable person (Bretherton, 1991). Moreover, confidence in the availability of a responsive care provider when distressed contributes to the emotion regulation skills often needed for prosocial behavior (Calkins & Leerkes, 2011; Cassidy, 1994). In contrast, insecure children are both deprived of security's benefits and may additionally face challenges specific to their particular type of insecurity; for instance, insecure-avoidant children may avoid the emotional closeness that prosocial behavior brings (Gross, Stern, Brett, & Cassidy, 2017), whereas insecure-disorganized children may be especially ill-prepared to handle a stressful situation (Lyons-Ruth & Jacobvitz, 2016). Thus, compared to children with insecure attachments, secure children should be better equipped with the confidence and motivation to provide care to others and are more likely to have the competence to do so effectively (Gross et al., 2017; Shaver, Mikulincer, Gross, Stern, & Cassidy, 2016; Stern & Cassidy, 2017).

Research investigating associations between attachment and prosociality has often supported the predictions made by attachment theory. In an early study, a secure attachment during infancy was predictive of 3.5-year-old children's observed sympathy toward peer distress in a preschool setting (Waters, Wippman, & Sroufe, 1979). Subsequent work has reported positive associations

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between attachment security and empathic concern and prosocial behavior in infants and toddlers (e.g., Panfile & Laible, 2012), and observed (e.g., Kestenbaum, Farber, & Sroufe, 1989; Paulus, Becker, Scheub, & König, 2015), mother-reported (Laible, 2006), and teacher-reported (Sroufe, 1983) prosociality in preschoolers. However, several other studies have found either no association between attachment and prosocial behavior (e.g., Volling & Belsky, 1992) or mixed results (van der Mark, van IJzendoorn, & Bakermans-Kranenburg, 2002). Overall, these findings suggest that a link exists between attachment and prosociality, but they also hint at undocumented complexities to this association.

Researchers focusing on prosocial behavior now offer a more nuanced view of prosocial development. Prosociality is not a unitary construct; rather, there are several distinct ways of supporting another person in need (e.g., Dunfield, 2014; Eisenberg & Spinrad, 2014; Hay & Cook, 2007; Warneken & Tomasello, 2009). For instance, *helping* is a response to an individual's instrumental need to complete a goal-directed action, *sharing* is a response to an individual's material desire, and *comforting* is a response to an individual's emotional distress (Dunfield, 2014). Current research indicates that helping, sharing, and comforting draw upon at least partially distinct cognitive and social processes (Svetlova, Nichols, & Brownell, 2010). They have divergent normative trajectories (Dunfield, Kuhlmeier, O'Connell, & Kelley, 2011; Eisenberg, 2005; Grusec, 1991; Yarrow et al., 1976), with helping typically appearing during the second year of life, comforting at approximately 2–3 years, and sharing emerging along an even more protracted developmental sequence (Dunfield & Kuhlmeier, 2013). These forms of prosocial behavior can be uncorrelated within individual children (Dunfield & Kuhlmeier, 2013; Eisenberg et al., 1999), and they are associated with different patterns of neural activity (Paulus, Kühn-Popp, Licata, Sodian, & Meinhardt, 2012) and parenting antecedents (Brownell, Svetlova, Anderson, Nichols, & Drummond, 2013; Pettygrove, Hammond, Karahuta, Waugh, & Brownell, 2013; Rehberg & Richman, 1989). Consequently, descriptions of early prosocial development will be most accurate if they distinguish among the diverse forms that supportive behavior may take (Padilla-Walker & Carlo, 2014).

Yet no study has separately examined associations between children's attachment and multiple forms of prosocial behavior. A common approach has been to employ composite measures of prosociality that collapse across distinct behaviors or

assess only general conceptualizations of prosociality (e.g., Radke-Yarrow, Zahn-Waxler, Richardson, Susman, & Martinez, 1994; Seibert & Kerns, 2015). Other studies have investigated associations between attachment and a single type of prosocial behavior; however, all but one of these have focused on comforting (e.g., Kestenbaum et al., 1989), perhaps reflecting attachment theory's emphasis on children's experiences when emotionally distressed (Bowlby, 1969/1982). The one exception examined children's sharing (but only during experimenter-requested decisions concerning two forced-choice options; Paulus et al., 2015), and none has examined instrumental helping. An additional measurement decision may further obscure distinctions between forms of prosocial behavior: Many of the studies described above rely on adult reports of children's behavioral tendencies. Such judgments may be influenced by an informant's overall expectations or impressions of a child, resulting in less measurement specificity for each form of prosocial behavior than impartial, observational approaches would provide.

These limitations significantly constrain our understanding of the association between attachment and prosociality. First, it remains unclear if attachment relates equally to all types of prosocial behavior or to some types more than others. Whereas some of the potential mediating mechanisms between attachment and prosociality may impact all varieties of prosocial behavior (e.g., a general view of others as valued and worthy of support), others may be more need specific. For instance, scripts provided by a caregiver's models of effective comforting of emotional distress would not sufficiently explain a link between security and instrumental helping. Determining specific associations between attachment and distinct prosocial behaviors would contribute to theory building about the range of mechanisms needed to explain attachment–prosociality associations. Second, greater recognition of the diversity of prosocial behaviors may help to clarify inconsistencies across previous investigations of attachment and early prosociality. For instance, if not all forms of prosocial behavior are associated with attachment, then inferences drawn from composite scores will be highly influenced by the idiosyncratic makeup of the composite measures.

This Study

We investigated concurrent associations between preschoolers' attachment quality and multiple,

independent observations of their helping, sharing, and comforting behaviors. The study was conducted with a large sample of preschoolers enrolled in urban Head Start programs; this low-income, largely African American population is critically underrepresented in research on children's prosocial development.

Given prior research, we predicted a positive link between attachment security and comforting. It is possible that the associations sometimes found between attachment and composite prosociality measures derive mainly from children's comforting. However, a number of the mechanisms described earlier may also support links between attachment and helping or sharing (e.g., having positive views of others and the self, or having parents who model these behaviors). Thus, our primary goal was to test the hypothesis that attachment is also associated with children's spontaneous helping and sharing behaviors, as attachment theory predicts. Our analyses centered upon continuous measures of security and avoidance (with predicted positive and negative associations with prosocial behavior, respectively). However, we also analyzed differences in prosocial responding across secure, insecure-avoidant, insecure-resistant, and insecure-disorganized classifications to improve understanding of less frequently occurring subtypes and their links with prosocial behavior. In all analyses, we also explored the potential moderating role of sex; although attachment theory does not anticipate sex differences in how security may relate to prosociality, boys and girls do sometimes show different levels of prosocial behavior (e.g., Fabes & Eisenberg, 1998).

A second goal hinged on the outcome of these initial analyses. If attachment is associated with more than one variety of prosocial behavior, then a natural question is whether these multiple associations occur through common or distinct underlying mechanisms. Thus, we also conducted a bifactor analysis to examine whether attachment is associated with either a general prosocial disposition or distinct factors underlying children's tendencies to produce different forms of prosocial behavior.

Method

Participants

Participants were 137 three- to five-year-old children ($M = 4.32$ years; $SD = 0.50$; 79 female; 91 African American), recruited from four Head Start centers in low-income Baltimore neighborhoods as

part of a randomized controlled trial (RCT) of an attachment-based parenting intervention (Cassidy et al., 2017). Participation was restricted to children and their mothers, who were also required to be the primary caregiver and to live with the child. Seventy-three children were in the intervention treatment group. The Supporting Information provides more detail on the RCT. The target sample size was based on the sample size needed for the larger RCT from which participants were taken. With this sample size, G*Power version 3.1.7 (Faul, Erdfelder, Lang, & Buchner, 2007) estimates that a general linear model reflecting our primary analytic strategy (i.e., attachment score and sex as predictors and prosocial behavior as outcome), and which assumes a medium effect size ($f^2 = .15$), would have power = .99 to detect the effect associated with one of the predictors ($\alpha = .05$). Data were collected between September 2013 and May 2015.

Study Design and Procedure

Both the attachment and prosocial behavior assessments were conducted in a single 90-min session, located at a research building near the Head Start centers. Sessions began with an observational assessment of the child's attachment. Following this, the mother exited the room, and the child and a female experimenter played a series of games, interspersed with additional tasks. Approximately 10 min into playing, the experimenter began to incorporate events featuring opportunities for the child to act prosocially. Summary details for the attachment assessment and individual prosocial tasks are available in Supporting Information. See <https://osf.io/vxedb/> for the complete procedures and coding manual for the battery of prosocial tasks.

Attachment

Children's attachment was measured using the 20-min Preschool Strange Situation procedure (PSS; Cassidy, Marvin, & the MacArthur Attachment Working Group, 1992). Children's responses to two separations from and reunions with the mother were video recorded for behavioral coding (see below for details).

Prosocial Behavior

Children were randomly assigned to one of two task sequences that intermingled multiple opportunities for helping, sharing, and comforting. Helping

and comforting opportunities occurred after the child began an independently engaging activity, whereas sharing opportunities occurred during the distribution of items to the child and experimenter.

The experimenter's emotionality varied across task types: helping tasks involved almost no emotion (e.g., only mild frustration), sharing tasks involved a moderate amount (e.g., sighing and mild sadness), and comforting tasks involved a considerable amount (e.g., moaning with clear distress). During each task, the experimenter progressed from nonverbal expressions through increasingly more direct statements about her negative state. The overall durations of each task type varied, based on prior research and expectations for preschoolers' responses (Dunfield & Kuhlmeier, 2013). Regardless of the child's response, the experimenter returned to a positive-neutral baseline mood after each task concluded, announcing that the problem was resolved.

Helping. Three tasks measured helping behavior (30 s each). In each, the experimenter attempted an action (e.g., hanging a poster) but circumstances prevented her from completing it (e.g., tape dropping beyond reach). This created an opportunity for children to help the experimenter complete her goal (e.g., by handing her the tape).

Sharing. Three tasks measured sharing behavior (45 s each). In each, the experimenter first gave the child a set of desirable items (e.g., four cookies) and then discovered that her own allotment of similar items was unavailable (e.g., the cookie box was empty). This created an opportunity for children to share some of the items they had received.

Comforting. Three tasks measured comforting behavior (2 min each). In each, the experimenter became distressed after accidentally damaging a possession (e.g., spilling water on her drawing) or hurting herself (i.e., bumping a knee). This created an opportunity for children to alleviate her negative emotions through words or actions.

Coding

Attachment

The main analyses centered upon two continuous scores reflecting attachment security (range = 1–9) and avoidance (range = 1–7), computed from children's behavior during the PSS (Cassidy et al., 1992). There is extensive evidence that the established coding system for the PSS has good psychometric properties (Solomon & George, 2016). High security scores are given when children engage in warm, intimate reunions with the parent, as

manifested either by affectionate physical proximity and/or contact, or through eager, responsive, continuing conversation, whereas low security scores are given for a variety of insecure behaviors, as described below. High scores on the avoidance scale are given to children who limit physical or psychological closeness with the mother, although in a neutral and nonconfrontational manner. Because the PSS coding system does not produce continuous scores for types of insecure attachment that occur less frequently than avoidance, it is important to keep in mind that a low security score does not necessarily indicate high avoidance.

Children were also classified into one of five groups: *secure*, *insecure-avoidant*, *insecure-ambivalent*, *insecure-disorganized*, or *insecure-other*. Children classified as *secure* engage in warm, intimate interactions as described above; children classified as *insecure-avoidant* limit proximity and interaction and show neutral, nonconfrontational behavior; children classified as *insecure-ambivalent* show immature behavior and ambivalence about proximity-seeking; and *insecure-disorganized* children control the interaction or show behaviors common to disorganized infants (e.g., freezing, fear expressions). *Insecure-other* children show a mixture of insecure behaviors; following typical practices, these children were combined with the disorganized group to form a single group lacking an organized attachment strategy (Main, 1990); hereafter, we refer to this combined group as *insecure-disorganized*.

Coding was conducted by a team blind to additional information about the parent and child. Twenty-six percent of cases were double coded, with high agreement for both the continuous ($ICC_{\text{Security}} = .89$, $ICC_{\text{Avoidance}} = .96$, $ps < .001$) and categorical (Cohen's $\kappa = .79$, $p < .001$) scores. Conferencing resolved disagreements.

Prosocial Behavior

Trained coders scored children's prosocial behavior during each helping, sharing, or comforting opportunity. Scores reflect both how quickly the child provided the supportive response and the quality or successful completion of this behavior. On the basis of prior research (e.g., Edwards et al., 2015), we anticipated that supportive responses could include both direct physical behaviors and various indirect responses, such as offers to help, suggestions for what to do, verbal soothing, or other prosocial commentary. Consequently, the rubric for each task identified different levels of supportiveness for both verbal and nonverbal response (see

Dunfield & Kuhlmeier, 2013, for similar considerations). Following prior research (e.g., Beier, Terrizzi, Woodward, & Larson, 2017; Svetlova et al., 2010), we also incorporated the speed of responses into children's prosocial scores to capture the full variation in strength of children's prosocial behavior. Latencies may reflect children's eagerness to act prosocially or the extent to which they required the experimenter's increasingly clear explanations before formulating and executing a response.

At least two coders reviewed 37% of helping and sharing and 71% of comforting tasks. Comforting tasks were assigned more often to multiple coders because we anticipated comforting responses would be more complex; whereas helping and sharing behaviors were specific concrete actions, comforting could appear in many forms, with varying degrees of effectiveness. Coders were blind to additional information about the participants, and they resolved disagreements by conferencing.

Helping. Scores reflect the speed and presence of helping behavior (range = 1–6). Children who helped received scores of 5 or greater. Children who did not physically help but offered verbal solutions or other acknowledgments of the problem received scores from 2 to 4. Children who did not help or comment supportively received a score of 1. Reliability between coders for the three helping scores was high ($.93 < \text{Krippendorff's } \alpha_s < .99$).

Sharing. Scores reflect the speed and amount of sharing (range = 1–7). Children who shared received scores of 5 or greater. Children who made comments or gestures indicating willingness to share, without physically transferring the item, received scores from 2 to 4. Those who did not share or acknowledge the problem received a 1. Reliability was high (all $\alpha_s = .98$).

Comforting. Scores reflect the speed, variety, quality, and persistence of comforting behavior (range = 1–5). Comforting behaviors included physical and verbal attempts to soothe the experimenter's emotions (e.g., hugs, pats, or comments intended to make her feel better) and to alleviate the cause of her negative state directly (e.g., applying an imaginary Band-Aid or suggesting what she might do to feel better). Children received a score of 5 if they offered physical soothing (e.g., a hug) or one of several predefined combinations of rapid responses, diverse strategies, and persistent attempts to comfort; less effective or engaged responses received lower scores. Children who scored a 1 showed little or no sign of concern following the initial incident and offered only minimal, half-hearted support at most. Reliability was high ($.81 < \alpha_s < .94$).

Final prosocial behavior scores. Global helping, sharing, and comforting scores were calculated as the means of the three task scores for each task type. These were the main units of analysis for the assessment of children's prosocial behaviors. If a single task could not be completed (1.3% of total tasks), global scores were calculated from the means of the remaining tasks of that type.

A prosocial composite score was also created from the mean of the three global scores. This composite score was intended to resemble earlier examinations of the association between attachment and prosociality that did not distinguish among types of prosociality. Given the differences in scales, each global score was standardized before averaging.

Results

Preliminary Analyses

Because skewness statistics for helping (-1.45) and sharing ($-.94$) scores were at or near the conservative cutoff of ± 1.0 recommended by Bulmer (1979), we reversed the scale and applied a natural-log transformation to these variables; for interpretability, we describe results according to the original scale direction. Additionally, the prosocial composite score was calculated over untransformed global scores for all three types of prosocial behavior, reflecting the historical approach of assessing a single prosocial outcome. Correlations among prosocial behavior scores are reported in Supporting Information.

Although children's enrollment in Head Start ensured that they had family incomes near or below federal poverty guidelines (Maryland Head Start, n.d.), there can nonetheless be substantial variation in resource access among Head Start families. We were unable to request mothers' income levels directly, but we did collect information on maternal education levels, which have been used as a proxy for socioeconomic status (SES; e.g., Hauser, 1994). We thus examined associations between maternal education and each attachment and prosocial behavior variable. No correlations were significant.

Children in the RCT's intervention treatment and control groups did not differ in age, security, or avoidance, $t(135)s < 1$, $ps > .596$, and these groups did not earn significantly different helping, sharing, comforting, or prosocial composite scores, $t(135) < 1.07$, $ps > .288$. Preliminary versions of the tests of associations between attachment and the prosocial composite, helping, sharing, and comforting scores, conducted with intervention status as a

moderator, revealed no main effects of intervention status and no more interaction effects involving intervention status than would be expected by chance (see Supporting Information for details). Intervention status was not considered further.

Given extensive prior research on age and sex differences in prosocial behavior (e.g., Fabes & Eisenberg, 1998), we examined child age and sex as potential covariates. Age was not a significant predictor and did not change the overall pattern of results when it was included. However, child sex was a significant predictor in many models. Tests of associations between attachment quality and the prosocial composite or individual prosocial behaviors thus included child sex, but not age, as a covariate.

Descriptive statistics for main study variables are reported by child sex in Table 1. Boys were significantly more secure than girls ($p < .05$); although this pattern in PSS responses has been documented previously (e.g., Campbell et al., 2004), sometimes the reverse is true (e.g., Barnett, Kidwell, & Leung, 1998), and often there is no difference between boys and girls (e.g., Moss, Bureau, Cyr, & Dubois-Comtois, 2006). Girls had marginally higher prosocial composite and comforting scores ($ps = .11$). Frequencies for categorical attachment classifications were consistent with prior work and are provided in Supporting Information.

Associations Between Attachment and Prosocial Behavior

Analytic Strategy

We first investigated associations between the attachment variables and the prosocial composite

score. Because many earlier studies utilized similar composite scores, this approach provides an opportunity to replicate the previously documented attachment–prosociality link using a gold-standard attachment assessment and task-based observations of prosocial behavior. Furthermore, because our lower-SES population is underrepresented in this area of research, conducting analyses similar to earlier reports can reveal whether earlier findings generalize to other sociocultural contexts.

Next, we investigated associations between the attachment variables and separate scores for children’s helping, sharing, and comforting behaviors. In addition to providing an opportunity to replicate prior reports of an attachment–comforting link, this step addresses our primary research question: Are the qualities of children’s attachments associated with their helping and sharing behaviors?

We examined these relations between attachment and prosocial behavior through a series of analysis of covariance (ANCOVA) models, each with an attachment variable entered as the predictor, a prosocial behavior score as the outcome, and sex as the sole covariate. Child sex was included as a potential moderator; however, the interaction term was dropped where it was nonsignificant to maximize model parsimony. For the two instances in which removing sex as a moderator influenced the significance of results for attachment effects, we report both versions below. Continuous security and avoidance scores were centered.

For each prosocial behavior score, we first present results with the continuous attachment predictors—the more powerful approach—and then discuss the four-way attachment classification to provide additional information. We also conducted analyses with two dichotomous predictors, secure

Table 1
Descriptive Statistics for Attachment Dimensions and Prosocial Behavior Scores by Child Sex

	Girls (N = 79)			Boys (N = 58)		
	M	SD	95% CI	M	SD	95% CI
Attachment (continuous scores)						
Security	4.65*	1.73	[4.26, 5.04]	5.46*	1.56	[5.05, 5.87]
Avoidance	2.66	1.62	[2.30, 3.03]	2.45	1.33	[2.10, 2.80]
Prosocial behavior						
Prosocial composite	0.09	0.69	[−0.06, 0.25]	−0.12	0.84	[−0.34, 0.10]
Helping	5.01	0.94	[4.80, 5.22]	4.72	1.27	[4.38, 5.05]
Sharing	5.35	1.53	[5.01, 5.69]	5.21	1.80	[4.73, 5.68]
Comforting	2.66	1.05	[2.43, 2.90]	2.35	1.13	[2.05, 2.65]

Note. Prosocial composite is the mean of standardized helping, sharing, and comforting global scores. Individual prosocial behavior scores are presented as untransformed values (helping and sharing were natural-log transformed for main analyses). Sex differences: * $p < .05$.

versus insecure and organized versus disorganized attachment. Because they largely showed the same pattern of findings as the main attachment predictors, we provide these results in Supporting Information.

Links With the Composite Prosocial Behavior Score

Children’s attachment security positively predicted composite prosociality scores, controlling for child sex, $F(1, 133) = 13.32, p < .001, \eta_p^2 = .091, 95\% \text{ CI } [0.019, 0.191]$, a medium effect size. There was a main effect of child sex, with girls showing greater prosocial behavior than boys. There was also a significant Sex \times Attachment Security interaction, $F(1, 133) = 4.27, p = .041, \eta_p^2 = .031, 95\% \text{ CI } [0, 0.108]$, reflecting a positive association between attachment security and prosocial behavior for boys, $F(1, 56) = 11.46, r = .41, p = .001, \eta_p^2 = .170, 95\% \text{ CI } [0.029, 0.337]$, but not for girls, $F(1, 77) = 1.87, r = .15, p = .176, \eta_p^2 = .024, 95\% \text{ CI } [0, 0.123]$.

In the model with attachment avoidance, there was a marginal negative relation between avoidance and prosocial behavior, $F(1, 134) = 3.33, p = .070, \eta_p^2 = .024, 95\% \text{ CI } [0, 0.096]$, a small effect size. This main effect becomes significant if sex is included as a moderator in the ANCOVA, $F(1, 133) = 5.57, p = .020, \eta_p^2 = .040, 95\% \text{ CI } [0.001, 0.122]$. The main effect of child sex was also marginal in this model, with girls showing a trend toward greater prosocial behavior than boys. The Attachment Avoidance \times Sex interaction was not significant.

Furthermore, children’s overall prosocial behavior differed by their four-way attachment classification. Specifically, secure children were more prosocial than disorganized children, $M_{\text{diff}} = 0.51, SE = .17, 95\% \text{ CI } [0.06, 0.95]$, Bonferroni-corrected $p = .016$. No other between-group differences were significant.

Links With Individual Prosocial Behavior Scores

Complete statistics for tests of association between attachment and helping, sharing, and comforting are reported in Table 2. Here we summarize the significant effects found for each model.

Helping. Children’s attachment security positively predicted helping behavior, controlling for child sex, $F(1, 133) = 5.52, p = .020, \eta_p^2 = .040, 95\% \text{ CI } [0.001, 0.122]$, a medium effect size. There was a marginal main effect of sex, with girls showing a trend toward greater helping behavior than boys. There was also a significant Sex \times Attachment Security interaction, reflecting a positive association

Table 2
Analysis of Covariance Models of Child Attachment Predicting Individual Prosocial Behaviors

	Helping				Sharing				Comforting						
	df	F	p	η_p^2	95% CI	df	F	p	η_p^2	95% CI	df	F	p	η_p^2	95% CI
Attachment security	1, 133	5.52	.020	.040	[0.001, 0.122]	1, 134	4.98	.027	.036	[0, 0.115]	1, 134	9.00	.003	.063	[0.007, 0.155]
Attachment security	1, 133	3.44	.066	.025	[0, 0.098]	1, 134	0.36	> .250	.003	[0, 0.045]	1, 134	5.54	.020	.040	[0.001, 0.121]
Child sex	1, 133	5.31	.023	.038	[0, 0.120]		Removed from model					Removed from model			
Sex \times Attachment Security															
Attachment avoidance	1, 133	2.21	.140	.016	[0, 0.081]	1, 134	0.46	> .250	.003	[0, 0.048]	1, 134	4.99	.027	.036	[0, 0.115]
Attachment avoidance	1, 133	1.93	.167	.014	[0, 0.077]	1, 134	0.02	> .250	< .001	[0, 0.005]	1, 134	3.35	.070	.024	[0, 0.096]
Child sex	1, 133	8.84	.004	.062	[0.007, 0.154]		Removed from model					Removed from model			
Sex \times Attachment Avoidance															
Four-way attachment classification	3, 132	1.76	.158	.039	[0.006, 0.025]	3, 132	2.86	.039	.061	[0, 0.137]	3, 132	3.01	.033	.064	[0, 0.141]
Attachment classification	1, 132	2.04	.155	.015	[0.008, 0.030]	1, 132	0.21	> .250	.002	[0, 0.041]	1, 132	5.07	.026	.037	[0, 0.118]
Child sex															
Sex \times Attachment Classification															

Note. Helping and sharing scores are natural log-transformed.

between attachment security and helping for boys, $F(1, 56) = 7.52$, $r = .34$, $p = .008$, $\eta_p^2 = .118$, 95% CI [0.008, 0.281], but not girls, $F(1, 77) = .002$, $r < .01$, $p > .250$, $\eta_p^2 < .001$, 95% CI [0, 0.001].

In the model with attachment avoidance, there were no main effects of avoidance or sex on helping; however, the Sex \times Attachment Avoidance interaction was significant, $F(1, 133) = 8.84$, $p = .004$, $\eta_p^2 = .062$, 95% CI [0.007, 0.154]. A significant negative relation between attachment avoidance and helping behavior was evident for boys, $F(1, 56) = 6.32$, $r = -.32$, $p = .015$, $\eta_p^2 = .101$, 95% CI [0.004, 0.262], but not for girls, $F(1, 77) = 1.92$, $r = .16$, $p = .170$, $\eta_p^2 = .024$, 95% CI [0, 0.125].

Children's four-way attachment classification did not significantly predict helping behavior.

Sharing. Children's attachment security positively predicted sharing behavior, controlling for child sex, $F(1, 134) = 4.98$, $p = .027$, $\eta_p^2 = .036$, 95% CI [0, 0.115], a medium effect size. There was no main effect of sex and no significant interaction.

The model with attachment avoidance revealed no main effects of avoidance or sex on sharing behavior and no significant interaction.

In line with the security results, children's four-way attachment classification significantly predicted sharing behavior. When sex is included as a moderator in the analysis of variance, the main effect of attachment classification decreases to marginal significance, $F(3, 132) = 2.64$, $p = .052$, $\eta_p^2 = .058$, 95% CI [0, 0.131]. Secure children attained higher sharing scores than disorganized children, $M_{diff} = 0.38$, $SE = .13$, 95% CI [0.03, 0.73], Bonferroni-corrected $p = .029$. No other between-group differences were significant.

Comforting. Children's attachment security positively predicted their comforting behavior, controlling for sex, $F(1, 134) = 9.00$, $p = .003$, $\eta_p^2 = .063$, 95% CI [0.007, 0.155], a medium effect size. There was a main effect of child sex, such that girls showed greater comforting behavior than boys. The Sex \times Attachment Security interaction was not significant.

Children's attachment avoidance negatively predicted comforting behavior, $F(1, 134) = 4.99$, $p = .027$, $\eta_p^2 = .036$, 95% CI [0, 0.115], a medium effect size. The marginal main effect of sex also indicated that girls showed a trend toward greater comforting behavior than boys. The Sex \times Attachment Avoidance interaction was not significant.

Children's four-way attachment classification also significantly predicted comforting behavior, $F(3, 132) = 3.01$, $p = .033$, $\eta_p^2 = .064$, 95% CI [0, 0.141]; however, Bonferroni-corrected post hoc tests

did not find any significant between-group comparisons (without the Bonferroni correction, secure children had higher comforting scores than disorganized children).

Associations Between Attachment and the Bifactor Structure of Prosocial Behavior

Analytic Strategy

Because attachment was associated with more than one variety of prosocial behavior, we next considered whether these multiple associations likely occurred through common or distinct underlying mechanisms. This analysis proceeded in two steps.

The first step was to determine whether children's responses across all nine prosocial behavior tasks support a view of prosocial behavior as a multifaceted construct, with distinct helping, sharing, and comforting components. A confirmatory bifactor analysis examined the extent to which covariance in children's prosocial behaviors could be explained by a general prosocial factor, as well as by specific factors reflecting the unique features of helping, sharing, and comforting. This type of factor analysis permits individual task scores to load on both the general factor and their associated specific factor, while keeping the general factor uncorrelated with the specific factors and the specific factors uncorrelated with each other (Chen, Hayes, Carver, Laurenceau, & Zhang, 2012; Reise, 2012). Finding support for the specific helping, sharing, or comforting factors would confirm that these task groupings reflect sources of common variance in children's overall responses that are not accounted for by a general prosocial disposition.

For the second step, we assessed relations between attachment and the latent variables confirmed by the preceding bifactor analysis. This approach provides insight into whether child attachment relates to an overarching prosocial disposition, specific facets of prosocial behavior, or both. An association between attachment and a need-specific factor would reflect the involvement of mechanisms influencing how children meet the unique challenges of that specific prosocial behavior, above and beyond their general prosocial tendencies.

For each of the two continuous attachment scores, we tested a model treating attachment as a predictor of the confirmed prosocial behavior factors. These models also included sex and its interaction with attachment as predictors of the prosocial

behavior factors. In the final versions of the models, we removed all interaction terms that did not achieve statistical significance.

Confirmatory Bifactor Analysis of Prosocial Behavior

For this analysis, we used maximum likelihood estimation and set factor variance for both the general factor and each specific factor to 1. Scores for one helping task (“out-of-reach object”) were log-transformed, as the skewness statistic for this task was extreme (-2.69); scores for the remaining tasks were not transformed. Because scores for the three types of prosocial behavior had different ranges, we report standardized factor loadings. The analysis was conducted using Mplus software version 7.3 (Muthén & Muthén, 1998–2014).

The factor loadings are presented in Table 3. Overall, the bifactor structure provided a good fit to the prosocial behavior scores, $\chi^2(18, N = 137) = 32.42$, comparative fit index = .952, standardized root mean squared residual = .050, root mean square error of approximation = .076 (90% CI [0.030, 0.118]). All prosocial tasks loaded onto the general factor ($ps < .005$). Two of the three helping tasks also loaded onto the specific helping factor ($ps = .016$ and $.041$), and the third helping task loaded marginally ($p = .055$). All three comforting tasks loaded strongly on the specific comforting factor ($ps < .001$). However, the specific sharing factor did not emerge as a source of shared variance in performance on the sharing tasks ($ps > .40$). This pattern of loadings indicates that children’s performance on sharing tasks is largely explained by the general factor, whereas their performance on helping and comforting tasks is best explained by a combination of the general factor and their respective specific factors.

Links With the Confirmed Bifactor Structure

We next assessed relations between attachment and the latent variables confirmed by the preceding bifactor analysis: the general prosocial factor, and the specific helping and comforting factors. Security was associated with both the general factor and specific helping factor, and marginally with the specific comforting factor. Avoidance was associated with the specific helping factor and, marginally, with the specific comforting factor. Table 4 reports full results for each model. As the association in both models between attachment and the specific helping factor was qualified by a significant interaction between attachment and sex, we also ran separate versions for each sex. The link

between security and the specific helping factor was present for boys ($\beta = .489, p = .002$) but not girls ($\beta = -.202, p = .390$). Similarly, the link between avoidance and the specific helping factor was present for boys ($\beta = -.451, p = .006$) but not girls ($\beta = .021, p = .898$).

Discussion

For decades, research on prosocial development has typically treated prosociality as a unitary phenomenon. However, recent theoretical advances and empirical work reveal that much insight can be gained from separately investigating the different ways that children support other people (e.g., Padilla-Walker & Carlo, 2014). Helping, sharing, and comforting each follow unique developmental pathways, draw upon different cognitive and motivational factors, and have distinct neural underpinnings (Dunfield, 2014). The present work contributes to this new approach by separately examining, for the first time, the links between children’s attachment quality and their helping, sharing, and comforting behaviors.

Confirming our predictions and previous research, there was a robust association between attachment and comforting. Moving beyond prior work, we show here that security is also positively associated with children’s spontaneous helping and sharing behaviors. Thus, the connection between attachment and prosociality is not based solely upon secure children’s management of others’ emotional distress. Secure children are also more responsive to others’ instrumental needs and material desires.

Understanding the Attachment–Prosociality Association

Having now established that attachment is linked to several distinct varieties of prosocial behavior, questions about the nature of these associations arise. Attachment theory offers many potential mechanisms through which children’s experiences of receiving care may contribute to the development of their prosocial behaviors (Gross et al., 2017). Some mechanisms are likely to impact all types of prosocial behavior in similar ways. As an example, secure children’s positive views of others and of the self may contribute to a general prosocial disposition by enhancing overall concern for others and confidence in one’s own abilities to meet others’ needs. Other mechanisms may influence some varieties of prosocial behavior more than others. To illustrate, secure

Table 3
Factor Loadings of the Bifactor Model of Children's Prosocial Behaviors

Prosocial task	General and specific factors							
	General		Helping		Sharing		Comforting	
	Estimate	<i>p</i>	Estimate	<i>p</i>	Estimate	<i>p</i>	Estimate	<i>p</i>
Out-of-reach object	.396	< .001	.543	.016				
Opening door	.336	.005	.382	.041				
Spilled marbles	.368	< .001	.273	.055				
Cookies	.714	< .001			.177	.402		
Stickers	.707	< .001			.375	.713		
Balloons	.773	< .001			-.199	.829		
Ruined drawing	.507	< .001					.510	< .001
Hurt knee	.351	< .001					.599	< .001
Broken phone	.382	< .001					.698	< .001

Note. Standardized factor loadings reported. Loadings in bold are significant at $p < .05$.

Table 4
Links Between Attachment and the General and Specific Factors of Prosocial Behavior

Model	Predictor	General and specific factors					
		General		Helping		Comforting	
		β	<i>p</i>	β	<i>p</i>	β	<i>p</i>
1. Attachment security	Attachment security	.236	.021	.651	.007	.195	.086
	Child sex	.116	.269	.234	.081	.204	.063
	Sex \times Attachment Security	Removed from model		-.656	.003	Removed from model	
2. Attachment avoidance	Attachment avoidance	-.073	.518	-.759	.003	-.218	.063
	Child sex	.073	.492	.202	.137	.166	.130
	Sex \times Attachment Avoidance	Removed from model		.780	.003	Removed from model	

Note. Coefficients in bold are significant at $p < .05$. The sharing factor is not included because it was not supported by the confirmatory bifactor analysis (see Table 3).

children's experiences of receiving care when distressed may provide situation-specific scripts that prove most applicable when children encounter others with similar needs; moreover, the advanced emotion regulation skills of secure children would be most useful when encountering others whose needs are themselves distressing. Additionally, other factors outside of the direct effects of security may contribute to associations between attachment and either some or all varieties of prosocial behavior. For instance, parents who establish secure bonds with their children through responsive comforting may also provide models of reliable helping or sharing. Last, genetic factors (Knafo, Israel, & Ebstein, 2011) and bidirectional influences between parenting and prosocial behavior (Newton, Laible, Carlo, Steele, & McGinley, 2014) may be involved.

Yet there is little direct empirical evidence for mediation of the attachment-prosociality link in early childhood by any particular mechanism. Although this study was not designed to test hypotheses about specific mechanisms, our results offer novel insight into the range of mechanisms that may be involved, in four key ways. First, the associations found between attachment and helping and sharing behaviors indicate that the mechanisms linking attachment and prosociality are not limited to those that would impact comforting alone. Because the preponderance of prior work was focused on children's responses to others' emotional distress, previous empirical results are consistent with the possibility that attachment's influence on prosocial behavior is restricted to mechanisms that specifically promote comforting behavior. However, helping and sharing involve little to no emotional

distress, and effective helping and sharing responses bear little resemblance to scripts derived from children's receipt of sensitive comforting. Thus, the present findings require the involvement of additional mechanisms—ones that either impact prosociality in a general fashion or that specifically support children's helping and sharing behaviors.

Second, our bifactor analyses reveal links between attachment and both a general prosocial disposition and specific factors relating to distinct prosocial behaviors. The association between security and the general prosocial factor suggests that attachment's influence on prosociality involves a common mechanism (or constellation of co-occurring mechanisms) influencing multiple facets of prosocial behavior—including helping, sharing, and comforting. The link between security and the specific helping factor suggests that attachment also influences helping in ways that go beyond this general prosocial disposition. A similar account may explain the marginally significant link between security and the specific comforting factor. Together, these results provide evidence that the association between attachment and prosociality springs both from mechanisms that influence children's general prosocial dispositions and those that help them meet the unique challenges of helping and comforting. They also highlight the need for future research to explore mechanisms specific to the links between attachment and helping (e.g., security promotes a sense of self-efficacy, which may be particularly influential for children's ability and willingness to help others achieve a goal) and between attachment and comforting (e.g., a secure base script may uniquely support comforting, as it is derived from what happens when children themselves become distressed).

Third, comparison of findings using the security scale with those using the avoidance scale lends additional empirical support to the proposal that multiple mechanisms link attachment and prosociality. At the behavioral level, security was associated with greater helping, sharing, and comforting, with similar effect sizes for each relation. In contrast, avoidance was principally associated with reduced comforting but was unrelated to sharing. At the factor level, security was associated significantly with both a general prosocial factor and a specific helping factor, and marginally with a specific comforting factor. Although avoidance had similar associations with the specific factors as security, it was unrelated to the general factor. These dissociations between security and avoidance are consistent with how these two attachment classifications

are interrelated: Just as avoidance is but one of several forms of insecurity, it appears that the links between avoidance and prosociality comprise a subset of the links between security and prosociality. It will be important for future research to continue to distinguish between the consequences of being more or less secure and those of being more or less avoidant; moreover, examining other forms of attachment insecurity, such as insecure-ambivalence or disorganization, may reveal additional means by which early attachment influences different facets of prosocial development.

Fourth, child sex moderated the association between attachment and helping: Only boys helped more with increasing security, and only boys helped less with increasing avoidance. These interaction effects likely arise from the lack of measurement variability in girls' helping scores; however, the fact that girls' scores were near ceiling makes it difficult to know if there is indeed a difference in how attachment relates to helping in boys and girls or if the difference we observed is a byproduct of our chosen study procedures. It is possible that a more challenging helping task would produce greater variability among girls' helping scores, thereby revealing an association with attachment. Alternatively, however, divergent influences of the same parenting practices on boys' and girls' prosociality have been documented elsewhere (Hastings, McShane, Parker, & Ladha, 2007). Similar considerations also limit interpretation of the fact that sex-by-attachment interactions were specific to helping. With scores well below ceiling levels, links from sharing and comforting to girls' attachment were evident. However, there may also be differences in how girls and boys experience others' instrumental needs that would enhance the relevance of attachment style to helping in boys more than girls; for instance, if girls receive more external, social pressures to be helpful, it is possible that they in turn view it as a normal, expected behavior, rather than as a way to increase interpersonal closeness (as boys may). In particular, given increasing recognition of the roles of culture and biology on development (e.g., Bornstein, Leventhal, & Lerner, 2015), it would be informative for future investigations to explore how gendered cultural norms or biological differences may explain the interactions observed here.

Drawing these insights together, one way to view the overall pattern of findings is that the positive features of being secure often promote prosocial responses in ways that apply similarly to helping, sharing, and comforting opportunities,

whereas avoidance limits some prosocial responses more than others. For instance, secure children's positive views of others and themselves, including a value that people are worthy of care, may enhance prosocial motivations across helping, sharing, and comforting opportunities. Moreover, parents of secure children may be more likely to provide effective models of diverse prosocial behaviors, and secure children may be more receptive to the socialization efforts of their parents. In contrast, children high on avoidance may struggle in ways linked more specifically to particular types of prosocial behavior. For instance, avoidant children may be particularly affected by highly emotional situations, such as when others are hurt or very sad and require comforting, leading them to turn away from these upsetting situations. Yet difficulty with the emotional distress of others is likely not the only reason for reduced prosociality among avoidant children. Although the experimenter in this study exhibited only mild frustration when she needed help with a physical goal, avoidant boys were still less likely to help her. Perhaps they wished to help, but were uncomfortable with the interpersonal closeness that it would bring. If this finding is replicated in future research, it will be important to further consider what it is about a person needing help that leads avoidant boys to act less prosocially.

We offer these proposals as suggestions for new research directions that may prove fruitful, but it is important to note that other accounts are possible. Future research should directly investigate potential mediators of the links between different dimensions of attachment, a general prosocial disposition, and distinct varieties of prosocial behavior (e.g., differences in reasoning about goals vs. emotions; Dunfield & Johnson, 2015).

On the Multifaceted Nature of Prosocial Behavior

This study was motivated by the insight that prosocial behavior is a multifaceted phenomenon. As reviewed earlier, there is now extensive evidence supporting this view. Yet there are also stable individual differences in children's general prosocial dispositions, particularly as they age and become more skilled at meeting the basic demands of prosocial tasks (Knafo-Noam, Uzefovsky, Israel, Davidov, & Zahn-Waxler, 2015). Moreover, some socialization practices affect multiple varieties of prosocial behavior; for instance, the extent to which parents talk about emotions is linked to both helping and sharing in toddlers (Brownell et al., 2013).

Observations that children who are prosocial in one respect may be prosocial in other ways are separate from the claim that each form of prosocial behavior draws on partially distinct cognitive and social skills. However, empirical reports do not often treat these two perspectives as complimentary.

Our bifactor analysis found support for both perspectives. We confirmed a model in which the combination of a general factor and specific helping and comforting factors accounted for children's responses across all prosocial tasks. The general factor may be viewed as reflecting an overall prosocial disposition; this factor also helps to explain why there were small to moderate correlations among the different prosocial behavior scores. In contrast, the specific helping and comforting factors likely relate to the cognitive abilities, social skills, and motivations unique to their respective varieties of prosocial behavior. Although bifactor models are increasingly employed in other fields (Reise, 2012), this study is the first to use this technique to investigate the latent structure of prosociality in young children.

Interestingly, no specific sharing factor was confirmed, indicating that the three sharing tasks did not have common variance apart from what the general factor could explain. This was surprising because only sharing tasks require children to give up their own valuable resources, a requirement that draws directly on their abilities to suppress egoistic motives and exert behavioral control (Steinbeis & Over, 2017). Reviewing the demands of each of our prosocial tasks, multiple accounts for the lack of a specific sharing factor are possible. For instance, as both the helping and comforting tasks required children to disengage from an exciting play activity, perhaps behavioral control is among the processes contributing to the general prosocial factor. Additionally, the physical requirements of sharing actions are often simpler than helping or comforting actions, further reducing the potential sources of sharing-specific covariance. However, these considerations raise a broader reminder that should continue to guide future research: The latent structure best capturing performance on a set of prosocial opportunities will depend upon the particular behaviors required by each task. For this study, we chose to measure children's responses across multiple naturalistic instances of each variety of prosocial opportunity, where different instances often required very different actions (e.g., helping tasks involved picking up an out-of-reach object, opening a closed door, and collecting a set of spilled items; Warneken & Tomasello, 2009). Other research

approaches have instead standardized the action requirements of different varieties of prosocial behavior as much as possible (e.g., handing over a single object may count as helping, sharing, or comforting, depending on the context; Svetlova et al., 2010). Furthermore, parent-report measures that distinguish between distinct forms of children's prosocial behavior (e.g., Torrén & Kärtner, 2017) provide a valuable complement to laboratory-based tasks, as they reflect many observations across an even wider range of real-world situations and supportive behaviors. It will be important for future research to see how variation in the measures used to assess children's prosociality influences what latent factor structures emerge, thereby providing a richer view of their general and need-specific components.

Overall, insights from the bifactor analysis converge nicely with findings from a recent report that took a different approach to investigate the structure of children's prosocial behavior (Newton, Thompson, & Goodman, 2016). In a person-centered analysis of 18-month-old toddlers' helping and sharing behaviors, researchers found evidence for multiple latent groups. Some children displayed consistently low or moderate amounts of prosocial behavior across all task types; however, one group showed frequent helping and only moderate sharing. The overall consistency of individual differences in toddlers' responses pointed to a general prosocial orientation, perhaps related to the general prosocial factor confirmed in the present analyses. However, it is notable that one group of toddlers stood apart in their instrumental helping behavior. Social-cognitive processes associated with our specific helping factor may account for this group's superior helping. Support for this proposal comes from an additional result by Newton et al. (2016): Scores for maternal sensitivity also distinguished their "frequent helping" group from the other groups. Because sensitive maternal responding is consistently correlated with attachment security (Fearon & Belsky, 2016), this observation complements the present finding that attachment predicts our specific helping factor.

Regarding the Specificity and Generalizability of Findings

Our participants were drawn from a population frequently underrepresented in studies of social-cognitive development (i.e., lower-SES, mostly non-White). This population is at risk for socio-emotional problems and other adverse outcomes

(McLoyd, 1990). Because research describing positive development in high-risk groups is particularly lacking (Swanson et al., 2003), the present focus on prosocial development in our sample is worthwhile in its own right. Moreover, prosocial behavior has been proposed as a protective factor against the development of antisocial behavior in adolescence (Carlo et al., 2014). Consequently, the present investigation of associations between attachment and prosocial behavior may inform strategies to support the healthy development of children in disadvantaged communities.

Because our participants are largely neglected in research on early prosociality, this study is also an opportunity to assess the generalizability of prior results on this topic. This is a critical step in building valid developmental theories (Nielsen, Haun, Kärtner, & Legare, 2017). We found evidence for two broad patterns that have been documented previously. First, children's attachment security was associated, as it has been in most previous research, with a composite measure of their prosocial behavior (e.g., Radke-Yarrow et al., 1994). Second, in line with a meta-analysis by Fabes and Eisenberg (1998), girls were more prosocial than boys overall; this effect, however, reached significance only when controlling for attachment security. Despite confirming that these two findings common in previous research also hold with the children in our sample, we cannot also assume that such would be the case in all other sociocultural contexts. Moreover, although we have no specific reason to expect associations between attachment and different facets of prosocial behavior to function differently in different groups, it will be important for future research to make these comparisons directly.

It is also an open question whether the present findings would generalize to children of different ages. Although child age did not moderate any of the effects we report, our range of 3–5 years is a relatively small developmental window during a period of major social-cognitive change. Younger children might have more difficulty recognizing the experimenter's material desires; if so, a bifactor analysis including data from younger children might reveal a specific sharing factor capturing this behavior-specific challenge. Additionally, links between attachment and different forms of prosocial behavior may vary over time, as children's abilities mature or additional mechanisms supplement those underlying the associations reported here. Research examining concurrent links between attachment and prosocial behavior in infancy would be a particularly valuable complement to the

present findings with preschoolers. To attain a more complete developmental picture, we encourage researchers to examine the present findings in both younger and older children.

Conclusion

This study illuminates the range of general and need-specific ways in which attachment relates to prosocial behavior. Contrary to traditional emphasis, the attachment–prosociality association is not limited to mechanisms involved in handling emotional distress. In addition, in the first study to employ a bifactor model to investigate the latent structure of prosociality in young children, we have documented attachment’s links to both a general prosocial disposition and specific factors capturing the unique challenges of helping and comforting. This will provide a critical guide for future research, encouraging investigators to seek multiple mechanisms of association. These conclusions provide novel insight into the sources of individual variation in children’s prosociality, contributing to our understanding of both early prosocial behavior and attachment. More generally, this work demonstrates how recognizing the multifaceted nature of prosociality contributes to more accurate models of social development.

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Supporting Information

Additional supporting information may be found online in the Supporting Information section at the end of the article:

Table S1. Frequencies of Attachment Classifications, Security Status, and Disorganization by Child

Table S2. Correlations of Prosocial Behavior Scores ($N = 137$)

Table S3. ANCOVA Models of Child Security Status and Disorganization Predicting Prosocial Behavior

Appendix S1. Method and Results

Appendix S2. Preschool Strange Situation Protocol