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Predicting differentiated developmental trajectories of prosocial behavior: A 12-year longitudinal study of children facing early risks and vulnerabilities

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Abstract

The current study examined the heterogeneity in the development of school-based prosocial behavior from Grades 1 to 12 and the role of multiple early childhood antecedents in predicting heterogeneous developmental trajectories of prosocial behavior in a sample of 784 children facing early risks and vulnerabilities (predominantly from low-income families and academically at risk; 52.6% male). In alignment with the risk and resilience framework, antecedents consisted of risk and protective factors from both individual (i.e., ego-resilient personality, behavior problems, intelligence, academic performance, gender, and ethnicity) and contextual domains (i.e., maternal support and responsiveness, family socioeconomic adversity, teacher–child warmth and conflict, and peer acceptance and rejection). We identified four distinct prosocial trajectories including a high-stable (52.5%), high-desisting (15%), moderate-increasing (20.6%), and low-stable class (11.9%). Results revealed that the low-stable, high-desisting, and moderate-increasing classes were associated with lower ego resiliency, higher behavior problems, lower teacher–child warmth, higher teacher–child conflict, and peer rejection in early childhood, compared to the high-stable group. Boys and African Americans were more likely to be in the low-stable, high-desisting, and moderate-increasing classes. Individual characteristics such as ego-resilient personality and contextual influences such as teacher–child warmth served as common protective antecedents. Interestingly, teacher–child conflict served as a unique predictor for the high-desisting class, and behavior problems and peer rejection served as unique predictors for the low-stable class.

Prosocial behavior has been defined as voluntary behavior meant to benefit another individual (Carlo & Randall, 2002; Eisenberg et al., 2006). Multidimensional conceptualizations of prosocial behavior recognize that this construct encompasses different forms (e.g., public, emotional, anonymous, altruistic, and compliant; Carli & Randall, 2002; Carlo, 2014). In the current study, we were interested in examining prosocial behaviors in scholastic contexts. Research has shown that school-based prosocial behavior is associated with several positive scholastic and socioemotional outcomes (e.g., excelling in academics, demonstrating better self-regulation, and maintaining positive interpersonal relationships with teachers and peers; Carlo, 2014; Caprara et al., 2000).

Although there are normative increases in prosocial behavior from childhood through adolescence (Carlo et al., 2007; Eisenberg et al., 2006), studies utilizing person-oriented analyses indicate considerable individual differences and heterogeneity in the growth and continuity of prosocial behavior. Variations (i.e., continuity and discontinuity) in the development of prosocial behavior are likely to be influenced by the degree to which children face early risks or vulnerabilities. Extant research suggests that experiences of socioeconomic adversity and academic difficulties in early childhood may contribute to maladaptive deviations in prosocial behavior (Eisenberg et al., 2006; Hanson et al., 2017). Building on these findings, it is important to examine the development of prosocial

behavior among children who are at greater risk for having lower levels of prosocial behavior and to identify additional factors (i.e., risk and resilience antecedents) in early childhood which may function to either enhance (or mitigate) its development. Consequently, the current study utilized data from a sample of children who were both academically at risk (as indicated by having low literacy scores at school entry) and experiencing socioeconomic adversity (65% of participants were low socioeconomic status as indicated by income-based eligibility for free/reduced lunch and 42.5% had parents with a high school diploma or less educational attainment), to address two primary aims: (a) to examine variations in children's developmental trajectories of school-based prosocial behavior, from Grades 1 to 12, and (b) to identify risk and resilience factors associated with these heterogeneous developmental trajectories. To address these aims, we utilized a person-centered approach to examine heterogeneous developmental trajectories based on

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intraindividual variations across time (i.e., differential patterns of continuity and discontinuity in prosocial behavior), as opposed to variable-centered approaches which typically examine rank-order stability.

The Differentiated Developmental Trajectories of Prosocial Behavior

Distinct growth trajectories in prosocial behavior have been documented during early to late childhood (e.g., from ages 4 to 13 years, see Barker et al., 2010; ages 6 to 12, see Cotè et al., 2002; ages 3 to 6, see Jambon et al., 2019; ages 6 to 12, see Kokko et al., 2006; and ages 2 to 11, see Nantel-Vivier et al., 2014), from childhood to preadolescence (i.e., ages 10–15, see Nantel-Vivier et al., 2009), during adolescence (i.e., ages 11–14, see Padilla-Walker et al., 2015; ages 11–18, see Bono et al., 2019; ages 12–16, see Carlo et al., 2015; ages 12–20, see Padilla-Walker et al., 2018; ages 13–18, see Van der Graaff et al., 2018), and from early adolescence to adulthood (i.e., ages 13–21, see Kanacri et al., 2014). Collectively, these studies have differentiated subgroups of children who exhibit stability (continuity) in prosocial behavior (i.e., high- and low-stable groups) from children who evidenced significant and systematic changes (discontinuity) over time (e.g., low/moderate increasing and high/moderate desisting) in both childhood and adolescence. Most of these studies focused on community/population-based samples, except for two studies that targeted boys from low socioeconomic backgrounds. More specifically, Kokko et al. (2006) identified two distinct trajectories in middle and late childhood (ages 6–12): low-declining (57.6%) and moderate-declining (42.4%). Nantel-Vivier et al. (2009) reported three trajectories in early adolescence (ages 10–15): low-declining (53%), high/declining (16%), and high/steep declining (31%). Taken together, although there is some evidence that there are normative increases in prosocial behavior across childhood and adolescence (Carlo et al., 2007; Eisenberg et al., 2006), results from studies on more at-risk samples indicate that across different subgroups, there tends to be a decreasing trend. However, because these studies focused on specific developmental periods, less is known about patterns of long-term continuity and discontinuity across the entirety of formal schooling (Grades 1–12), which may reveal insights pertaining to variations in the development of prosocial behavior as children make the transition into adolescence.

Early Childhood Risk and Resilience Antecedents

In the current study, we applied a risk and resilience framework (see Cicchetti, 2013; Luthar et al., 2000; Masten & Narayan, 2012) to evaluate the role of multiple early childhood antecedents. Risk and resilience frameworks, in the context of prosocial development, would argue that both risk and protective factors influence the trajectories of prosocial behavior in either a negative (risk) or positive manner (resilience). Such frameworks consider how a child's adjustment is a dynamic process of adaptation in the context of adversity through three sets of factors: attributes of the children themselves (i.e., the individual), characteristics of their families, and influences from other social contexts (i.e., contextual factors; see also Carlo, 2014; Eisenberg et al., 2006). For example, individual risk factors for prosocial development often encompass behavior problems and difficult temperament, whereas ego resiliency has been described as a temperamental and personality dimension

that functions to promote prosocial behavior. At a contextual level, risk factors include family socioeconomic adversity, teacher–child conflict, and peer rejection, whereas protective factors include maternal support, teacher–child warmth, and peer acceptance. Thus, it is important to not only investigate heterogeneity in the development of prosocial behavior but to also consider how multiple early childhood risk and resilience factors may be associated with such heterogeneity. Despite ample evidence of the independent effects of these factors on prosocial development in prior studies, the additive effects based on a simultaneous examination of these factors (i.e., controlling for the potential confounding of multiple individual and contextual factors) have not been comprehensively examined in one study.

Children's individual characteristics, including temperament and personality (e.g., see Carlo, Crockett et al., 2012; Liew et al., 2011), behavior problems (Carlo et al., 2012), and gender (Chaplin & Aldao, 2013; Van der Graaff et al., 2018) have been consistently documented as antecedents for prosociality. For instance, girls and children with higher levels of effortful control and lower levels of negative emotionality and behavior problems have been reported to have higher rates of prosocial behavior. However, for other individual characteristics, such as intelligence, academic performance, and ethnicity, there have been smaller and more inconsistent associations with prosocial behavior (Caprara et al., 2000; Carlo & Randall, 2002; de Guzman & Carlo, 2004). We also examined the predictive role of ego resiliency, which has been defined as a positive regulatory adaptation process in the context of risky and vulnerable circumstances (Block & Block, 1980). Consistent with this notion, ego-resilient children have been characterized as being resourceful and persistent, with adequate coping capacities, and are more likely than their nonresilient peers to exhibit prosocial behavior (Taylor et al., 2013).

In addition to children's individual characteristics, risk and resilience frameworks highlight the role of contextual processes in shaping children's developmental trajectories. In early childhood, contextual influences can be characterized primarily by salient interpersonal interactions that children experience with teachers, peers, and parents. Within each of these relational domains, socialization processes may collectively function to promote the development of prosocial behavior or, alternatively, maladaptive socialization experiences may undermine its development. For instance, positive parent–child interactions, and maternal support and responsiveness, in particular, are likely to contribute to the early socialization of prosocial behavior (Carlo et al., 2011), and these associations have been found to be mediated by factors such as maternal sensitivity (Newton et al., 2014) and maternal emotional expressiveness (Laible, 2007). Taken together, one implication of these findings is that when parent–child interactions are characterized by support, sensitivity, and responsiveness, children are more likely to internalize rules and social norms and comply with parental expectations pertaining to socially acceptable (e.g., prosocial) behaviors. Similar processes have been proposed to understand the role of teacher–child relationships and children's behavioral adjustment. Teacher–child relationship quality has typically been conceptualized along two interrelated, but distinct dimensions, reflecting warmth and conflict. Studies indicate that prosocial behavior is positively associated with teacher–child warmth, and conversely, it is negatively associated with teacher–child conflict (Eisenberg et al., 2006; Luckner & Pianta, 2011). When teacher–child relationships are characterized by warmth, and the classroom climate is generally supportive, children are more

likely to comply with teacher's expectations and interact in prosocial ways with their peers and teachers. In contrast, teacher–child relationships characterized by conflict promote a hostile classroom climate in which children are more likely to disobey teacher's expectations and exhibit disciplinary problems and less likely to enact prosocial behaviors with classmates or teachers. Finally, peer relationships may also contribute to children's prosocial behavioral styles such that when children are well liked and accepted by peers, they are more likely to have positive perceptions of their peer climate, which may serve to reinforce and foster prosocial behavior. In contrast, children who are disliked and rejected by peers are likely to have fewer opportunities and less motivation to engage in prosocial behavior (Caputi et al., 2012; see Eisenberg et al., 2006). Taken together, each of these relational domains may independently contribute to the socialization of, and growth in, prosocial behavior. However, it has been rare for investigators to evaluate (1) multiple types of potential socializers (e.g., parents, peers, and teachers), (2) their additive effects to ascertain which domain may have a stronger influence, and (3) whether adaptive or maladaptive relational experiences more consistently promote or disrupt children's prosocial trajectories.

Study Aims and Hypotheses

The current study extends prior research in several ways as we (1) examined the heterogeneity in the development of school-based prosocial behavior across a longer time span than previously investigated, namely Grades 1–12, and (2) utilized a multi-informant and multimethod approach to assess the additive effects of multiple early childhood risk and resilience antecedents incorporating both individual child characteristics and contextual influences across multiple domains (parents, peers, and teachers) in a sample of children who are predominantly from low-income families and academically at risk. To effectively promote prosocial behavior, it is imperative to identify potential risk and protective antecedents that may be associated with school-based prosocial behavior. Investigating antecedents from both individual and contextual domains may also provide additional insights into the etiology of prosocial development in early childhood and the extent to which distinct trajectory subtypes either share common or unique antecedents. That is, it is possible that certain risk and resilience antecedents may be uniquely associated with a particular type of trajectory (i.e., high desisting or low stable). Efforts to differentiate early childhood antecedents of these trajectory subtypes would not only contribute to our theoretical understanding of why children are manifesting different prosocial tendencies but may also have implications for intervention efforts targeting the promotion of prosocial behaviors for children facing early risks and vulnerabilities.

Consistent with prior studies which investigated prosocial trajectories on at-risk samples (Kokko et al., 2006; Nantel-Vivier et al., 2009), we expected to identify between two and three distinct trajectory classes characterized by stable (i.e., high stable and low stable) or declining trends (slopes) across time (i.e., high declining, moderate declining, and low or low declining). However, because these studies focused on at-risk boys and specific developmental periods, it remains unclear whether the prevalence rates they reported for each trajectory class would be reflective of our sample. Nonetheless, it is plausible that a substantial portion of boys *and* girls facing early risk and vulnerability are likely to exhibit low or moderate-declining prosocial behavior in contrast to high prosocial

behaviors. Moreover, because more severe and persistent forms of maladjustment are likely to be associated with experiencing multiple, co-occurring risk factors (Evans et al., 2013), we hypothesized that children belonging to the low-stable class would be characterized by multiple early childhood risk antecedents and fewer resilience factors, compared to children with high-stable prosocial behavior. As an additional exploratory aim, we were also interested in investigating potential common and unique risk and resilience antecedents associated with the differentiated trajectory classes that were identified.

Method

Participants

Participants were 784 academically at-risk children (47% girls) who were followed annually from Grades 1–12 (M_{age} = 6.57 years in Grade 1), coming from one urban and two small city school districts in Texas, United States. The sample was ethnically diverse: 34.1% of the sample was White, 23.2% African American, 37.4% Hispanic, 3.6% Asian or Pacific Islander, and 1.8% Other. Since the broader aim of the original project was to study the impact of grade retention in academically at-risk children, all children recruited into the study had literacy scores (assessed in the spring of kindergarten or the fall of Grade 1) below the median in their respective school districts (see Hughes et al., 2005, 2018). Participating children were predominantly from low socioeconomic families as 65% qualified by income for free or reduced lunch and 42.5% had parents with a high school diploma or less. Additional eligibility criteria included speaking English or Spanish as a first language, not receiving special education services, and not having been previously retained in first grade.

Procedure

Each year (from Grades 1 to 12, with the exception of Grade 11), teachers reported on children's prosocial behavior in the classroom. Multi-informant measures (i.e., school district data, standardized tests, parent-, peer-, self-, and teacher-reports), collected in Grade 1 (i.e., Wave 1), were used to assess early childhood antecedents. Specifically, participating school districts provided information on demographic variables (i.e., age, gender, race, ethnicity, and eligibility for free or reduced-price lunch), parents completed questionnaires to report on their family socioeconomic status, and teachers were asked to report on children's personality attributes and their teacher–child relationship quality. Peer reports were collected at school using sociometric interviews which assessed children's behavior problems and peer acceptance and rejection. Children were individually interviewed at school to report on their self-perceived maternal support and responsiveness at home. Finally, trained research staff conducted individually administered standardized assessments at school to assess children's intelligence and academic performance. The current study was approved from the Institutional Review Board of Texas A&M University (Protocol No. 2015-0789M).

Measures

Prosocial Behavior

Prosocial behavior was measured on an annual basis from Grades 1 to 12 (with the exception of Grade 11) with a 5-item subscale of the

Table 1. Descriptive Statistics for Study Variables.

Variables	Reporters	Grade	N	Mean	SD	Min	Max	Range	a
Outcome									
Prosocial behavior	Teacher	1	676	7.05	2.53	0.00	10.00	10.00	0.84
		2	621	7.14	2.65	0.00	10.00	10.00	0.86
		3	547	7.07	2.61	0.00	10.00	10.00	0.84
		4	528	7.10	2.55	0.00	10.00	10.00	0.84
		5	541	6.75	2.67	0.00	10.00	10.00	0.86
		6	439	6.56	2.68	0.00	10.00	10.00	0.87
		7	430	6.15	2.67	0.00	10.00	10.00	0.86
		8	437	5.72	2.78	0.00	10.00	10.00	0.87
		9	405	6.33	2.60	0.00	10.00	10.00	0.84
		10	434	6.23	2.57	0.00	10.00	10.00	0.85
		12	388	6.53	2.64	0.00	10.00	10.00	0.87
Individual antecedents									
Ego-resilient personality	Teacher	1	699	10.32	2.41	3.57	15.00	11.43	0.94
Problem behavior	Peer	1	602	0.02	0.99	−1.24	4.08	5.32	—
Intelligence	School	1	767	93.06	14.63	48.00	132.00	84.00	0.94
Academic performance	School	1	757	433.57	29.05	117.00	523.00	406.00	0.98
Contextual antecedents									
Maternal support and responsiveness	Child	1	737	2.86	0.66	1.17	4.00	2.83	0.72
Family socioeconomic adversity	School and parent	1	776	0.04	0.74	−1.27	1.66	2.93	—
Teacher–child warmth	Teacher	1	699	4.00	0.81	1.00	5.00	4.00	0.94
Teacher–child conflict	Teacher	1	702	1.88	1.02	1.00	5.00	4.00	0.91
Peer acceptance	Peer	1	602	−0.13	0.90	−2.01	2.65	4.67	—
Peer rejection	Peer	1	595	0.03	0.95	−1.80	3.21	5.01	—

Note. a = reliability.

Strengths and Difficulties Questionnaire (Goodman, 2001; i.e., considerate of other people's feelings, shares readily with other children, helpful if someone is hurt, kind to younger children, and often volunteers to help others). Teachers responded to each item on a 3-point Likert-type scale and items were summed to create a prosocial behavior scale with higher scores being indicative of more prosociality (see Table 1 for descriptive statistics and scale reliabilities at each wave and Table S1 for bivariate correlations). Confirmatory factor analyses were performed, and results indicated that this measure exhibited longitudinal measurement invariance from Grades 1 to 12 (see Table S2 for model fit indices and nested model comparisons).

Individual Antecedents

Intelligence. The abbreviated version of the *Universal Nonverbal Intelligence Test* (UNIT) is a measure of general intelligence that evaluates children's memory and reasoning. The UNIT is administered using nonverbal gestures and has been found to be less culturally and linguistically biased than verbal measures (Bracken & McCallum, 1998).

Academic performance. Academic performance was calculated with Woodcock–Johnson Tests of Achievement Third Edition (Woodcock et al., 2001) using a composite of the Broad Reading W score (Letter-Word Identification, Reading Fluency, and Passage Comprehension). If children were more proficient in Spanish than in English, they were administered the comparable Spanish version. Both versions of this measure have been used extensively in education research and demonstrate adequate reliability and validity (Woodcock et al., 2001).

Ego-resilient personality. The measure of ego-resilient personality consisted of a total of 22 items from the Child California Q-Set (Block & Block, 1980) and the Big Five Inventory (John et al., 1991) and has been validated by Kwok et al. (2007) with this same data set.

Behavior problems. Sociometric interviews were conducted with participating children and their classmates, and one item was used to assess physical and verbal aggression: "Some kids start fights, say mean things, or hit others." Children provided unlimited nominations of classmates who fit this description and scores were standardized by classroom to account for differences in class size.

Contextual Antecedents

Maternal support and responsiveness. The measure of maternal support and responsiveness consisted of 6 items adopted from the Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (Harter, 1985). This measure utilized a 4-point Likert-type scale and sample items are "mom smiles," "mom takes you places you like," "mom cooks favorite foods," "mom reads to you," "mom plays with you," and "mom talks to you."

Family socioeconomic adversity. Data pertaining to family socioeconomic adversity were gathered from school records and parents' reports and calculated based on the grand mean of the standardized scores on five domains: eligibility for free or reduced lunch (coded 0–1, 1 = *yes*), single-parent status (coded 0–1, 1 = *yes*), rental status (coded 0–1, 1 = *yes*), the highest occupational level of any adult in the home (reverse-scored), and the highest education level of any adult in the home (reverse-scored). Higher scores represented higher family socioeconomic adversity.

Teacher–child warmth and conflict. Teachers completed the 22-item Teacher Relationship Inventory (Wu & Hughes, 2015) using a 5-point Likert-type scale. Items from this inventory were used to derive two subscales: Warmth (13 items; e.g., "I enjoy being with this child," "This child gives me many opportunities to praise him or her") and Conflict (6 items; e.g., "This child and I often argue or get upset with each other," "I often need to discipline this child").

Peer acceptance and rejection. Children were asked to rate how much they like, or do not like, to play with each child in their classroom by pointing to one of the five faces depicting a sad face (1 = *don't like at all*) to a happy face (5 = *like very much*). A child's peer acceptance score was based on the number of times they received a rating of "5" from classmates, and a peer rejection score was based on the number of "1" ratings received by classmates. All scores were then standardized within the classroom to adjust for differences in classroom size.

Data Analysis Plan

The first step in the analysis plan was to identify subgroups of children with heterogeneous prosocial trajectories from Grades 1 to 12. A one-class model was first specified to ascertain normative trends in prosocial behavior across time and to determine whether there was significant variability in the growth factors (i.e., intercept, slope, and quadratic variances) to estimate models with additional classes. Meeting this condition, a series of growth mixture models (GMMs) with additional (i.e., 2- thru 6) classes were specified. These models initially included intercept, slope, and quadratic latent growth factors, and in cases in which the model reflected a linear growth process, the quadratic effect was removed. To determine the optimal model, a combination of multiple information criteria (i.e., Akaike information criterion [AIC], Bayesian information criterion [BIC], and sample-size adjusted BIC [SABIC]), the likelihood ratio test (i.e., Lo–Mendell–Rubin likelihood ratio test [LMR-LRT]), and classification accuracy were used to assess each model. Models with smaller AIC, BIC, and SABIC values indicate better solutions. A significant p value on the LMR-LRT indicates that a model with k classes has a better fit than a model with $k - 1$ classes. Entropy and class assignment probabilities were assessed to examine classification accuracy (values closer to 1 indicate more precise classification).

The second step of the analyses was to specify a predictive model to examine the effects of the individual and contextual antecedents on the prosocial trajectory classes. Within the GMMs, multinomial logistic regression was performed. All of the individual and contextual antecedents were entered simultaneously into one model; thus, the estimates are controlling for the effects of other predictors. For each antecedent, odds ratios (*OR*s) and significance tests were estimated. All analyses were conducted in Mplus 7.4.

Results

Addressing Missingness

Missingness in the measure of prosocial behavior increased across the 12-year span and ranged from 14.3% to 42.6% (see Table 1 for sample sizes reported at each wave). Several analyses were performed to examine patterns of missing data. First, Little's test was used to assess whether the data were missing completely at random
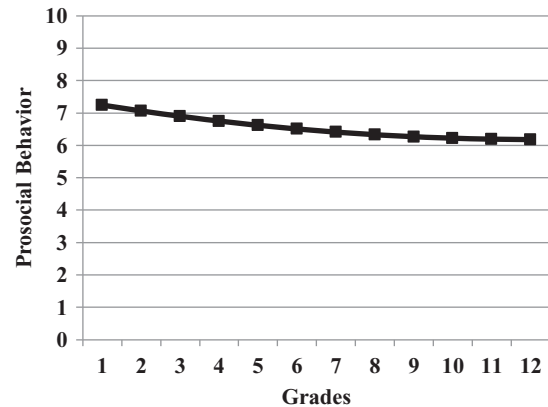

Figure 1. Normative Developmental Trajectory for Prosocial Behavior From Grades 1 to 12.
Note. N = 784.

(MCAR), and results supported this assumption, $\chi^2(5,439) = 5,609.623$, $p = .052$. Second, a series of univariate t tests were performed to examine whether missing data or participant attrition over time was associated with the early childhood (Grade 1) antecedents. Results indicated that none of these antecedents were systematically associated with participant attrition or missing data. Thus, the use of full information maximum likelihood (FIML) estimation appeared to be an appropriate method for handling missing data, since this approach produces unbiased estimates when data are either missing at random or MCAR (Enders, 2010).
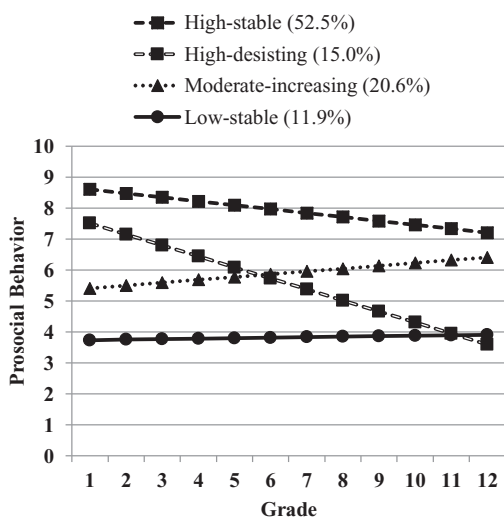
Developmental Trajectories of Prosocial Behavior

Growth mixture models were specified to identify children with heterogeneous prosocial behavior trajectories from Grades 1 to 12. First, a one-class (latent growth) model was specified to ascertain normative trends in prosocial behavior across time. This model indicated a nonlinear decreasing trend in prosocial behavior over time ($I = 7.237$, $p < .001$; $S = -.188$, $p < .001$; $Q = .008$, $p < .009$; see Figure 1), and variance estimates were significant, but small for the slope and quadratic factors. Subsequently, GMMs with additional classes (ranging from two to six classes) were specified. These models initially included a quadratic latent factor to assess nonlinear growth; however, quadratic effects were consistently small and not statistically significant. Therefore, this factor was removed, and results are presented for the more parsimonious linear growth models (see Table 2 for model fit indices). The four-class model was selected as the optimal solution. This model had the smallest BIC, third smallest AIC, and second smallest SABIC and adequate entropy, adequate average class assignment probabilities, and the LMR-LRT were statistically significant. Although the five-class solution had the smallest SABIC and the six-class solution had the smallest AIC, the additional classes identified in these models did not improve model fit according to the LMR-LRT. Moreover, the additional class identified in the five-class model was relatively small (about 6.4% children) and was not distinct conceptually from the classes identified in the four-class model. The two additional classes identified in the six-class model exhibited low-class assignment probabilities (i.e., below .6) or contained a relatively small proportion of children (i.e., less than 5%).

The trajectory classes identified in the four-class model are illustrated in Figure 2. About 11.9% (n = 93; 20.2% female,

Table 2. Fit Indices for Models Examining Prosocial Trajectories in Grades 1 to 12.

Model	LogL	AIC	BIC	SABIC	Entropy	LMR-LRT	p
Two class	−12,526.01	25,084.02	25,158.42	25,107.62	.74	918.31	<.001
Three class	−12,451.22	24,940.43	25,028.79	24,968.45	.70	142.45	<.001
Four class	**−12,425.67**	**24,895.34**	**24,997.65**	**24,927.79**	**.65**	**48.65**	**.006**
Five class	−12,419.64	24,889.28	25,005.54	24,926.16	.62	11.48	.385
Six class	−12,415.85	24,887.70	25,017.90	24,928.99	.57	7.23	.204

Note. N = 784. The optimal model is shown in boldface font. LogL= loglikelihood value; AIC = Akaike information criterion; BIC = Bayesian information criterion; SABIC = sample-size adjusted Bayesian information criterion; LMR-LRT=Lo–Mendell–Rubin likelihood ratio test.

Figure 2. Differentiated Developmental Trajectories (and Class Percentages) for Prosocial Behavior From Grades 1 to 12.
Note. N = 784.

40.4% African American, 24.7% Hispanic) of children had low levels of prosocial behavior across Grades 1 to 12 (labeled low stable). About 15.0% (n = 118; 32.4% female, 29.4% African American, 32.4% Hispanic) exhibited high prosocial behavior in the early grades followed by a sharp decline during later grades (labeled high desisting). About 20.6% (n = 161; 39.8% female, 29.2% African American, 32.3% Hispanic) exhibited a moderate level of prosocial behavior in the early grades which increased over time (labeled moderate increasing). Finally, 52.5% (n = 412; 59.4% female, 15.4% African American, 43.7% Hispanic) of children exhibited persistently higher levels of prosocial behavior across Grades 1 to 12 (labeled high stable).

Examining the Antecedents of the Prosocial Behavior Trajectory Classes

After selecting the four-class model as the optimal solution, this model was respecified to include the early childhood individual and contextual antecedents. Multinomial logistic regression was used to assess which individual and contextual antecedents were significantly associated with class membership, controlling for the effects of other antecedents (see Table 3 for *OR*s and significance tests). The first three columns of Table 3 reflect the results based on using the high-stable class as the reference group. The latter three columns were based on comparisons among the three other trajectory classes (i.e., high-desisting, moderate-increasing, and low-stable) to further distinguish potential subgroup differences.

Compared to the high-stable group, children in the low-stable group had significantly lower ego resiliency, higher behavior problems, lower teacher–child warmth, higher peer rejection, and were more likely to be boys and African American. Children in the high-desisting group had higher teacher–child conflict and were more likely to be boys and African American, compared to the high-stable prosocial group. Children in the moderate-increasing group were characterized by lower ego resiliency, lower teacher–child warmth, and were more likely to be boys and African American.

Additional analyses were performed to make comparisons among the low-stable, high-desisting, and moderate-increasing groups. Compared to the moderate-increasing group, children in the low-stable group had higher behavior problems. Moreover, compared to the high-desisting group, children in the low-stable group had lower ego resiliency, higher behavior problems, and experienced lower teacher–child warmth. No significant differences were found between the high-desisting and the moderate-increasing groups.

Across these comparisons, intelligence, academic performance, maternal support and responsiveness, family socioeconomic adversity, peer acceptance, and ethnicity (i.e., being Hispanic) were not significantly associated with class identification.

Discussion

The results of this study make three novel contributions to the literature on prosocial development. First, the study utilized a person-centered approach and provided a more complete description of continuity and discontinuity in the development of prosocial behavior across the entire formal schooling period (i.e., Grades 1–12). Second, the findings identified four distinct subtypes of prosocial behavior based on a sample of children who were ethnically diverse, academically at risk, and predominantly low income. Third, our findings corroborated risk and resilience perspectives and identified both common and unique early childhood antecedents that were associated with the development of prosocial behavior.

The four distinct classes identified in the present study, including a high-stable, a moderate-increasing, a high-desisting, and a low-stable class, were consistent for the most part with previous studies, which have examined heterogeneous developmental trajectories of prosocial behavior (Barker et al., 2010; Cotè et al., 2002; Kanacri et al., 2014; Kokko et al., 2006). Although our study targeted an academically at risk and predominantly low-income sample, findings were largely in agreement with prior research which has focused on community-based samples, such that the majority of the children exhibited persistently high levels of prosocial behavior

Table 3. Multinomial Logistic Regression Analyses Comparing the Four Differentiated Trajectories in Terms of Early Childhood Antecedents.

Early Childhood Antecedents	Low Stable vs. High Stable	High Desisting vs. High Stable	Moderate Increasing vs. High Stable	Low Stable vs. Moderate Increasing	Low Stable vs. High Desisting	High Desisting vs. Moderate Increasing
Individual antecedents						
1 Gender (1 = boys)	9.30**	9.16***	5.15*	1.82	1.08	1.73
2 African American	7.60*	7.16**	6.80*	1.13	1.05	1.07
3 Hispanics	2.24	1.39	3.25	0.69	1.51	0.44
4 Intelligence	0.99	1.00	0.97	1.02	1.00	1.02
5 Academic performance	1.08	0.85	1.35	0.80	1.25	0.63
6 Ego-resilient personality	0.34***	0.76	0.41***	0.83	0.46*	1.83
7 Behavior problems	3.28*	1.56	2.13	1.53*	2.13*	0.72
Contextual antecedents						
8 Maternal support and responsiveness	1.03	1.26	1.52	0.68	0.83	0.82
9 Family socioeconomic adversity	1.02	0.87	0.68	1.52	1.19	1.28
10 Teacher–child warmth	0.12**	0.54	0.17*	0.69	0.21**	3.23
11 Teacher–child conflict	1.97	2.37*	1.52	1.30	0.85	1.55
12 Peer acceptance	0.97	1.20	0.82	1.20	0.79	1.50
13 Peer rejection	2.89**	2.32	1.96	1.49	1.20	1.23

Note. $N = 784$. Odds ratios are reported with significance tests at 95% confidence interval.
*$p < .05$. **$p < .01$. ***$p < .001$.

from early childhood through adolescence (Barker et al., 2010; Kanacri et al., 2014; Nantel-Vivier et al., 2014). Several of the identified classes were also consistent with studies which more specifically examined at-risk samples (Kokko et al., 2006; Nantel-Vivier et al., 2009), such that we identified a high-declining class and a low class. However, in contrast to these studies, we also identified a moderate-increasing class. Due to the variations in methodologies, sample characteristics, and age ranges across studies, it is difficult to discern the exact causes for these differences.

Early Childhood Risk and Resilience Antecedents

Compared to children with high-stable prosocial trajectories, the results revealed that a combination of individual child (i.e., lower ego resiliency, higher behavior problems, gender, and race) and contextual antecedents (i.e., lower teacher–child warmth, higher teacher–child conflict, and higher peer rejection) were additively associated with less optimal trajectories of prosocial behavior over time. These findings support multiple risk perspectives, according to which the combination of multiple risks factors and few protective resources may collectively undermine more adaptive developmental trajectories (Evans et al., 2013). More specifically, child behavior problems, peer rejection, and teacher–child conflict were the most pronounced risk factors, and ego-resilient personality and teacher–child warmth functioned as protective factors.

Consistent with the risk and resilience framework, our findings highlight the effects of attributes of the children themselves, and their social contexts, on the growth and continuity of prosocial behavior in childhood and adolescence (Liew, Cao et al., 2018; Liew, Carlo et al., 2018). Across the four identified prosocial trajectory classes, the results revealed that a combination of individual child characteristics (i.e., behavior problems and ego-resilient personality) differentiated class membership by functioning as both common and unique risk and resilience factors. Specifically, behavior problems functioned as a risk factor which increased the likelihood of being in the low-stable trajectory class, compared to the other three classes. Perhaps it is not surprising that children who engaged in more aggressive behaviors in early childhood were more likely to have deficits in their prosocial behavior trajectories. Prior research has demonstrated that children's physical aggression is associated with low prosocial behaviors (e.g., Romano et al., 2005). In contrast, ego-resilient personality appeared to function as a common resilience antecedent, such that it increased the likelihood that children would be on a high-stable or high-desisting trajectory. For children facing early vulnerability, ego resiliency may function as a protective factor that contributes to more adaptive prosocial behavior trajectories. That is, children who display more resilient coping skills, such as being confident and resourceful, may be more resistant to, and better equipped to recover from adversity (Block & Block, 1980).

Results pertaining to the contextual antecedents further revealed how a combination of risk and resilience factors were associated with children's prosocial trajectories, over and above the effects of their individual characteristics. For instance, in addition to ego resiliency, teacher–child warmth was a common protective factor associated with high-stable and high-desisting prosocial trajectories. Warm relationships with teachers may enhance children's social cognitions relating to moral reasoning and prosocial emotions (e.g., empathy, sympathy), which are linked to prosocial behavior (see Eisenberg et al., 2006). Further, warm relationships with teachers can provide feelings of security for children allowing them to more actively explore and engage in social interactions in the classroom or at school. In turn, these warm or supportive relationships may facilitate children's emotional self-regulation skills, conflict management with peers, and prosociality (Jennings & Greenberg, 2009). However, it is worth noting that teacher–child warmth appeared to be more consistently associated with high initial levels of prosocial behavior, such that it predicted membership in both the high-stable and high-desisting classes. Exactly why teacher–child warmth was associated with more sustained prosocial behavior for some children, but declines in other children, is unclear. Perhaps children in the former group maintained persistently warm relationships with teachers across their formal

schooling years, but those in the latter group experienced declines in warmth. Because it was not possible in the current study to assess time-varying changes in teacher–child warmth, this explanation remains speculative and may serve as an important direction for future research.

In addition to the resilience factors, we identified some unique risk factors that are associated with the development of prosocial behavior. Interestingly, what primarily differentiated the high-stable and high-desisting classes was teacher–child conflict. These findings suggest that early teacher–child conflict may put some children at risk for exhibiting declines in their prosocial behaviors. Perhaps early teacher–child conflict may result in children establishing negative mental representations of their teachers, which may contribute to them having more conflictual interactions in subsequent relationships with teachers. However, as previously noted, because it was not possible to assess time-varying changes in teacher–child conflict, this explanation remains speculative, and it may be important to consider more dynamic models of development which considered time-varying changes in prosocial behavior in conjunction with teacher–child conflict, as well as other focal constructs. We are also aware that early teacher–child conflict may not be the only reason for explaining this desisting trend, and factors such as a focus on the self as indicated by the developmental need for separation-individuation and independence during adolescence may contribute to this desisting pattern (e.g., decreased gratitude, Bono et al., 2019; decreased sympathy, Carlo et al., 2015). In addition, discontinuities (e.g., a high-desisting class) in prosocial behaviors may correspond with the effects of the middle school transition and changing classroom structure or specific biological/hormonal changes that are associated with the onset of adolescence. For instance, adolescents report greater school disengagement and may be less inclined to be prosocial in the school context due to more rigorous academic demands (O'Connor & McCartney, 2007). They usually have multiple teachers, larger classes, and fewer interactions with teachers, which may also decrease the likelihood of teachers to observing students' prosocial behavior.

The results also revealed that peer rejection functioned as an additional contextual risk factor which increased the likelihood of being in the low-stable trajectory class. Thus, it appeared that children with stable low levels of prosocial behavior faced a combination of behavior problems and peer rejection. It is plausible that the cumulative effects of aggression and peer rejection likely deprived children of having opportunities to experience more normative prosocial socialization experiences, which maintained their persistently low prosocial behavior trajectories.

Strengths and Limitations

Strengths of this investigation included a relatively large sample of children followed from Grades 1 to 12. These longitudinal data points used to measure prosocial behavior enhanced the reliability and flexibility of the longitudinal analyses. The current study also extended previous literature and examined a broader range of early childhood antecedents ranging from individual characteristics and contextual factors, which contributed to a more comprehensive understanding of how and why some children are more prosocial than others. Moreover, because the current study focused on an at-risk sample, the findings contribute to, and expand, extant research on prosocial behavior which has typically been based on more normative samples. Cross-validation of our results using different

analytical techniques could provide confidence and prediction of the identified classes and associated predictors. Because the current study assessed prosocial behaviors as a global school-based construct and solely based on teacher-reports, there remains a need for additional research to examine the long-term developmental trajectories of different forms of prosocial, consistent with multidimensional perspectives (see Padilla-Walker et al., 2015, 2018, for a more detailed discussion of this topic).

Conclusion

Findings from the current study elucidate multiple distinct trajectories of prosocial behavior across the formal schooling years. Results revealed that children's demographic characteristics (boys, African Americans), ego-resilient personality, behavior problems, teacher–child relationship quality, and peer rejection in early childhood all significantly differentiated the prosocial trajectory classes. The results suggest multiple intervention strategies may be beneficial in promoting children's prosocial behaviors, including efforts to enhance ego resiliency, reducing behavior problems, and maintaining positive relationships with teachers and peers. These strategies may be most beneficial in early childhood, or at the outset of formal schooling, to promote more positive developmental trajectories as children progress through school.

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Supplemental material

Supplemental material for this article is available online.

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