



Prosocial pathways to positive adaptation: The mediating role of teacher-child closeness

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ABSTRACT

Despite robust evidence that prosocial behavior is associated with positive adaptation and likely engenders it, few studies have evaluated mechanisms that may account for these effects. The current study utilized a diverse sample of young children ($N = 228$, 49.6% female, 45.6% Latinx) to evaluate prospective relations between an observational assessment of children's prosocial sharing behavior at age 6 and children's depressive symptoms and academic achievement at age 8 via intervening teacher reports of a close relationship with the child. The findings supported a significant indirect pathway from prosocial sharing to fewer depressive symptoms and higher academic achievement via the closeness of children's relationship with their primary school teacher. Potential explanations for these findings and their implications for intervention are discussed.

Introduction

Prosocial behaviors are broadly defined as actions intended to benefit another person (Batson & Powell, 2003). Although a growing body of research has sought to identify antecedents of prosociality in adults (McNeely & Meglino, 1994; Piff, Kraus, Cote, Cheng, & Keltner, 2010) and, more recently, in children (Anderson et al., 2010; Hay & Pawlby, 2003; Padilla-Walker & Christensen, 2011), fewer studies have examined the adaptive significance of such behaviors. Some cross-sectional evidence suggests that prosocial behaviors, such as helping or caring for peers, are associated with positive adjustment indicators, such as lower levels of aggression and higher levels of perspective taking ability (Carlo, 2006; Carlo, Hausmann, Christiansen, & Randall, 2003; Nantel-Vivier, Pihl, Cote, & Tremblay, 2014). Likewise, a few longitudinal studies indicate that prosocial behaviors may contribute to later social competence (e.g., socially appropriate behaviors, peer reputation; Chang, 2003; Crick, 1996; Eisenberg et al., 1996). However, less is known about the relation between prosocial behavior and non-social domains of adaptation in childhood, and still fewer studies have evaluated mechanisms that may underlie relations between prosociality and positive developmental outcomes.

The current study sought to fill several gaps in our understanding of whether and how young children's prosocial behavior may influence later adjustment by evaluating a mediation model whereby children's prosocial expressions were expected to predict fewer depressive symptoms and higher academic achievement via the closeness of

children's relationships with their primary school teachers. First, relative to the abundance of studies documenting positive associations between children's prosocial behavior and social competence (e.g., Chang, 2003; Laible, McGinley, Carlo, Augustine, & Murphy, 2014), fewer investigations have examined prospective associations between prosocial behavior and non-social domains of adjustment. Therefore, this study sought to expand our understanding of the adaptive significance of children's prosocial behavior beyond the social domain by evaluating prospective relations with children's depressive symptomatology and academic achievement. Second, very few studies to date have examined potential mechanisms by which prosociality may contribute to positive outcomes (e.g., Laible et al., 2014; Wentzel, 1993). Thus, this investigation contributed new information regarding the role of closeness within the teacher-student relationship as a putative mediator of predicted relations between children's prosocial behavior and later adjustment. By testing the role of teacher-child relationship closeness as a modifiable mediator of positive child development, this investigation sought to inform school-based prevention and intervention efforts. Third, prior studies have favored self- or informant-reports of prosocial behavior using cross-sectional designs in predominantly White European American middle-class samples. In contrast, the current investigation drew on multiple methods, including direct observations of children's prosocial behavior, and informants to evaluate the hypothesized model using longitudinal data drawn from a large and diverse community sample. Moreover, we explored the invariance of predicted pathways across child gender, child race/ethnicity, and

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family socioeconomic status (SES), to yield generalizable findings regarding predicted relations among prosocial behavior, teacher-child closeness, and child adaptation.

Prosocial behavior and child adjustment

A number of studies demonstrate strong and consistent associations between children's prosocial behavior and a range of adaptive outcomes, particularly social competence (Eisenberg, Fabes, & Spinrad, 2006). For example, Crick (1996) found that sixth graders who were nominated as prosocial by their peers (e.g., "kids who say or do nice things for others") reported higher levels of perceived social support six months later relative to sixth graders who received fewer prosocial behavior nominations. Moreover, children who received fewer prosocial behavior nominations endorsed higher levels of social rejection at follow-up than their more prosocial peers. At younger ages, preschoolers whom teachers rated as engaging in prosocial acts evidenced more stable and supportive friendships in later development than their less prosocial peers (Fabes, Hanish, Martin, Moss, & Reesing, 2012; Sebanc, 2003). Importantly, prosocial behavior also evidences negative relations with problematic social outcomes. For example, in a longitudinal study of elementary school children, Griese and Buhs (2014) found that peer-reported prosocial behavior was related to less self-reported loneliness concurrently, as well as to less peer victimization and more peer social support one year later.

Although less often studied, some data suggest that prosocial behavior may be related to outcomes beyond the social domain in childhood and adolescence, including depressive symptomatology and academic achievement. However, specific relations between prosocial behavior and nonsocial adjustment outcomes remain unclear. For example, some studies have documented negative relations between prosocial behavior and depression (e.g., X. Chen, Li, Li, Li, & Liu, 2000; Wentzel & McNamara, 1999), but others have shown that depressive symptomatology and prosocial behavior are positively correlated (Wentzel, Filisetti, & Looney, 2007). Mirroring these mixed findings, Nantel-Vivier et al. (2014) found that children who evidenced low levels of prosocial behavior from ages 2 to 11 reported both the lowest and highest rates of depression across time. These findings suggest that relations between prosocial behavior and depressive symptomatology are complex. On the one hand prosocial behavior may eventuate in greater in depressive symptomatology, perhaps due to excessive concern for the well-being of others at the expense of one's own well-being (Keenan & Hipwell, 2005; O'Connor, Berry, Lewis, Mulherin, & Crisostomo, 2007). On the other hand, a prosocial orientation may eventuate in fewer depressive symptoms, perhaps due to the positive impact of prosociality on one's social standing and available support (e.g., Crick, 1996; Fabes et al., 2012). This study evaluated the latter hypothesis wherein we predicted that prosocial behavior would be negatively related to depressive symptoms as a result of the positive influence of prosocial behavior on the child's social surroundings.

Relative to research on prosocial behavior and psychopathology, relations between prosocial behavior and academic outcomes are consistently positive. Among adolescents, for example, volunteerism is positively correlated with youths' reports of school achievement (Switzer, Simmons, Dew, Regalski, & Wang, 1995). Likewise, in a longitudinal study from sixth to twelfth grade, Chen et al. (2002) found that peer nominations of prosociality in sixth grade were positively associated with youths' educational attainment in twelfth grade. Studies with school-aged samples demonstrate similarly positive relations of prosocial behavior with both grade point average and standardized test scores (Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000; Gerbino et al., 2017; Wentzel, 1993). The current study extended prior findings earlier in development by evaluating the hypothesis that a laboratory-administered observational measure of prosocial sharing behavior at age 6 would be positively associated with gains in children's academic achievement at age 8.

Mediators of prosocial effects

Despite evidence that prosocial behaviors, at least as assessed via peer nominations, are related to positive adjustment outcomes in a variety of domains within and beyond the interpersonal sphere, few studies have examined the mechanisms underlying these relations. Although an early investigation of middle schoolers by Wentzel (1993) evaluated relations among prosocial behavior, positive attitudes toward school, and academic achievement, the cross-sectional design of this study limited its capacity to evaluate mediation. To our knowledge, only one study has explicitly evaluated an explanatory model of prosocial behavior effects over time. In a large sample of seventh graders, Laible et al. (2014) found that a) children's benign attributions (i.e., giving others the benefit of the doubt in an ambiguous situation) engendered prosocial behavior as assessed via teacher and parent reports of children's social behaviors, and b) children's prosocial behavior predicted their application of benign attributions in future social exchanges.

Data suggesting that prosocial effects may follow from mutually reinforcing associations between prosocial behavior and adaptive social information processing (e.g., Laible et al., 2014), are consistent with prior assertions that relational mechanisms may account for the adaptive implications of prosocial behavior. For example, Caprara et al. (2000) suggested that positive associations between children's prosocial behavior and academic success reflect the creation of a positive and supportive school environment by prosocial children. In addition to robust relations between prosocial behavior and peer competence (e.g., Crick, 1996; Fabes et al., 2012; Sebanc, 2003), some evidence suggests that teachers are more likely to endorse a close relationship with prosocial children, and view them more favorably (Birch & Ladd, 1998; Caprara et al., 2000). Moreover, the quality of children's relationships with their teachers is a well-established (and potentially modifiable) influence on children's socioemotional and academic adjustment (Birch & Ladd, 1997; Hamre & Pianta, 2001; Pianta & Stuhman, 2004). Thus, we sought to extend these findings to evaluate a mediation model wherein we hypothesized that teacher-reports of closeness within the teacher-student relationship would account for significant variance in the predicted relations of prosocial behavior with decreases in children's depressive symptomatology and increases in their academic achievement.

Moderators of prosocial effects

Efforts to elucidate specific contexts across which the expression, impact, or explanation of prosocial behavior may vary are important to refine applied theory and practice. However, it is equally essential to explain the rationale for considering specific moderators to mitigate the risk of inadvertently reifying deficit models of diversity (Coll et al., 1996). This study capitalized on a large and diverse sample of young children to explore empirically- and theoretically-supported moderators of children's prosocial behaviors and their effects. Specifically, we evaluated child gender, child race/ethnicity, and family SES as potential qualifiers of the predicted relations among children's prosocial behavior, teacher-child closeness, and later adjustment.

Investigations documenting higher rates of prosocial behavior among females (Hastings, Utendale, & Sullivan, 2007; Veenstra et al., 2008) have not always replicated (McMahon, Wernsman, & Parnes, 2006), with comparable rates across genders found most often in studies using observational measures of prosocial behavior (e.g., Brownell, Iesue, Nichols, & Svetlova, 2013; Rose & Rudolph, 2006; Warneken & Tomasello, 2007). However, other data suggest that the developmental correlates of prosocial behavior may vary by gender. For example, prosocial behavior seems to be more strongly associated with peer status among girls than among boys (Crick, 1996; Zimmer-Gembeck, 2005). Likewise, some data suggest that teachers feel closer to their female than male students (Saft & Pianta, 2001), and other evidence

indicates the impact of this relationship varies in salience for girls versus boys across contexts (Ewing & Taylor, 2009). Given the mixed data regarding child gender effects, we explored the role of gender as a potential moderator of pathways among prosocial behavior, teacher-child closeness, and later adjustment in the proposed model.

With regard to race/ethnicity, prior work has documented cultural differences in the expression of prosocial behavior (Trommsdorff, Friedlmeier, & Mayer, 2007). In particular, the emphasis on family solidarity and interdependence in Latin cultures may promote children's understanding and implementation of prosocial action (Armenta, Knight, Carlo, & Jacobson, 2011; Carlo, Koller, & Eisenberg, 1998). For example, in a study of prosocial resource allocation, Brazilian children were more likely to prefer cooperative (i.e., altruistic or equal) allocation options than their European-American counterparts (Carlo, Roesch, Knight, & Koller, 2001). Beyond mean differences, researchers have not yet examined whether the adaptive implications of these behaviors vary across cultures or racial/ethnic groups. Given the value attached to prosocial and community-oriented behavior in Latin cultures (Armenta et al., 2011; Carlo et al., 1998; Carlo et al., 2001), prosocial expressions, or their absence, may be strongly related to adaptive outcomes. Alternatively, these cultural values may render prosocial expressions an expected aspect of behavior among Latinx children, such that they may be less noteworthy and thus less strongly related to teachers' feelings about Latinx children. Relatedly, some data suggest that children's race/ethnicity is related to teacher reports of their relationship quality (Saft & Pianta, 2001), and the meaning of the teacher-child relationship may vary across racial/ethnic groups (Miyong & Neuharth-Pritchett, 2011). Given the cultural embeddedness of prosocial behavior, as well as the necessity to evaluate proposed models of development within and across racial/ethnic groups (Coll et al., 1996), we explored child race/ethnicity as a moderator of the proposed explanatory model.

Studies examining rates of prosocial behavior across various economic groups have yielded mixed results. Some data suggest children from families of higher SES engage in more prosocial donating behavior (Benenson, Pascoe, & Radmore, 2007), but other data indicate that children from families of lower SES engage in more donation behavior (Chen, Zhu, & Chen, 2013). There is greater consistency across studies showing that adversity, including economic disadvantage, may magnify the impact of prosociality (or its absence) on child adjustment. For example, Flouri and Sarmadi (2016) found that deficits in prosocial behaviors, which were broadly defined as cooperation, caring, and empathy, were related to more problem behaviors in school, and the magnitude of this relation was greatest for children who lived in low-income neighborhoods and/or attended low-performing schools. At the same time, the protective influence of a positive relationship with a supportive adult, such as a close relationship with a teacher, may be magnified among high-risk populations, including those facing socioeconomic instability (Rhodes, Ebert, & Fischer, 1992; Zimmerman, Bingenheimer, & Notaro, 2002). Thus, we hypothesized that relations among prosocial sharing behavior, teacher-child closeness, and children's socioemotional and academic adjustment would be especially robust among children with relatively low family SES.

The current study

Although a large body of evidence suggests that prosocial behavior is associated with positive adaptation and likely engenders it, few studies have evaluated mechanisms that may underlie these effects. Moreover, to our knowledge, no study has evaluated prospective relations between an observational measure of children's prosocial behavior and independent assessments of later adjustment. Given prior evidence that prosocial behavior engenders positive teacher-child relationships (Birch & Ladd, 1998), and additional studies implicating the role of the teacher-child relationships in children's internalizing symptomatology (Baker, Grant, & Morlock, 2008) and academic achievement (Pianta &

Stuhlman, 2004), we hypothesized that observations of young children's prosocial sharing behavior in the laboratory would be negatively related to depressive symptoms and positively related to academic achievement two years later. Moreover, we predicted that these relations would be mediated, in part, by an indirect pathway through which prosocial children would be viewed as more desirable and relatable by teachers, and teacher reports of closeness would, in turn, be negatively related to children's later endorsement of depressive symptoms and positively related to academic achievement. Finally, in addition to adopting a longitudinal, multi-method design, we capitalized on our large and diverse community sample to evaluate the proposed model across groups defined by child gender, child race/ethnicity, and family SES.

Method

Participants

The current sample was drawn from an ongoing study of development among 250 caregiver-child dyads. Participants in these analyses ($N = 228$; 49.6% female) completed a laboratory assessment at age 6 ($N = 215$; $M_{\text{age}} = 73.30$ months, $SD = 2.51$) and/or age 8 ($N = 214$; $M_{\text{age}} = 97.58$ months, $SD = 3.18$). The children were diverse with regards to race/ethnicity (11.4% White, 18.4% Black, 45.6% Hispanic/Latinx, 0.4% Asian, 24.6% multiracial) and representative of the southern California community from which they were drawn (U.S. Census Bureau, 2011). At age 6, participating caregivers were biological mothers (91.6%), female extended kin (5.6%), or foster/adoptive mothers (2.8%). The average family SES score, based on the Hollingshead (1975) Four-Factor Index of Social Status, was 33.08 ($SD = 12.31$), which corresponds to semi-skilled employment (e.g., sales clerk). Children who completed assessments at both ages 6 and 8 ($n = 197$; 86.4%) did not differ from those who completed just one assessment ($n = 31$; 13.6%) with regards to child gender, race/ethnicity, and family SES.

Procedure

Caregivers were recruited to participate in a longitudinal study of children's early learning and development via flyers placed in community-based preschool programs and child development centers. Exclusionary criteria included children with diagnosed developmental disabilities or delays, children outside the recruitment age range of 45–54 months, and children who were unable to understand English. At each data wave, dyads completed a three-hour laboratory assessment that consisted of measures with the child, the caregiver, the caregiver and child interacting, and school-based data collection via mailed surveys to the child's primary teacher. Teacher questionnaires were sent a minimum of one month following the child's entry into the classroom to ensure the teacher had sufficient time to become familiar with the child. Caregivers were compensated with \$25/h of assessment, children received a small gift each visit, and teachers were compensated with a \$20 gift card upon return of the questionnaire packet. At each visit, informed consent and assent were obtained from the child's legal guardian and the child, respectively. All procedures were approved by the human research review board of the participating university.

Measures

Prosocial behavior

At age 6, children completed an adaptation of O'Connor, Dollinger, Kennedy, and Pelletier-Smetko's (1979) snack sharing task. About 90 min into the visit, the examiner mentioned that s/he was hungry and asked if the child would like a snack. Children were given three snack choices, each consisting of approximately the same number of smaller

pieces (i.e., Goldfish™, Teddy Grahams™, fruit snacks). After the child selected their preferred snack, the examiner said, “*Oh, those are my favorite too. I think I’ll have that too!*” The examiner then left to retrieve the snacks, and returned with only one saying “*I sure am hungry, but there was only one snack left. It’s okay. You can have it.*” If the child shared their snack with the examiner, the examiner dropped the piece they were given and said “*Oh, no! I dropped it!*” They then threw their piece in the trash.

Sharing behaviors were rated on a 7-point scale with the highest score of 6 assigned to children who shared the snack spontaneously with the examiner within 20 s of distribution (5.5%) and subsequently shared another piece after the examiner dropped hers, a score of 5 to children who spontaneously shared once but not after the examiner dropped hers (4.1%), a score of 4 to those who shared within 20 s of the examiner’s inquiry “*Is it good?*” and again after the examiner dropped hers (2.8%), a score of 3 to those who shared after the examiner’s inquiry “*Is it good?*” but not after she dropped hers (1.4%), a score of 2 to children who shared within 20 s of the examiner’s direct request to try one of the snacks and after she dropped hers (45%), a score of 1 to children who shared within 20 s of the examiner’s direct request to try one of the snacks but not after she dropped hers (34.4%), and a score of 0 reserved for children who did not share at all (2.8%).

Teacher-child closeness

Following the age 6 visit, the children’s teachers completed the short form of the Student Teacher Relationship Scale (STRS; Pianta, 2001) via a mailed survey. Teachers indicated how much they agreed with 10 statements pertaining to the closeness of the teacher-child relationship (e.g., “This child openly shares his/her experiences with me”) on a 5-point likert scale from definitely applies (5) to definitely does not apply (1). The STRS has been widely used to assess the quality of teacher-child relationships and evidences strong validity and reliability in diverse populations, including in the current sample ($\alpha = 0.80$; Decker, Dona, & Christenson, 2007; Gregoriadis & Tsigilis, 2008).

Depressive symptoms

At age 6, caregivers completed the Child Behavior Checklist (CBCL; Achenbach, 1994), which is a standardized form for rating behavior and affect in children aged 6 to 18. The primary caregiver rated the child on 125 items using a 3-point scale from not at all true (0), to somewhat or sometimes true (1), to very true or often true (2). The CBCL was validated in a diverse sample of clinically referred and non-referred children from varied ethnic groups. Caregiver reports of broadband internalizing symptoms at age 6 were included as a covariate in analyses predicting children’s depressive symptoms at age 8.

At age 8, children completed select subscales of the age 8–11 version of the Behavior Assessment System for Children-Second Edition (BASC-2; Reynolds & Kamphaus, 2004) Self-Report of Personality (SRP). The BASC-2 is a well-validated measure of psychological functioning in diverse populations (McGill et al., 2014). Children reported on their depressive symptomatology across 9 true/false items (e.g., “I used to be happier”) and 4 items assessed on a four-point scale from never (0) to almost always (3) (e.g., “I feel depressed;” $\alpha = 0.73$). Analyses were computed using BASC-2 *T* scores, which were calculated based on a nationally representative age-matched sample.

Academic achievement

At ages 6 and 8, children completed the Letter-Word and Applied Problems subtests from the Woodcock Johnson III Tests of Achievement (WJ-III) to assess reading and math achievement, respectively (Woodcock, 1989). The WJ-III is a well-validated measure of academic achievement designed for use from age 2 to adulthood. In the Letter-Word subtest, children were asked to read a series of increasingly

difficult words out loud beginning with a six-item basal level and continuing until six consecutive items were missed. In the Applied Problems subtest, children were read a series of mathematical story problems for which they supplied calculated, rather than multiple choice, answers using scratch paper as needed. Analyses were computed using the sum of children’s age-standardized scores for the Letter-Word and Applied Problems subtests.

Missing data

Of the 228 participating children, 19 (8.33%) were missing prosocial sharing data because they did not complete the age 6 assessment ($n = 11$), they did not complete the prosocial task ($n = 7$), or the examiner did not administer the task correctly ($n = 1$). Parent reports of internalizing behavior were missing for 13 children (5.70%) because they did not complete the age 6 assessment. Further, 16 children were missing achievement data at age 6, either because they did not complete the assessment ($n = 13$) or the test was administered incorrectly ($n = 3$). Teacher data were missing for 58 (25.4%) children as a result of caregivers’ refusal to collect school data ($n = 2$), children not being in school ($n = 1$), inability to locate the teacher ($n = 1$), incomplete STRS data returned ($n = 10$), or teacher non-response/passive refusal ($n = 44$). Finally, 20 children (8.8%) were missing data on depressive symptoms and 22 children (9.6%) were missing data on academic achievement at age 8, either because they did not complete the assessment ($n = 16$) or they did not complete one or both individual measures ($n = 6$). Independent samples *t*-tests indicated that there were no significant differences in family SES, prosocial sharing, depressive symptoms, or achievement between children with and without teacher reports of teacher-child closeness. Likewise, chi-square analyses indicated there were no differences in child gender or race/ethnicity between children with and without teacher data.

Missing data were imputed using the expectation maximization (EM) algorithm across 50 iterations in SPSS 24.0 as supported by Little’s (1988) MCAR test, $\chi^2(952) = 523.272, p = 1.000$ (Schafer & Graham, 2002). The EM algorithm uses multiple imputation methods to impute values into a single data set, rather than listwise deletion or imputation across multiple data sets, which was the only estimation method available in previous versions of SPSS. The pattern of obtained findings was consistent across both the raw and imputed data sets, though their significance varied due to the high rate of missing teacher data. Together, these preliminary analyses justified the use of the full sample, despite the high rate of missing teacher data, which was comparable to teacher participation rates in other survey-based studies (Izzo, Weissberg, Kasprow, & Fendrich, 1999; Youngstrom, Findling, & Calabrese, 2003).

Moderated mediation analyses

Separate models evaluated the indirect effect of prosocial sharing on children’s depressive symptoms and achievement via teacher-child closeness. Moderated mediation analyses explored whether and how these relations differed between girls and boys, children of Latin descent versus those from other racial/ethnic groups, and family SES. Hayes’ (2013) SPSS PROCESS routines for simple mediation and moderated mediation yielded 95% bootstrapped confidence intervals (CIs) for both unconditional and conditional effects. Bootstrapping is a non-parametric technique that minimizes the influence of non-normality across study variables, and yields a more reliable estimation of mediation than Sobel’s (1982) test, particularly in smaller samples (Preacher, Rucker, & Hayes, 2007). Bootstrapping allows for direct estimation of mediation and mitigates power problems due to the asymmetric and non-normal sampling distribution of indirect effects (Edwards & Lambert, 2007). These routines also permit the evaluation of conditional indirect effects (i.e., moderated mediation) by calculating the significance of the indirect effect at a given value of the

Table 1
Descriptive statistics and bivariate correlations among study variables.

	M (SD)	1	2	3	4	5	6
1. Family SES (age 6)	33.200 (11.927)	–	–	–	–	–	–
2. Internalizing Symptoms (age 6)	48.140 (8.909)	–0.052	–	–	–	–	–
3. Academic Achievement (age 6)	102.499 (10.903)	0.236**	0.019	–	–	–	–
4. Prosocial Sharing (age 6)	2.021 (1.339)	0.087	–0.081	0.108	–	–	–
5. Teacher-Child Closeness (age 6)	3.725 (0.828)	0.232**	–0.191*	0.221**	0.238**	–	–
6. Depressive Symptoms (age 8)	50.589 (8.321)	–0.147*	0.071	–0.323**	–0.084	–0.269**	–
7. Academic Achievement (age 8)	102.634 (14.263)	0.243**	0.032	0.880**	0.035	0.263**	–0.349**

Note. Symptoms at ages 6 and 8 reflect caregiver and child reports, respectively.

* $p < 0.05$.

** $p < 0.01$.

moderator. Predictors were centered to reduce multicollinearity (Kraemer & Blasey, 2006). All models controlled for child gender, child race-ethnicity, family SES, and prior depressive symptoms or academic achievement.

Results

Descriptive and bivariate analyses

Descriptive statistics and bivariate correlations are shown in Table 1. A multivariate analysis of variance (MANOVA) revealed no significant differences across study variables by child gender (Wilks' $\lambda = 0.983$, $p = 0.432$), race/ethnicity (Wilks' $\lambda = 0.981$, $p = 0.359$), or their interaction (Wilks' $\lambda = 0.979$, $p = 0.309$). Bivariate analyses indicated that family SES was negatively related to later depressive symptoms and positively related to teacher-child closeness and achievement at both time points. Early internalizing symptoms and teacher-child closeness were negatively correlated. Early achievement was positively correlated with teacher-child closeness and later achievement, but negatively correlated with later depressive symptoms. Prosocial sharing behavior at age 6 was positively related to subsequent teacher-child closeness. Teacher-child closeness was negatively related to depressive symptoms and positively related to academic achievement at age 8. Achievement and depression were negatively correlated at age 8.

Moderated mediation analyses

Separate analyses evaluated relations between children's prosocial sharing at age 6 and their adjustment two years later (i.e., depressive symptoms and achievement) as predicted by the intervening measure of teacher-child closeness. Parameter estimates and 95% bootstrapped

confidence intervals (CI) across 10,000 resamples are shown in Table 2. Mediation analyses revealed a significant indirect effect of children's prosocial sharing on later depressive symptomatology over and above the influence of prior depressive symptoms ($B = -0.333$, $SE = 0.150$, 95% CI $[-0.697, -0.100]$), and significant indirect effects of children's prosocial sharing on later academic achievement through teacher-child closeness even when controlling for prior levels of academic achievement ($B = 0.401$, $SE = 0.195$, 95% CI $[0.095, 0.844]$). However, these mediating relations did not differ significantly by child gender, race/ethnicity, or family SES (Table 3).

Discussion

This investigation documented a significant pathway from children's prosocial behavior to decreased depressive symptomatology and increased academic achievement via enhanced closeness of the teacher-child relationship. Further, these pathways did not differ between groups as a function of child gender, race/ethnicity, or family SES. This study provides important and actionable information regarding teacher-child closeness as one mechanism by which prosocial behavior may eventuate in positive developmental outcomes. Thus, we offer preliminary empirical support for future studies aimed at developing and evaluating interventions to promote positive developmental outcomes by encouraging prosocial behavior and positive student-teacher relationships.

Evidence supporting specific pathways by which prosocial behavior may eventuate in fewer depressive symptoms and greater academic achievement as a function of its positive influence on the closeness of the teacher-child relationship represents an important advance in our effort to identify mechanisms by which prosocial behavior may influence child development. Consistent with prior suggestions that prosocial children may evoke positive social environments that, in turn,

Table 2
Indirect effect of prosocial sharing on child depressive symptoms through teacher-child closeness.

Effect	B	Bootstrapped SE	t	p	95% CI bias corrected	
					LLCI	ULCI
Child gender → teacher-child closeness	0.054	0.106	0.507	0.613	–0.155	0.262
Child gender → depressive symptoms	–0.846	1.093	–0.774	0.440	–3.000	1.307
Child race/ethnicity → teacher-child closeness	0.065	0.101	0.610	0.542	–0.144	0.273
Child race/ethnicity → depressive symptoms	0.279	1.093	0.256	0.799	–1.874	2.433
Family SES → teacher-child closeness	0.014	0.004	3.245	0.001	0.006	0.023
Family SES → depressive symptoms	–0.056	0.047	–1.200	0.232	–0.149	0.036
Age 6 symptoms → teacher-child closeness	–0.029	0.012	–2.339	0.020	–0.053	–0.005
Age 6 symptoms → depressive symptoms	0.033	0.128	0.256	0.798	–0.219	0.285
Prosocial sharing → teacher-child closeness	0.137	0.039	3.487	0.001	0.060	0.215
Teacher-child closeness → depressive symptoms	–2.424	0.692	–3.501	0.001	–3.789	–1.060
Prosocial sharing → depressive symptoms (direct)	–0.070	0.417	–0.168	0.867	–0.891	0.751
Prosocial sharing → depressive symptoms (indirect)	–0.333	0.150	–	–	–0.697	–0.100

Note: SE = Standard Error. LLCI = Lower limit confidence interval. ULCI = Upper limit confidence interval. Child gender (female = 1). Child race/ethnicity (Latinx = 1). Confidence intervals are bias-corrected based on 10,000 samples. No p -values given for indirect effects, as indirect effects are known to be non-normal.

Table 3
Indirect effect of prosocial sharing on academic achievement through teacher-child closeness.

Effect	B	Bootstrapped SE	t	p	95% CI bias corrected	
					LLCI	ULCI
Child gender → teacher-child closeness	0.021	0.105	0.196	0.845	−0.187	0.229
Child gender → academic achievement	−3.095	1.775	−1.744	0.083	−6.592	0.403
Child race/ethnicity → teacher-child closeness	0.091	0.105	0.863	0.389	−0.117	0.298
Child race/ethnicity → academic achievement	−4.070	1.772	−2.297	0.023	−7.561	−0.578
Family SES → teacher-child closeness	0.013	0.005	2.783	0.006	0.004	0.022
Family SES → academic achievement	0.059	0.078	0.756	0.450	−0.094	0.212
Age 6 academic achievement → teacher-child closeness	0.006	0.003	2.410	0.017	0.001	0.011
Age 6 academic achievement → academic achievement	1.132	0.042	26.980	< 0.001	1.049	1.214
Prosocial sharing → teacher-child closeness	0.130	0.039	3.283	0.001	0.052	0.207
Teacher-child closeness → academic achievement	3.095	1.129	2.742	0.007	0.871	5.319
Prosocial sharing → academic achievement (direct)	−1.747	0.679	−2.573	0.012	−3.085	−0.409
Prosocial sharing → academic achievement (indirect)	0.401	0.195	–	–	0.095	0.884

Note: SE = Standard Error. LLCI = Lower limit confidence interval. ULCI = Upper limit confidence interval. Child gender (female = 1). Child race/ethnicity (Latinx = 1). Confidence intervals are bias-corrected based on 10,000 samples. No *p*-values given for indirect effects, as indirect effects are known to be non-normal.

foster positive developmental outcomes (e.g., Caprara et al., 2000; Griese & Buhs, 2014; O'Toole, Monks, & Tsermentseli, 2017), the current findings may reflect a process whereby prosocial children elicit favorable responses from primary school teachers, who then provide a sense of social connectedness, as well as both emotional and academic supports that contribute to fewer depressive symptoms and improved academic achievement. However, in addition to, or instead of, an evocative effect of prosocial behavior on the behavior of others, it may be that the same social information processing that promotes prosocial behavior (e.g., benign attribution biases) also engenders close social relationships, including with teachers (Laible et al., 2014; Nelson & Crick, 1999). Future studies employing longitudinal designs with multi-wave assessments of each construct will be needed to test the relative contributions of multiple factors to the positive effects of prosocial behavior on child development.

Consistent with prior studies (e.g., Caprara et al., 2000; Gerbino et al., 2017), children's prosocial sharing behavior evidenced a significant direct relation with improved academic achievement across the early school years. However, the absence of a significant direct path from children's prosocial sharing to their emotional adjustment revealed greater than expected complexity in the relation between young children's prosocial behavior and depressive symptomatology. Prior studies have documented associations between children's prosocial behavior and a range of adaptive outcomes, including peer acceptance and academic achievement (Birch & Ladd, 1998; Caprara et al., 2000; X. Chen et al., 2002; Eisenberg et al., 1996; Flouri & Sarmadi, 2016). Thus, the absence of a direct relation between prosocial sharing and depressive symptomatology in the current study was somewhat surprising. This unexpected pattern may reflect the operation of varied and competing motivations undergirding the observed sharing behavior.

Prosocial behavior may be fueled by varied motivations ranging from altruism, to compliance, guilt, and insecurity (Carlo & Randall, 2002; Ilies, Peng, Savani, & Dimotakis, 2013). These varied motivations may result in the appearance of a positive prosocial action, such as sharing, but some motivations may also fuel other behaviors or feelings that do not support positive development, such as guilt. For some children in the current study, sharing with an adult examiner may have been motivated by altruism or compliance, and these motivations likely support later adaptation. However, other children may have been motivated to share by guilt or an overwhelming desire to please adults at the expense of their own needs, both of which may undermine positive adaptation, particularly with regard to depressive symptoms. Indeed, prior studies suggest that feelings of guilt are positively related to depressive symptoms (Kim, Thibodeau, & Jorgensen, 2011), and solicitous behavior patterns in childhood may reflect insecurities that eventuate in problematic outcomes, including social rejection and withdrawal

(Lu, Fung, Farver, Chen, & Chang, 2015). Thus, although prosocial sharing was positively related to teacher-child closeness, and, by extension, positive socioemotional outcomes in this study, the same characteristics that engendered sharing in some of these children may have contributed to problematic socioemotional outcomes as well.

Importantly, the significant direct relation with academic achievement may indicate that alternate motivations for prosocial sharing and attendant relational insecurities might be uniquely tied to children's internalizing pathology, which is also consistent with prior theory and research (e.g., Kim et al., 2011; Lu et al., 2015). Together, these findings suggest that prosocial behavior may initiate multiple adaptive pathways toward both positive and problematic adjustment outcomes. Efforts to clarify the outcomes associated with specific types of prosocial behavior (e.g., sharing versus helping) and/or specific motivations to act in a prosocial fashion (e.g., altruism versus guilt) may help to clarify the complexity of relations between prosocial behavior and adjustment.

The absence of significant moderation effects by child gender, child race/ethnicity, or family SES is consistent with prior mixed evidence regarding differences in the expression or impact of prosocial behavior across varied groups (e.g., McMahon et al., 2006; Veenstra et al., 2008). Indeed, group differences have been notably absent in the few studies that have employed observational assessments of prosocial behavior (e.g., Rose & Rudolph, 2006; Warneken & Tomasello, 2007). However, the absence of significant differences in the relation between teacher-child closeness and later adjustment outcomes was somewhat surprising given prior evidence that teacher-student relationships are especially important for children in relatively high-risk settings (e.g., racial/ethnic minorities, low-income children; Dubois, Holloway, Valentine, & Cooper, 2002). It may be that the uniquely diverse region from which the present sample was drawn, as well as the generally high-risk nature of the current sample, minimized group differences that might otherwise have emerged. Overall, these data highlight the prominence of teacher-student relationships for understanding children's emotional and academic adjustment across the transition to formal schooling, as well as the potential for children's own prosocial behavior to positively influence the development and/or quality of such relationships.

Strengths and limitations

The current study is among the first to evaluate the quality of the teacher-student relationship among children who behave prosocially, as well as its potential role as an explanatory mechanism undergirding pathways from prosocial behavior to positive adaptation. The identification of teacher-child relationships as a one mechanism by which prosocial behavior may engender positive outcomes is important

because it has the potential to inform efforts to promote positive outcomes by encouraging prosocial behavior, especially in the school setting. However, several limitations necessarily qualify the interpretation of the obtained findings.

First, we employed an observational measure of prosocial sharing behavior that constrained the generalizability of these relations beyond the expression of prosocial sharing with an adult authority in the observational context of the research laboratory. Indeed, the obtained distribution of prosocial sharing responses suggested that only a subset of the children in this sample (i.e., ~14%) shared with minimal or no prompting, whereas most evidenced compliant prosocial sharing in response to the examiner's request for a snack. As discussed earlier, the characterization of a behavior as prosocial does not necessitate a particular motivation (Batson & Powell, 2003), but the adaptive significance of the behavior may vary across different motivations (e.g., altruism versus guilt). Likewise, the current findings stemmed from observations of prosocial sharing, but evidence suggests that other forms of prosocial behavior (e.g., helping, comforting) may not follow the same pattern of expression or impact (Dunfield, Kuhlmeier, O'Connell, & Kelley, 2011). Although this observational paradigm aptly mirrored the school setting where children encounter an unfamiliar adult authority figure, the one-on-one laboratory context is quite distinct from a classroom setting where peers (and peer dynamics) also operate.

Second, we were not able to assess the potential influence of examiner-child similarity with regard to gender, race/ethnicity, or other attributes on children's willingness to share. Several studies have shown that perceived similarity and/or familiarity of the receiving agent may influence prosocial propensities (Dunham, Baron, & Carey, 2011; Kinzler, Dupoux, & Spelke, 2012; Martin & Olson, 2015; Weller & Hansen Lagattuta, 2013). Although all examiners behaved in a warm, respectful, and child-centered fashion, individual differences may have influenced children's willingness to share in ways that could not be examined here beyond the post-hoc finding that sharing did not vary across examiner. Interestingly, we did not find significant gender differences in prosocial sharing, even though all examiners were female. Likewise, we were not able to analyze important sociodemographic features of the current teacher sample. For example, given that prosocial sharing may be a more normative element of social exchanges in Latin cultures (Armenta et al., 2011; Carlo et al., 2001), teachers of Latin descent may have been less sensitive to children's prosocial behavior given the cultural normativity of such expressions.

Third, the current study did not address peer relationships, which may have been affected by children's prosocial behavior. A wealth of evidence suggests that the most well-liked children in school settings behave prosocially (for a review, see Rodkin & Ryan, 2012). Thus, it is possible that peer acceptance encouraged positive socioemotional and/or academic outcomes. Indeed, evidence suggests that peer acceptance negatively influences depression (Kistner, Balthazor, Risi, & Burton, 1999) positively influences academic achievement (Kingery, Erdley, & Marshall, 2011), while peer rejection has the opposite effect (DeRosier, Kupersmidt, & Patterson, 1994; Platt, Kadosh, & Lau, 2013). Therefore, future research will be strengthened by considering the role of the entire classroom ecology, including the influence of both teachers and peers, in the relation between prosocial behavior and adjustment.

Fourth, despite a modicum of directional inference supported by the longitudinal assessments examined herein, as well as our inclusion of prior adjustment indicators in all models, our inability to assess all study variables at all time points limited our capacity to infer causality. Moreover, our inability to provide an exact control for children's depressive symptoms due to the absence of a suitable child-report measure for six-year-old children should be noted. As mentioned earlier, in future research, it will be important to evaluate the likely transactional relations between children's prosocial expressions and teacher-child relationship quality by including consistent measures of all study variables at multiple time points. For example, because mentoring is

itself an expression of prosocial behavior (Allen, 2003), it is possible that a close relationship with one's teacher may have modeled and therefore engendered students' prosocial sharing in the laboratory, either in addition to, or rather than, children's prosocial behavior enhancing the closeness of the teacher-student relationship. Teachers may also provide opportunities for children who are more emotionally positive and academically competent to practice prosocial sharing of knowledge in the classroom via tutoring or responding to questions. Although research suggests that such reciprocal pathways exist in the context of peer relations (Laible et al., 2014), these relations have not been explored in the context of children's relationships with teachers or other adults.

Implications for future research and practice

The current study highlights the salience of children's prosocial behavior for understanding adaptation across multiple domains, including those with potentially enduring implications for long-term adaptation. Further, the obtained findings suggest that teacher-student closeness may be one mechanism underlying positive relations between prosocial behavior and adaptation. The identification of this mechanism may be particularly relevant to intervention efforts aimed at promoting positive outcomes for school-aged children.

Evidence suggests that the presence of non-parental adult mentors is instrumental in promoting positive outcomes for children (Dubois et al., 2002; DuBois & Silverthorn, 2005). Further, these mentoring relationships might be especially salient for children from adverse backgrounds (Rutter, 1979; Southwick, Morgan III, Vythilingam, & Charney, 2007). Given that teachers are one non-parental adult that is available for most school-aged children, understanding factors that may promote a strong teacher-child relationship and the adaptive significance of such relationships is integral to the development of interventions aimed at improving child outcomes.

The obtained findings are consistent with prior works demonstrating that teacher-child relationships can positively influence children's emotional health and academic achievement (Birch & Ladd, 1997; Hamre & Pianta, 2001; Pianta & Stuhlman, 2004), and expand this literature by documenting a relation between teacher-child closeness and children's prosocial actions. Intervention efforts to foster prosocial expressions in children and thereby promote close teacher-child relationships may be a valuable strategy to facilitate positive adaptive outcomes. Indeed, some research indicates that kindness-centered mindfulness training programs implemented in the classroom setting may promote children's prosocial behavior and teacher reports of child social competence (Flook, Goldberg, Pinger, & Davidson, 2015). Looking ahead, there is a need for more nuanced investigations to elucidate the timing and directionality of likely transactional relations among children's prosocial behavior, teacher-student relationship processes, and adaptation to further inform intervention efforts.

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