ijbd

International Journal of Behavioral Development
2021, Vol. 45(4) 289–292

DOI: 10.1177/0165025421990759
journals.sagepub.com/home/jbd

Introduction to the Special Section: Prosocial development in risky and vulnerable contexts

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Abstract

The introduction highlights a developmental perspective on children's and youth prosocial behavior in risky and vulnerable contexts. The six empirical papers published in this Special Section are considered within a multilevel, multidimensional framework and reflect a diversity of methodological approaches. The studies each provide foundational work that informs theory, builds our knowledge base, and has important intervention implications. We highlight the contributions of each study and present recommendations for future developmental research on prosocial behaviors.

Keywords

Risk factors, prosocial, social ecological model, cross-cultural developmental psychology, risky and vulnerable contexts, methodology

Prosocial behaviors, or voluntary acts aimed primarily to benefit another person (Eisenberg et al., 2015), are correlated with a host of health and well-being outcomes (Johnson et al., 1998; Littman-Ovadia & Steger, 2010), are important markers of moral development, and are foundational for understanding intergroup cooperation and conflict (Bowman et al., 2010; Carlo, 2014). The vast majority of this research, however, has focused the development of prosocial behaviors in normative environments. Relatively less attention has been paid to prosocial behaviors in risky and adverse contexts and to marginalized populations. To address this gap, this Special Section highlights work by leading scholars on *Prosocial Development in Risky and Vulnerable Contexts*.

Psychological research within the context of adversity and risk often adopts a pathology, deficit, or maladaptation-oriented approach. Although such research is necessary, there are high costs associated with an overemphasis on pathology and the relative neglect of positive development. This skewed focus can be particularly troubling because oftentimes the study populations are minorities, which can promote stigma and further marginalize such groups. Shifting the focus away from pathological and negative outcomes and toward prosocial behaviors emphasizes children's abilities to actively and positively transform their own trajectories and provides important insights on resiliency and promotive factors (Davis & Carlo, 2019; Masten & Narayan, 2012; Taylor et al., 2019). Thus, a developmental approach to the study of prosocial behaviors may inform scholars, practitioners, and policymakers about avenues to promote prosociality among at-risk groups in the face of adversity and threat.

Several recent advances in this field have accompanied the growing interest in prosocial development. Some scholars have advocated for more sophisticated conceptualizations of prosocial behaviors that emphasize the unique correlates and trajectories of specific types and targets of prosocial behaviors (Padilla-Walker & Carlo, 2015; Taylor et al., 2020). This approach allows us to identify specific types of prosocial behaviors that might promote distinct benefits across different levels of children's social ecology (Taylor, 2020; Taylor et al., 2014, 2018). A second recent advancement is the renewed focus on studying diverse cultural groups. Although research on prosocial behaviors has existed for decades, relatively little attention has been paid to the study of prosocial development in groups from diverse nationalities and in diverse minority groups within societies (Bähr et al., in press; Carlo, 2006; Carlo & de Guzman, 2009). These kinds of studies are necessary to examine the generalizability of models across cultures and to understand normative social development within specific cultural contexts. A third major trend is the proliferation of more sophisticated study designs (e.g., longitudinal, experimental) and measures (e.g., multi-informants, multidimensional scales) (e.g., Taylor et al., 2018). These advancements facilitate the discovery of age-related trends, allow us to better discern the direction of relations, provide valuable convergent evidence, and strengthen the internal validity of studies. The papers in the Special Section showcase these advancements and positively position the future of the study of prosocial development.

Specific Contributions of the Special Section

In this Special Section, different levels of children's and youth's social ecology are reflected in the studies. As in the wider literature, the majority of research in this Special Section focuses on the microsystemic structure of the family. Distinguishing among

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family relationships, Rum, Zachor, and Dromi (2021) examine prosociality between siblings, while Samper, Llorca, Malonda, and Mestre (2021) focus on the role of parents, and Bradshaw, Creaven, and Muldoon (2021) investigate the influence of incarcerated primary caregivers. Davis et al. (2021) take a holistic approach through measuring family cohesion among Latino families in the U.S. Within the microsystem, but beyond the family, Shi, Ettekal, Liew, and Woltering (2021) examine the quality of the interpersonal relationships with teachers and peers. In contrast, the consideration of exosystemic and macrosystemic influences is relatively less common in the existing literature. Reflecting these contextual aspects of adversity, Shamoa-Nir et al. (2021), situated in Israel, examine intergroup relations related to the ongoing conflict, with potential cultural and political implications. Shi et al. (2021) examine the impact of risks associated with socioeconomic status, shaped by parental workplace/income, on children's prosocial behavior.

Although most of the papers in the Special Section examine prosocial behaviors aiming to benefit an individual or an unspecified target, some of the papers study specific targets of prosocial behaviors. For example, Rum et al. (2021) focuses on prosociality in sibling dyads, particularly between a typically developing older sibling and a younger sibling with autism spectrum disorder. The Rum et al. (2021) study provides important insights on prosocial development in an understudied and unique family relationship context. The Shamoa-Nir et al. (2021) study measures sharing with outgroup members. This latter study highlights one of the important implications of the study of prosocial behaviors, namely the relevance of such actions for understanding prejudice and discrimination.

The Special Section also reflects a multiplicity of research designs and methodological approaches. Observational data (Rum et al., 2021), experimental tasks (Shamoa-Nir et al., 2021), self-report (Bradshaw et al., 2020; Davis et al., 2021; Samper et al., 2021; Shamoa-Nir et al., 2021), and multi-informant (Shi et al., 2021) surveys were used. Three papers are longitudinal studies (Bradshaw et al., 2021; Davis et al., 2021; Shi et al., 2021) spanning 3–12 years. Longitudinal designs are especially useful since they enable researchers to test the direction of effects and assess within-person change in risk or protective variables. Such process-oriented research is also emphasized in the person–process–context model (Bronfenbrenner, 1986) and in the triadic-reciprocal determinism model (Bandura, 1986). Two other studies are comparative and focus on potential group differences between offender and non-offender populations (Samper et al., 2021) and Jewish and Arab-Muslim children (Shamoa-Nir et al., 2021), respectively.

Beyond the Special Section

The papers in the Special Section represent important advancements in the study of prosocial development. The diverse samples and methodologies in the context of risk and vulnerability fill a much-needed gap in the field. The papers highlight the resilient nature of children and youth in the face of adversity and risk. The studies also complement existing work on these at-risk populations that examines pathology and maladjustment. Taken together, the accumulation of data from studies on prosocial behaviors and maladjustment can better inform policymakers and program developers. Such interventions should aim not only to reduce maladjustment but also to promote positive health and well-being.

There are, of course, additional future studies on prosocial development needed. First, given the substantial existence of work on microsystem influences, there is a need for more research that captures exo- and macrosystem influences on the development of prosocial behavior (Taylor et al., 2018). Second, the Special Section covers several adversity and risk contexts but there are many other contexts of adversity to explore such as chronic illness, poverty and homelessness, mass migration, collective traumatic experiences (such as the global pandemic of COVID-19), natural disasters, war and violence (e.g., gangs).

Third, more studies on bidirectional effects between children's prosocial behavior and their environment are also needed. Prior work has demonstrated, for example, a positive feedback loop between maternal warmth and prosociality (Carlo et al., 2011). A mutual influence has also been identified for neighborhood factors; sense of community can be understood as both a cause and effect of neighborhood activism (Chavis & Wandersman, 1990). Relatedly, greater theoretical and empirical clarity on how children's prosocial behavior influences various systems is equally important. For example, a multilevel orientation can further investigate the links between interpersonal prosocial behavior to civic engagement and collective action in children and youth (Taylor et al., 2018). These types of studies that focus on children residing in risk and vulnerable contexts could ultimately inform intervention efforts that consider children's agency.

And fourth, although the Special Section papers present a wide array of methodologies, future research can benefit from additional methodological diversity. Research utilizing multiple methods can provide convergent evidence. Self-report measures (including daily diaries) can be complemented with observational, other informants, and psychophysiological indices. While increasingly being used with adults, bio-psychological, neurobiological, and neuroanatomical markers with children and young people should also be explored (e.g., Decety et al., 2016). Moreover, well-designed, ecologically valid experiments (e.g., manipulating scenarios to observe and measure actual behaviors) and interventions are needed to test causality and also lend greater transferability to real-world actions. Finally, building on the Special Section's global and diverse coverage (Spain [Samper et al., 2021]; U.S. [Davis et al., 2021; Shi et al., 2021]; Israel [Rum et al., 2021; Shamoa-Nir et al., 2021]; and Ireland [Bradshaw et al., 2021]), more cross-cultural research that extends beyond WEIRD-populations (Henrich et al., 2010) are needed.

Conclusion

Millions of children are born into and raised in risky and adverse environments, which shape their developmental trajectories. The work presented here provides evidence on the powerful agency of children in the face of adversity and informs intervention efforts that can trigger positive health and well-being outcomes and buffer against risk. Indeed, all of the Special Section papers present crucial information for the creation and improvement of targeted interventions. For instance, Bradshaw et al. (2021) suggest interventions focus on the primary caregivers of a child in the context of parental incarnation. Shi et al. (2021) highlight ego-resilience as a protective factor for youth in conflict with teachers and peers.

Although these studies focus on the benefits of prosocial behaviors for fostering well-being and positive interpersonal relationships, it is important to note that prosocial behaviors are also the basic building block of cooperation, peace, and harmony. Given the

many current global challenges and problems, more research that links individual-level prosocial behaviors to group-level outcomes (e.g., cooperation, reduced conflict, efforts to combat poverty) is needed to address these global challenges. Each of the papers in this Special Section offer provocative evidence that can contribute to such efforts. Importantly, the Special Section papers also inform the development of integrated models of prosocial development that provide a strong foundation for future investigations in this important area of research.

Acknowledgments

The authors would like to thank the IJBD team and leadership for supporting this Special Section, as well as the numerous reviewers who strengthened the global contributions. Additional appreciation for Celia Bähr who contributed to the literature review during her UCD internship with Taylor in Spring 2020.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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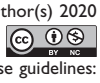
International Journal of Behavioral Development
2021, Vol. 45(4) 293–298



DOI: 10.1177/0165025420971042
journals.sagepub.com/home/jbd


Prosocial behaviors of children with autism spectrum disorder (ASD) during interactions with their typically developing siblings

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Abstract

This observational study focuses on prosocial behaviors of children with autism spectrum disorder (ASD) during an interaction with their older, typically developing sibling (TD-Sibs). Twenty-eight sibling dyads, in which the younger sibling was diagnosed with ASD (ASD-Sibs), were video-recorded at home playing a game of their choice. Video recordings were microanalyzed, measuring frame-by-frame observational indices of prosocial behaviors. Siblings' interactions were mostly collaborative. During the interaction, the older TD-Sibs initiated more actions and the younger ASD-Sibs imitated more. The frequency of the prosocial behaviors of the ASD-Sib was associated with the frequency of the TD-Sib's prosocial behaviors. The findings emphasize the importance of sibling interactions as an opportunity for children with ASD to practice prosocial behaviors.

Keywords

Prosocial behavior, autism, RRBI, sibling relationship, siblings, interaction, microanalysis

Autism spectrum disorder (ASD) is characterized by social-communication impairments and restricted, repetitive behaviors, and interests (RRBI) (American Psychiatric Association, 2013). Considering the fact that social difficulty is a primary facet of ASD, there is relatively little work directly examining prosocial behaviors in this population (Jameel et al., 2014). It is reasonable to assume that children with ASD display fewer prosocial behaviors in comparison to typically developing (TD) children, due to the social challenge inherent in an ASD diagnosis. Studies supporting this assumption, however, rely mainly on parental reports (Russell et al., 2012; Totsika et al., 2015). Yet, some empirical studies found no difference in prosocial behaviors between children with ASD and controls. For example, Deschamps et al. (2014) found that prosocial behavior in response to distress signals of a peer in a computer task was similar in 6–7-year-old children with and without ASD (see also McDonald & Messinger, 2012). While the prosocial behavior measured in these studies was a response to another person's distress, parents' reports of prosocial behaviors usually cover a broader set of circumstances (though filtered through the parents' perspective). Thus, in some contexts, children with ASD may display greater prosocial behavior than expected, considering the social difficulties associated with their diagnosis. Sibling interactions may be such a context. Interaction with siblings has been shown to be an important environment for social development in TD children (Brody, 2004; Dunn, 1992).

In a retrospective study, Ben-Itzchak et al. (2016) reported that children with ASD who have TD siblings gained better social functioning scores than children with ASD who grow up as only children in their families. This effect was even greater when TD siblings were older (mean age of 4 years old; Ben-Itzchak et al., 2018). Ben-Itzchak et al. (2018, p. 928) speculated that the benefit of having older siblings on the social functioning of children with ASD could be explained either by parental factors (e.g., more experienced parenting, reduced parental stress) or by the fact that "older TD siblings function as a role model for their younger sibling with ASD, take a lead in the relationship and enable participation in social interactions such as play and discourse". The present study was designed to explore the TD sibling as a role model for children with ASD by characterizing siblings' naturally occurring interactions in a home environment, with a focus on prosocial behaviors.

Studies that directly examined sibling interaction in families of children with ASD are rare (for exceptions, see Bontinck et al., 2018b; El-Ghoroury & Romanczy, 1999; Knott et al., 1995, 2007). Bontinck et al. (2018b) investigated 22 sibling dyads involving a child with ASD (3–15 years old) and his/her infant sibling (i.e., an infant at high risk for ASD, aged 17–20 months), in comparison to 29 TD siblings dyads (older siblings 3–8 years old, and younger ones 17–19 months). There were no between-group differences in positive behaviors (Bontinck et al., 2018b, define positive behaviors as prosocial, e.g., sharing a toy, as "allowing the other sibling to do something" [p. 7], and as positive responses to the other sibling's behaviors). However, sibling dyads involving an older sibling with ASD had higher levels of negative behaviors in

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comparison to pairs of TD sibling dyads. Knott et al. (1995) examined the interactions of 15 ASD children (3–10 years old) and their younger or older TD siblings (1–12 years old) in comparison to sibling pairs in which one of the siblings has Down syndrome (DS), and reexamined six of these dyads 12 months later (Knott et al., 2007). Knott and colleagues found that during the interaction with their TD siblings, younger siblings with ASD showed fewer prosocial initiations in comparison to younger siblings with DS. At the same time, Knott and colleagues emphasized that the children with ASD demonstrated better social skills than might have been predicted based on existing literature. El-Ghoroury and Romanczy (1999) compared the play interactions of nine children with ASD (3–7 years old) and their siblings (eight older siblings and one younger sibling) to the interactions of the same children and their parents. Although parents exhibited more play behaviors toward the children with ASD than the siblings did, children with ASD initiated more interactions with their siblings than with their parents.

These earlier studies either did not directly examine prosocial behaviors or did not use a younger ASD/older TD sibling dyad design. Therefore, it is hard to learn from them about the "TD sibling as a role model" hypothesis in the context of prosocial behaviors. Nevertheless, these studies reflect that comparing ASD/TD sibling dyads to dyads of siblings with no ASD highlights the social deficits in the ASD/TD siblings' dyadic interaction. Yet, comparing the interaction of the same child with ASD with different social partners in the family highlights the unique social role of sibling interaction.

In the current study, we aimed to microanalyze siblings' interactions to detect characteristics related to the "TD sibling as a role model" hypothesis. Taking "the lead" in the interaction on the part of the older sibling, as Ben-Itzchak et al. (2018, p. 928) describe, can be demonstrated by conducting more play-related behaviors, such as setting rules and roles, and initiating more discourse, agonistic (e.g., insulting and threatening), and prosocial (e.g., helping, sharing, and comforting; Abramovitch et al., 1986) behaviors. Nevertheless, the dominancy of the older sibling is not sufficient without the following and imitating on the part of the younger sibling. This role asymmetry is documented in a series of early studies on TD sibling interactions in middle childhood (Abramovitch et al., 1986; Pepler et al., 1981). Bontinck et al. (2018b) found that the typical asymmetric role relationship was followed when children with ASD interacted with their infant younger siblings. On the other hand, Knott et al. (1995, 2007) reported that typical asymmetric roles were not followed; younger or older TD siblings both initiated and imitated more than the ASD sibling. Using an adapted version of a coding system used by Abramovitch et al. (1986), Knott et al. (1995, 2007), and Bontinck et al. (2018b), we examined whether asymmetric roles are followed in sibling interaction in which the younger sibling has ASD. That is, do older TD siblings conduct more prosocial, discourse, play-related, and agonistic behaviors than their younger sibling, while younger ASD siblings imitate more? To that end, we analyzed both siblings' behaviors during the interaction.

Abramovitch et al. (1986) also reported that a high prevalence of positive or negative behaviors in one sibling was associated with a high prevalence of such behaviors in the other sibling. This pattern of association relates to Ben Itzchak et al.'s (2018, p. 928) point that the older TD sibling "enables participation in social interactions such as play and discourse". In the present study, we inspected whether this pattern of association between prosocial behaviors is followed in TD/ASD sibling dyads. When the siblings are engaged in collaborative play (i.e., engaged with each other and playing together, in contrast to parallel play when each child plays alone), such an association can reflect coordination in the interactions, and not solely similarity in the siblings' behaviors. Therefore, we started by examining whether the sibling dyadic interactions involved collaborative play.

In summary, based on the limited number of observational studies on ASD/TD siblings' interaction, we examined prosocial behaviors in TD and ASD siblings during free-play at-home interactions. Although role asymmetry and association between siblings' behaviors have been found in TD sibling dyads, potential social impairment inherent to an ASD diagnosis may elicit different results. First, we assessed whether the siblings' dyadic interactions were collaborative. Second, we examined the typical asymmetric roles; that is, did the older TD sibling conduct more prosocial, discourse, play-related, and agonistic behaviors, and the younger ASD sibling imitate more? Third, we examined whether prosocial behaviors of the child with ASD are associated with those of the TD sibling, controlling for age, adaptive functioning level of the child with ASD, and other behaviors of the TD older sibling. Finally, we documented low-level behaviors, such as RRBI, and took these into account in the analysis.

Method

Participants

Twenty-eight Israeli Jewish sibling dyads participated. The inclusion criteria were a younger sibling with ASD (ASD-Sib) and an older sibling with no developmental or health problems, who are in a regular education classroom (TD-Sib). All ASD-Sibs were diagnosed at authorized medical centers/health care centers, where the Autism diagnostic observation schedule (ADOS, Lord et al., 1999; ADOS 2, Lord et al., 2012) is a part of the diagnostic battery. The ASD-Sibs demonstrated varied levels of functioning, as measured by the Vineland Adaptive Behavior Scales (VABS; Sparrow et al., 2005). The sample included two pairs of fraternal twins (boys), each of whom had one twin with ASD while the other was TD. Table 1 details the characteristics of the sibling dyads.

Fifty-seven percent of the families reported an income reflective of the average or above the average income for households in Israel, and the rest reported an income reflective of slightly under or under the average income.

Procedure

Data collection. Data collection was done via direct observations during home visits. The parents signed an informed consent form and completed a demographic questionnaire. The mothers completed a standard structured interview for assessing the adaptive functioning of the ASD-Sibs (VABS; Sparrow et al., 2005). At the beginning of the home visit, the researcher informed the children that she wished to see them playing as they usually play and clarified that they could stop the game and/or videotaping if they wanted. They were asked to choose a game and to play with it together for 10 min.[1] Of the 10 filmed minutes, the middle 5 min were coded and analyzed (Bontinck et al., 2018a; Meirsschaut et al., 2011), using a coding system that was implemented into a program designed to analyze behavioral observations (INTERACT).

Coding. In a microanalytic frame-by-frame analysis, each action that occurred was counted and classified into one of the following

Table 1. Sibling Dyads.

	Autism spectrum disorder siblings ($n = 28$)		Typically developing siblings ($n = 28$)
Sex	89.3% (25) males		46.4% (13) males
Dyads		42.9% (12) same sex; 57.1% (16) mixed sex	
Age	$M = 6.37$ ($SD = 1.52$)		$M = 9.12$ ($SD = 2.06$)
Age difference		$M = 2.72$ ($SD = 1.36$)	
Vineland Adaptive Behavior Scales (VABS) score*	$M = 81.07$ ($SD = 15.55$) Min = 56; Max = 127		

Note. *Average VABS score in the general population is 100, $SD = 15$ (Sparrow et al., 2005).

behavioral categories: (1) prosocial (such as helping, praising, sharing, and comforting); (2) discourse (such as asking and sharing an experience or information not related directly to the ongoing play); (3) play-related (such as establishing roles and rules in the game[2]); (4) agonistic (such as a threat or an insult); (5) imitation (performing the same behavior as the other sibling); (6) low-level (i.e., incomplete or unclear behaviors such as speaking out of context, and RRBI, such as asking a repetitive question or hand-flapping upon winning a card in the game). The coding scheme was constructed by adapting and elaborating previously published interactional codes (Abramovitch et al., 1986; Knott et al., 2007; for low-level category, see Bauminger-Zviely, 2013; Hauck et al., 1995).

Additionally, each dyadic interaction was globally assessed as mostly collaborative (the siblings collaborate on the joint play for most of the interaction time) versus mostly parallel (the siblings spend most of the interaction time in parallel play).

Inter-rater reliability. Ten percent of the data were simultaneously coded by the researcher and another trained coder. The overall kappa for the counts and classification of actions was 0.80. Within specific categories, kappa values ranged from perfect to moderate (Landis & Koch, 1977) (prosocial: 0.63; discourse: 0.65; play: 0.81; agonistic: 0.58; imitation: 1.00; low-level: 0.58). When defining the interaction as collaborative versus parallel, there was a 100% agreement.

Data analysis. To examine whether a typical asymmetric role relationship between the siblings was followed, we compared behavior counts between the TD-Sibs and the ASD-Sibs. In light of the nature of the data (frequency counts), generalized linear models were used (Cohen et al., 2014). The distribution assumption was for a count variable, Poisson distribution, with an alteration to a negative binomial distribution (NBD) for overdispersion (Coxe et al., 2009; Hilbe, 2017). Then we examined associations between the frequency of the prosocial behaviors displayed by the ASD-Sib with those displayed by the TD-Sib. We further examined associations between the frequency of the prosocial behaviors displayed by the ASD-Sib with the other types of behaviors (see above), with the level of adaptive functioning and age of the ASD-Sib, and the age differences between siblings.

Results

First, to assess the nature of the siblings' dyadic interactions, we collected descriptive measures regarding collaborative versus parallel play in the sibling interaction, and the behaviors of the older and younger siblings. Collaborative play characterized most pairs (78.6%). Prosocial behaviors were the second most frequently observed behaviors (pair average: 17.46, *SD*: 13.58), occurring after play-related behaviors (pair average: 45.07, *SD*: 28.24). Interestingly, the proportions of prosocial behaviors to all other categories of behaviors were similar for TD-Sibs and ASD-Sibs (20% and 16%, respectively; see supplementary materials for distributions of behaviors by categories for TD and ASD siblings).

Second, to examine the typical asymmetric roles, we compared the number of actions between the older TD-Sibs and the ASD-Sibs by using a general linear model (GLM) where the action count distribution was assumed NBD (Hilbe, 2017). The NBD distribution is a corrected Poisson distribution for overdispersion. Using the multilevel GLM with NBD assumption, we controlled for the TD-Sibs and the ASD-Sibs as dyads, and correlation within dyads was set as unstructured. Thus, in the GLM analysis, we clustered the TD-Sibs and the ASD-Sibs into pairs to control for within-pair behaviors. The Wald's χ^2 test for significance level was used. We provided the linear and the exponentiated effect, with the confidence interval around the exponentiated estimate, where the exponent value is the change in the count of the TD-Sibs versus ASD-Sibs' behaviors. Consistent with typical asymmetric roles, TD-Sibs showed more prosocial, discourse, play-related, and agonistic behaviors, while ASD-Sibs showed more imitation and more low-level behaviors (Table 2). All differences remained significant when controlling for sex and the functioning level of the ASD-Sibs.

Third, using GLMs with NBD, we examined the association between the number of prosocial behaviors exhibited by TD-Sibs and ASD-Sibs. The same process was repeated for each of the other types of behaviors. Table 3 shows a summary of the associations between the TD-Sib's measures on the ASD-Sib in separate models for each type of behavior.

As is seen in Table 3, the number of prosocial behaviors displayed by the ASD-Sibs was significantly associated with the number of prosocial behaviors displayed by the TD-Sibs. The same pattern was found regarding discourse, play-related, agonistic, and imitative behaviors. Meaning, the number of behaviors displayed by the TD-Sib was significantly associated with the number of behaviors of the same kind displayed by the ASD-Sib. Only the low-level behaviors of the ASD-Sibs, which are characteristic to individuals with this diagnosis, were not associated with the number of low-level behaviors exhibited by the TD-Sibs, nor with any of the other examined variables.

Next, the effect of age and adaptive functioning level of the ASD-Sib, age difference between siblings, and the other behaviors of the TD-sib (discourse, play-related, agonistic, imitation, and low-level) were added to the model predicting prosocial behaviors

Table 2. Comparison of Behaviors Displayed by Each of the Siblings, GLM Results.

Type of observed behavior	Effect: b; EXP (b) Typically developing siblings (TD-Sibs) vs. siblings with a diagnosis of autism spectrum disorder (ASD-Sibs)	Mean (*SD*) ASD-Sibs	Mean (*SD*) TD-Sibs	Mean (*SD*) Joint total	Wald's χ^2	*df*
Prosocial*	0.47; 1.60	6.71 (7.4)	10.71 (8.6)	8.71 (8.20)	5.79	1
	[1.09, 2.33]	[4.50, 10.00]	[8.00, 14.35]	[6.31, 11.40]		
Discourse*	0.54; 1.73	3.11 (3.50)	5.36 (5.40)	4.23 (4.65)	7.93	1
	[1.18, 2.52]	[2.06, 4.68]	[3.71, 7.73]	[2.91, 5.73]		
Play-related***	0.42; 1.52	17.86 (12.38)	27.14 (17.94)	22.5 (15.98)	20.09	1
	[1.27, 1.83]	[13.88, 22.98]	[21.34, 34.52]	[17.51, 27.67]		
Agonistic**	0.51; 1.67	1.96 (2.6)	3.29 (3.55)	2.63 (3.15)	7.00	1
	[1.14, 2.45]	[1.22, 3.17]	[2.22, 4.87]	[1.71, 3.77]		
Imitation*	−1.01; 0.36	0.79 (1.64)	0.29 (0.81)	0.54 (1.31)	4.77	1
	[0.15, 0.90]	[0.37, 1.68]	[0.10, 0.80]	[0.22, 1.04]		
Low-level***	−1.39; 0.25	11.07 (10.5)	2.75 (2.3)	6.91 (8.62)	36.97	1
	[0.16, 0.39]	[7.84, 15.63]	[2.03, 3.73]	[4.36, 6.98]		

Note. In squared brackets, 95% confidence interval for exponentiated effect of ASD ($n = 28$) versus TD ($n = 28$); range of count observed behaviors displayed by each of the siblings (minimum–maximum): prosocial: 0–39; discourse: 0–20; play-related: 0–64; agonistic: 0–13; imitation: 0–8; low-level: 0–44. GLM = general linear model. *$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

Table 3. Associations Between Frequency of Behaviors of Siblings with a Diagnosis of Autism Spectrum Disorder ($n = 28$) and Frequency of Behaviors of Typically Developing Siblings ($n = 28$) in the Same Category.

				95% Wald confidence interval for Exp(*B*)		Hypothesis test		
	B	*SE*	Exp(*B*)	Lower	Upper	Wald's χ^2	*df*	Sig.
Prosocial*	0.07	0.03	1.07	1.01	1.14	5.02	1	0.025
Discourse*	0.09	0.04	1.09	1.01	1.19	4.51	1	0.034
Play-related*	0.03	0.01	1.03	1.01	1.06	7.28	1	0.007
Agonistic**	0.15	0.06	1.17	1.04	1.31	6.48	1	0.011
Imitation*	0.65	0.28	1.91	1.10	3.30	5.37	1	0.021
Low-level	0.02	0.09	1.02	0.85	1.22	0.06	1	0.812

Note. *$p < 0.05$. **$p < 0.01$.

of the ASD-Sib. None of the additional controls contributed any additional significance; the number of prosocial behaviors displayed by the TD-Sibs was the only variable that was significantly associated with the number of prosocial behaviors displayed by the ASD-Sibs. Adding many variables into the model may increase the likelihood of a type I error. However, the fact that the same pattern was found across categories of behaviors, excluding low-level behaviors, reinforces the validity of these findings.

Discussion

This study reports on the prosocial behaviors of children with ASD during the interaction with their older TD siblings, using an observational, naturalistic design with a frame-by-frame analytic computerized tool. Analyses indicated that prosocial behaviors were frequently observed in at-home free-play sibling interaction between TD and ASD siblings. We found a generally collaborative play and a positive nature of sibling dyadic interactions: play-related and prosocial behaviors were the most frequent behaviors in the interaction.

Asymmetric roles were identified during the interaction; older siblings conducted more prosocial, discourse, play-related, and agonistic, behaviors, while the younger sibling imitated more. Moreover, significant associations were found between prosocial behaviors of the two siblings in each dyad; this pattern was held across all categories of behavior, except for low-level behaviors. These findings are consistent with role asymmetry and associations between siblings' behaviors in TD dyads (e.g., Abramovitch et al., 1986). However, considering the social challenges inherent in ASD, the findings from this study suggest that sibling interaction is a valuable social context for developing and practicing prosocial behaviors in children with ASD.

Low-level behaviors were significantly more frequent among the children with ASD and did not follow the pattern of association with TD siblings' behavior. Moreover, age and functioning level adaptive function of the ASD sibling, nor any of the measured behaviors of the TD sibling, were associated with the low-level behaviors of the ASD sibling. In other words, these behaviors may be seen as being "left out" of the dyadic coordination. Low-level behaviors were specified as unclear, incomplete social actions or as RRBI, which constitute a defining characteristic of ASD (APA, 2013). The lack of association with TD siblings' behavior could indicate that low-level behaviors were accepted with no special attention, or even ignored, because the TD siblings are used to these behaviors. Thus, the children's low-level behaviors did not interfere with the flow of dyadic interaction and or coordination between siblings. This aspect of sibling relations may be related to the generally positive and collaborative play observed in the interaction.

Altogether, the findings of an asymmetric role relationship and coordination in the sibling dyadic interaction suggest that modeling by an older TD sibling and a generally collaborative and accepting social environment are possible explanations for Ben-Itzchak et al.'s (2018) findings of an association between better social outcomes in children with ASD and the presence of older TD siblings in the family. Our findings indicate that children with ASD benefit from coordinated interactions with older siblings.

Study Limitation and Future Research

Microanalysis is time-consuming in comparison to other methods, such as global or intuitive coding (Bontinck et al., 2018a; Prime et al., 2014). At the same time, it allows for an in-depth, rich, detailed investigation, including, for example, characterization of several behaviors that occur at the same time and influence each other. The utilization of a frame-by-frame analysis of video-recorded data is highly beneficial for capturing behaviors that would have likely been missed using other methods. Since microanalysis produces large data, it is often utilized with relatively small samples (Haidet et al., 2009). The current data set consisted of 28 dyads. Previous observational studies that examined sibling interactions in the context of ASD had similar or fewer TD/ASD sibling dyads (Bontinck et al., 2018b; El-Ghoroury & Romanczyk, 1999; Knott et al., 2007). However, future studies should aim for larger samples and, specifically, should increase the number of participating females with ASD. Although the male:female ratio in the current study was similar to the reported ratio in Israel (Raz et al., 2015), the small number of females in our sample made it impossible to draw conclusions on possible gender differences. Another limitation is that the TD siblings were included based on parental reports. Future studies should assess TD siblings for cognitive functioning, temperament, and personality traits since such variables might influence sibling interaction. In future studies, we suggest addressing the inter-rater agreement of the coding of agonistic and low-level behaviors, which reached lower kappa values (0.58) than other behaviors in our study. Kappa is a more stringent measure that corrects for the likelihood of chance agreement. Finally, children were asked to play a favored game, which may prompt higher levels of positive behaviors. The findings need to be considered within the context of playing a familiar, preferred game in a natural environment. Future studies could examine prosocial behaviors in different contexts (i.e., home and laboratory) and use experimental manipulations (e.g., instructing the TD sibling to behave in a certain way) to explore causal relationships in sibling interactions.

Significance and Implications

Contemporary perspectives challenge the assumption that individuals with ASD lack social interest and point to the need to investigate various ways in which they may express their social motivation (Jaswal & Akhtar, 2019). Our results add to that perspective, emphasizing the role of the social partner and the interaction setting as important variables in characterizing social behaviors in children with ASD. Even though a sibling is a potentially close, available social partner, and the home environment is central in the life of a child with ASD, little research is available in this area. Our findings highlight the importance of sibling interactions at home and support the hypothesis that sibling interactions provide an opportunity for children with ASD to practice prosocial behaviors.

Acknowledgments

The authors thank the families who participated in this study. YR is grateful to the Azrieli Foundation for the award of an Azrieli Fellowship and support for research expenses. Participants received a game worth 100 NIS (equivalent to USD$20–25) in gratitude for their participation.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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Supplemental material

Supplemental material for this article is available online.

Notes

1. This study is a part of a larger research (Rum, 2020). The participating children with ASD were also observed interacting with their mothers and friends, and during other tasks, over several home visits.
2. In the case of helping the sibling during play, the behavior was coded as "help," that is, as prosocial. Play-related behaviors demonstrated a playful, positive nature, but not a clear observed intention of conducting a prosocial action.

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ijbd

International Journal of Behavioral Development
2021, Vol. 45(4) 299–309

DOI: 10.1177/0165025421995930
journals.sagepub.com/home/jbd
SAGE

Examining the predictors of prosocial behavior in young offenders and nonoffenders

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Abstract

Research on young offenders has primarily focused on identifying predictors of the maladaptive, aggressive behavior; there is a scarcity of evidence on factors that relate to prosocial behavior in these adolescents. The current study examined the link from parenting, emotional instability, and prosocial reasoning to prosocial behavior, while also examining the mediating roles of empathic concern (EC) and perspective taking (PT) in a sample of Spanish adolescent offenders compared to a sample of nonoffenders. Participants were 440 adolescents: 220 young offenders residing in four Youth Detention Centres of Valencia (67.3% men) and 220 enrolled in public and private schools within the metropolitan area of Valencia (65.9% men). The two subsamples were similar in age (15–18 years), gender, and social class. Analyses show differences in mother's permissiveness with empathy (PT and EC), in emotional instability and internalized reasoning with PT in predicting prosocial behavior in offenders and nonoffenders adolescents. EC and PT are significative and positively related to prosocial behavior in both groups. These findings have implications for prevention and reeducation interventions oriented to social reinsertion of adolescent offenders and the development of family and social counseling programs that favor adaptive behavior.

Keywords

Prosocial behavior, predictor variables, nonoffenders, offenders

Prosocial behavior remains the subject of considerable research worldwide from the initial studies of Eisenberg (1972) or Batson (1983), to the most recent studies that include longitudinal analysis involving several countries (Putnick et al., 2018) and more than five or six waves (Van der Graff et al., 2018). Understanding the development and promotion of adaptive social behavior, especially in populations characterized by its absence, is particularly important.

Prosocial behaviors are voluntary acts, such as caring for, helping, and comforting others (Batson, 2011; Eisenberg et al., 2006). They are an example of adaptive, socially adjusted behavior that has been linked to positive outcomes like high self-esteem, academic success, and high-quality relationships (Carlo et al., 2018; Laible et al., 2004; Padilla-Walquer & Carlo, 2014). In addition, prosocial behavior maintains has an inverse relationship with aggression and depression (Caprara, 2014; Llorca, Malonda, et al., 2017), victimization, social exclusion, and harassment (Wang et al., 2015). Despite the potential benefits of prosocial behavior, victimization, social exclusion, harassment, and aggression persist. Therefore, greater research is needed to identify the predictors of prosocial development in at-risk populations, such as adolescent offenders.

Studying prosocial behavior among adolescent offenders is important for two reasons. First, most research with this population has focused on analyzing variables that predict maladaptive and aggressive behavior (e.g., Cutrín et al., 2016; Domes et al., 2013). Research on prosocial behaviors among adolescent offenders is relatively scarce (e.g., Hannibal et al., 2019; Mayer et al., 2018), focused primarily on cooperative behavior (e.g., Clark et al., 2015), without a clear indication of the factors that may relate to greater prosocial behaviors in this population. Second, to our knowledge, there are few studies comparing prosocial behavior across offender and nonoffender populations (e.g., Birkeland et al., 2014; Llorca, Richaud, et al., 2017); those limited studies focus on empathy (e.g., Bush et al., 2000; Hepper et al., 2014). Thus, we analyze the factors, such as empathy, that may relate to prosocial behavior in both Spanish adolescent offenders and nonoffenders.

Adolescence is an important period in the development of prosocial behavior and empathy due to cognitive and emotional changes, as well as social relationships that can influence perspective taking (PT), or the ability to be able to put oneself in the place of others and experience feelings of concern (Mestre, 2014; Van der Graaff et al., 2014). Cognitive developmental theorists showed the role of sociomoral cognitions in moral development (Lapsley, 1996; Turiel, 1998), and social cognitive theorists (Carlo, 2006; Eisenberg, 1986) want to demonstrate the relationship between moral emotions and cognitions. Furthermore, parents play an important role in promoting prosocial behaviors in adolescents, according to socialization researchers (Bandura, 1986; Hoffman, 2000). Therefore, this research examines the influence of parenting, emotional instability, prosocial reasoning, in the development of

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prosocial behavior through the mediation of empathy (Benita et al., 2017; Llorca, Richaud, et al., 2017; Mestre et al., 2019).

Parenting, Empathy, and Prosocial Behavior

Parenting has been shown to influence the development of empathy and prosocial behavior from early childhood (Taylor et al., 2013). Key parenting factors include permissiveness, negligence, control, and support. For example, aggression in young people has been associated with negative or maladaptive parenting (like permissiveness or negligence). This type of parenting has a negative effect in the emotional development of the adolescent (Calvete et al., 2014; Eisenberg, 2000). Moreover, psychological control, authoritarianism with physical punishment, highly coercive, or an excessively permissiveness parenting has a negative effect in the development and maintenance of aggressive behavior in children (Kuppens et al., 2013). Conversely, support in parent–child relationships facilitates emotional sensitivity, the ability to put oneself in the place of the other and prosocial involvement (Lam, 2012; Llorca, Richaud, et al., 2017). These associations have been found between maternal warmth and empathic concern (EC; Miklikowska et al., 2011). Therefore, parenting characterized by control and emotional support seem to enhance the development of empathy and prosociality. Furthermore, EC acts as a mediator among parenting and prosocial behavior in nonoffender adolescents (Llorca, Richaud, et al., 2017). There is evidence that a greater weight of maternal rearing exists in the behavior of sons and daughters, their social competence, empathy, and also aggressiveness (Laible & Carlo, 2004; Tur-Porcar et al., 2012), and more rejection from father and poor supervision from mother, compared to nonoffenders (Carlo et al., 1998; Llorca, Malonda, et al., 2017). Therefore, in the current study, we analyze mother and father parenting, separately. The next analyzed variable is emotional instability in the development of prosocial behavior through the mediation of empathy.

Emotional Instability and Prosocial Behavior

Several studies show how emotional processes correlate with prosocial and aggressive behavior, highlighting emotional instability as a predictor of aggressiveness while "positive," empathic and nonimpulsive emotionality as a predictor of prosocial behavior (Carlo et al., 2012; Llorca, Malonda, et al., 2017). Emotional instability is conceptualized as impulsivity (Buss & Plomin, 1975) or lack of self-control or a tendency to exhibit rapid, unexpected, and intense affective reactions. This variable is considered a negative emotion that, together with an inability to regulate emotions, can predict antisocial delinquent maladaptive behaviors (Mayer et al., 2018; McMahon et al., 2013) and difficulties in prosocial behaviors (Carlo et al., 2012). The link from emotional instability to empathy, however, has not been examined, to the best of our knowledge.

Prosocial Reasoning, Empathy, and Prosocial Behavior

Prosocial moral reasoning is a cognitive variable that precedes the making of a decision whether or not to engage in a helping behavior when facing problems which generate a conflict between physical and psychological needs of others and our own well-being, in situations where there are no laws or formal social directives. This reasoning is defined through five levels that develop through childhood and adolescence: hedonistic reasoning, oriented to approval, and oriented to the needs of others are the three levels present in early childhood and stereotyped and internalised (which includes the reasoning based on empathy) are developed later in childhood and in particular during adolescence (Eisenberg, 1986). The developmental literature suggests that prosocial moral reasoning is strongly related to EC and PT (Knight et al., 2014; Laible et al., 2008), as well as prosocial development (Eisenberg, 1986; Hoffman, 2000). Given the focus on young offenders, the research on the link from moral reasoning and delinquency yields disparate results, including both nonsignificant effects (Leenders & Brugman, 2005; Tarry & Emler, 2007) and a negative link (Beerthuizen et al., 2013). Complementing the past focus on the relationship between moral reasoning and delinquent behavior, the current study shifts the focus to the relationship between prosocial moral reasoning and prosocial behavior mediated by empathy in adolescent offenders (Azimpour et al., 2013; Carlo et al., 2008).

Empathy and Prosocial Behavior

Studies aimed at empirically evaluating the psychological processes underlying prosocial development highlight both the affective (EC, feelings oriented to the problem, or need of another individual) and cognitive dimensions (PT, ability to put oneself in the place of the other) (Knight et al., 2014; Van der Graaff et al., 2014) of empathy as a motivator of prosocial behavior (Batson, 1998; Hoffman, 2000). PT, understanding the thoughts, feelings, and social situation of others, is closely related to EC (i.e., feelings of sorrow or concern for others) (Davis, 1983; Hoffman, 2000) and has been shown to relate to adolescents' prosocial behavior (Berger et al., 2015; Carlo et al., 2015; Van Lissa et al., 2014).

Regarding adolescent offenders, empathy is an important factor that helps adolescents to stop or inhibit their aggressive and delinquent behavior (Carlo et al., 2010a; Van der Graaff et al., 2012); that is, empathy is a protective factor against aggression (Mayberry & Espelage, 2007; Wang et al., 2016). Low empathy has been linked with delinquency, particularly in the most violent delinquents (Jolliffe & Farrington, 2004). Moreover, previous research suggests significant differences in affective and cognitive empathy comparing offenders and nonoffenders (Schalkwijk et al., 2016). Extending this past work, the current study examines the relations between empathy and prosocial behavior in adolescent offenders and nonoffenders.

This study aims to examine the mediating role of EC and PT in the link from parenting, emotional instability, and prosocial reasoning to prosocial behavior, comparing the process in a sample of Spanish adolescent offenders and nonoffenders. We explored the aforementioned relations might vary across offenders and nonoffenders adolescents. In the offenders' group, relations would be marked by a greater effect of emotional instability, the reasoning based in hedonistic arguments and oriented to approval, and more rejection from father and poor supervision (permissiveness and negligence) from mother, compared to nonoffenders (Carlo et al., 1998; Llorca, Malonda, et al., 2017). Empathic concern and PT would be positively associated with prosocial behavior in both groups. In addition, we hypothesize that empathy will mediate the

effects of parenting, emotional instability, and prosocial reasoning on prosocial behavior. Parenting predicts adolescent prosocial behavior through empathy (Llorca, Richaud, et al., 2017). Furthermore, emotion regulation predicts adolescent prosocial behavior through the mediation of empathy (Benita et al., 2017).

Method

Sample and Procedure

A total of 440 adolescents took part in the study, 220 participants (65.9% boys) were randomly selected from 10 public and private schools in the metropolitan area of Valencia (Spain) by a stratified random sampling based on sociodemographic characteristics, as the type of institution (public and private) to obtain a representative sample including all socioeconomic levels and social groups. The age ranged from 15 to 18 years old ($M = 16.40$, $SD = 1.25$). As for the social class, the adolescents came from families of middle class (35.9%) and low-middle class (37.7%). We found, in a smaller amount, families of upper-middle class (11.8%) and lower class (8.2%). The selection of this subsample was carried out through a probabilistic cluster sample with various succeeding stages (multistage sampling). This kind of sampling is highly efficient when the population is big and it is comprised of natural groups like the school or classroom.

The other 220 (67.3% boys) were young offenders recruited from four Youth Detention Centers of Valencia, in which they were serving court sentences. They were selected depending on the committed crime, seeking a representation of the crimes (violence against their parents, damage against property, public health crimes, and bodily harm stand out). The ages were between 15 and 18 years old ($M = 16.22$, $SD = 1.49$). Regarding social class, the young offenders are located mainly in a lower middle class (51.4%), followed by middle class (23.2%), and to a lesser degree, we found families that belong to an upper (3.2%) and lower class (6.8%).

The adolescents filled in self-assessment questionnaires collectively during one class of 50 min at the Secondary Schools. In the Youth Detention Centres, questionnaires were administered in small groups made of two or three participants, and when necessary, it was administered individually. The research project was presented to the school management teams, teachers of the selected schools, and to the management of the youth detention centers in Valencia's Region who took part in the study. The cooperation of the centers and the evaluation had the authorization of the Valencian Government as well as parental authorization. All participants provided their written informed consent after being introduced to the aim of the study. The participation was voluntary and anonymous, taking into consideration all ethical principles pertaining to research with human beings included in the Helsinki Declaration, under the current regulations. This research had a favorable response from the University Ethics Committee because it is required for the concession of Research Projects.

Instruments

All measures were previously validated and adapted to a Spanish speaking population (e.g., del Barrio et al., 2001; Mestre et al., 1999, 2002, 2004) and were used by other research with young offenders and nonoffenders (Azimpour et al., 2013; Carlo et al., 2008; Llorca et al., 2016; Llorca, Samper, et al., 2017).

Child reports of Parental Behavior Inventory. This scale evaluates permissiveness, support and communication, psychological control, and negligence, distinguishing between their father and mother (Schaefer, 1965; Samper et al., 2006). The total score of each parenting dimension is obtained by averaging the items separately for the father and for the mother. Participants rated each item on a scale from 1 = *never* to 3 = *always*. *Permissiveness* ($\alpha_{father} = .70$ and $\alpha_{mother} = .75$ nonoffenders; $\alpha_{father} = .70$ and $\alpha_{mother} = .72$ offenders) is directed to the tendency of the parents to allow the child to do whatever they want without rules or limits. Sample item is as follows: "He or she lets me go out whenever I want." Finally. *Support and communication* ($\alpha_{father} = .85$ and $\alpha_{mother} = .89$ nonoffenders; $\alpha_{father} = .90$ and $\alpha_{mother} = .91$ offenders) refers to the perception of emotional support and affection perceived by the adolescents, together with the respect for previously established rules. Sample item is as follows: "He or she likes to talk about the news with me." *Psychological control* ($\alpha_{father} = .78$ and $\alpha_{mother} = .80$ nonoffenders; $\alpha_{father} = .70$ and $\alpha_{mother} = .72$ offenders) refers to dealing with intrusive control and a negative evaluation of the children. Sample item is as follows: "He or she wants to control everything I do." *Negligence* ($\alpha_{father} = .75$ and $\alpha_{mother} = .79$ nonoffenders; $\alpha_{father} = .78$ and $\alpha_{mother} = .72$ offenders) refers to lack of control and indifference from the parents toward the needs of the adolescents. Sample item is as follows: "He or She forgets to give me what I need."

Emotional Instability Scale. This scale describes the behavior that indicates a lack of self-control in social situations as a result of the scarce ability to control impulsiveness and emotionality (Caprara & Pastorelli, 1993; del Barrio et al., 2001). Participants rated 15 items ($\alpha = .82$, $\alpha = .82$; offenders and nonoffenders, respectively) from 3 = *often* to 1 = *never*. The total score is obtained by averaging all the items. Sample item is as follows: "I interrupt others when they talk."

Prosocial Reasoning Objective Measure. Participants reported the reasoning they carry out when facing a problem or need of another person, which implies a help response (Carlo et al., 1992; Mestre et al., 2002). The participants gave the responses to the five stories given to them. The score in the different kinds of reasoning is based on the sum of individual scores given for each category of reasoning: *hedonistic reasoning* (justify the behavior based on their personal interests), *oriented to need* (are guided by the necessity of others), *oriented to approval* (feel pressure for outside approval), *stereotyped* (are guided by what society considers good or bad), and *internalized* (are guided rather by principles, equality criteria, responsibility, anticipating of positive or negative consequences that can result of an action). Each story had 5 items that correlated to these five categories of reasoning. Participants gave a value of 1 = *nonimportant* to 5 = *maximum importance*. Cronbach's α evaluated in this study is, for offenders/nonoffenders: hedonistic $\alpha = .72/.71$, needs = .67/.70, approval $\alpha = .83/.80$, stereotyped $\alpha = .67/.65$, internalized $\alpha = .70/.71$.

The Interpersonal Reactivity Index. This scale evaluates the empathic disposition through four factors, two cognitive ones and two emotional ones (Davis, 1983; Mestre et al., 2004). It has 28 and rated from 1 = *does not describe me at all* to 5 = *describes me perfectly*. The total score in each factor is obtained by averaging all the items. As in previous studies (Carlo et al., 2010a, 2010b), we use the cognitive factor PT: ability to understand the point of

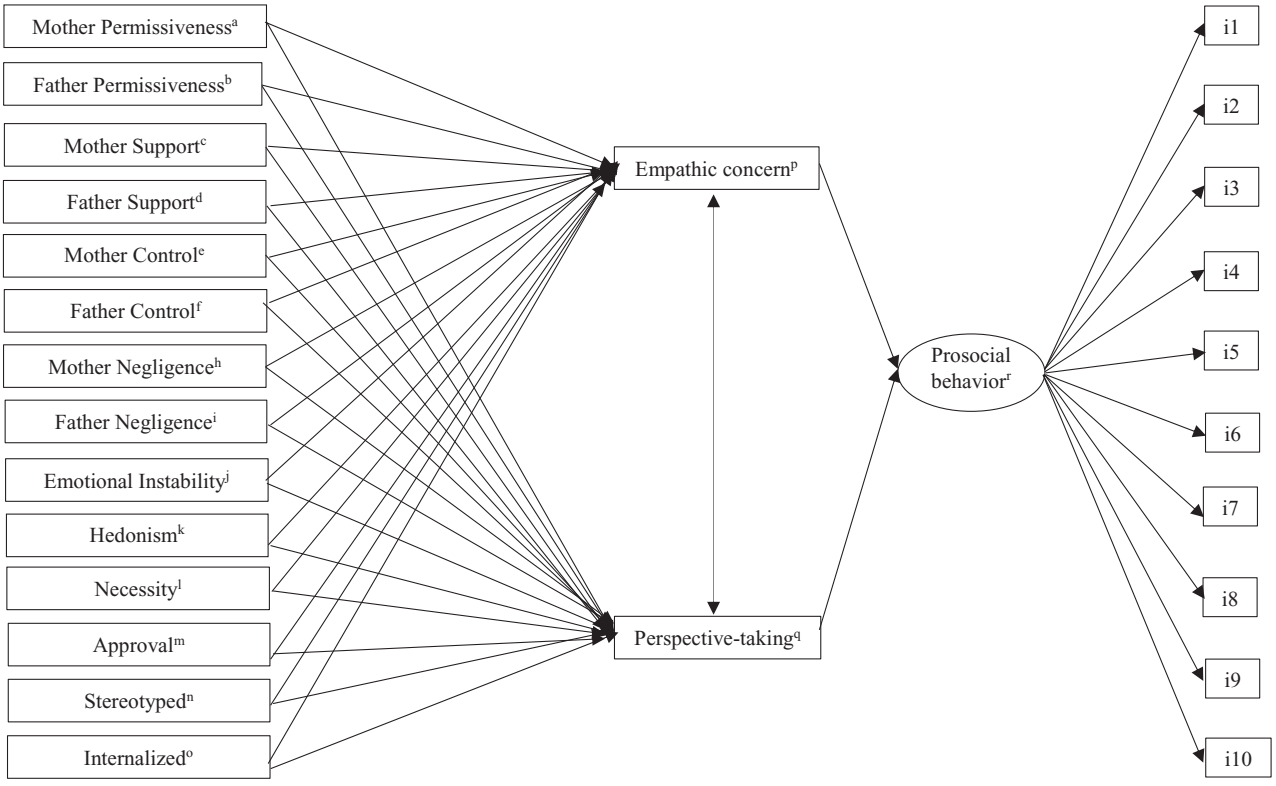

Figure 1. Theoretical a priori model. Correlations among exogenous variables are not shown.

view of the other person or to be able to put oneself in their place ($\alpha = .65$, $\alpha = .70$; offenders and nonoffenders, respectively), sample item "I sometimes try to understand my friends better by imagining how things look from their perspective," and the emotional factor *Empathic concern* (EC): feelings of concern, compassion, and affection for others ($\alpha = .65$, $\alpha = .67$; offenders and nonoffenders, respectively), sample item "I often have tender, concerned feelings for people less fortunate than me."

Prosocial Behavior Scale. This scale evaluates helping behavior and trust. It has 10 items ($\alpha = .81$, $\alpha = .79$; offenders and nonoffenders, respectively) and rated from 3 = *often* to 1 = *never* (Caprara & Pastorelli, 1993; del Barrio et al, 2001). The total score is obtained by averaging all the items. Item examples are as follows: "I try to help others," "I share things I like with my friends."

Statistical analyses

This study employed full structural equation models (SEMs) to estimate the mediating role of empathy, as comprised by an emotional aspect (EC) and a cognitive aspect (PT) in the link from parenting, emotional instability, and prosocial reasoning to a latent variable of prosocial behavior. Models were estimated with weighted least squares mean and variance corrected, given the ordinal nature of some of the items (Kline, 2015). Analyses were run in Mplus 8.2 software (Muthén & Muthén, 1998–2012).

First, the model in Figure 1 was estimated in the whole sample. Then, a multigroup model comparing offenders and nonoffenders was estimated. This multigroup model tests for the moderator (interaction) effects of offending on prosocial behavior. As recommended by the literature (Kline, 2015), several statistics and indexes were used to assess overall goodness of fit: the chi-square statistic, the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and its 90% confidence interval (CI). As endorsed by Hu and Bentler (1999) and Marshet al. (2004), cut-off criteria for adequate fit are a CFI of at least .90 and an RMSEA not higher than .08, while excellent fit is considered when CFI is higher than .95 and RMSEA is lower than .05. A statistical approach to fit comparison in multigroup SEMs uses (corrected) χ^2 differences ($\Delta\chi^2$) to compare constrained to unconstrained models. This approach is considered excessively powerful when detecting differences, and authors have further suggested an alternative practical approach (Cheung & Rensvold, 2002), which consists of CFI differences (ΔCFI) with a cut-off criterion of equal or lower than .01 CFI difference is generally used as evidence indicating retention of the more constrained (parsimonious) model.

Results

Structural Model in the Whole Sample

The model in Figure 1 was estimated. This a full SEM that predicts a latent variable of prosocial behavior composed of 10 indicators. The effects of the predictors on prosocial behavior are fully mediated by both the cognitive and the emotional components of empathy, namely PT and EC. Predictor variables are parenting, emotional instability, and prosocial reasoning (hedonism, necessity, approval, stereotyped, and internalized). This model fitted the data very well: $\chi^2(246) = 447.31$, $p < .001$, RMSEA = .043 90% CI [.037, .049], CFI = .925.

Table 1. Model Fit of the Multisample Sequence.

Model	χ^2	*df*	*p*	$\Delta\chi^2$	*df*	*p*	CFI	ΔCFI	RMSEA	95% CI
Model 1: Baseline	671.84	501	<.001	—	—	—	.930	—	.039	.031, .047
Model 2: Equal loadings	694.96	509	<.001	—	—	—	.924	—	.041	.033, .048
Model 3: All constrained	824.81	578	<.001	174.96	77	<.001	.898	.026	.044	.037, .051
Model 4: Modified (1)	797.32	573	<.001	142.39	72	<.001	.908	.016	.042	.035, .049
Model 5: Modified (2)	793.28	572	<.001	139.22	71	<.001	.909	.015	.042	.035, .049
Model 6: Modified (3)	784.78	570	<.001	129.92	69	<.001	.912	.012	.041	.034, .048
Model 7: Modified (4)	780.17	568	<.001	124.84	67	<.001	.914	.010	.041	.034, .048

Note. $N = 220$ young offenders and 220 young nonoffenders.
***$p < .001$.

Multigroup Structural Model

The multigroup sequence of models began with the baseline model (Model 1), which consists of the model in Figure 1 tested simultaneously in offenders and nonoffenders with no parameter constrained. This model is used for further comparisons. Goodness of fit of all multigroup models is depicted in Table 1. Model 2 constrains only the factor loadings in both samples, with all other parameters freely estimated. This model is needed, given that comparison of equality of effects requires factor loadings to be equal across samples (Van de Schoot et al., 2012).

Once equality of factor loadings was assured, we proceeded with a top-down model building strategy in which the next tested model, Model 3, presents all effects and correlations constrained for both groups. Poor fit of Model 3 indicates a moderation effect of the group on the relationships established by the model. Hence, modification indices were used to respecify the model. In Model 4, the effects of father control on EC and PT were freed to differ between offenders and nonoffenders, as were the effects of mother permissibility on EC, mother control on PT, and emotional instability on PT. As Model 4's goodness of fit was not satisfactory, Model 5 in which the effect of mother permissibility on PT was freed to differ between both groups was tested. Model 5 showed an inadequate CFI difference, indicating that there are some fixed effects that ought to be freed to vary across groups. Hence, Model 6 frees the effects of necessity and internalized prosocial reasoning on PT, and Model 7 further frees the effects of hedonism and approval on PT. Model 7 finally showed adequate fit of the model to the data, with a CFI difference indicating no great difference between Model 7 and Model 2.

Model 7 was retained as the best-fitting model representing the mediating role of empathetic concern and PT in the relationships among parenting, emotional instability, and prosocial reasoning with prosocial behavior across offenders and nonoffenders. Statistically significant ($p < .05$) unstandardized parameter estimates of the final model are presented in Figure 2. The model explained 27.2% of the variance of prosocial behavior for the offender group and 33.3% for the nonoffender group. Correlations among family and prosocial reasoning exogenous variables are shown in Tables 2 and 3, respectively.

Bias-corrected bootstrap CIs suggested that there were significant indirect effects from mother permissiveness to prosocial behavior via EC ($B = -.07$, $p = .02$) and PT ($B = -.05$, $p = .04$), in offenders. There was also a significant effect from father permissiveness to prosocial behavior via PT in both samples (offenders: $B = -.02$, $p = .007$; nonoffenders: $B = -.02$, $p = .007$). Furthermore, there was a significant indirect effect from mother support to prosocial behavior via EC in both groups (offenders: $B = .06$, $p = .05$; nonoffenders: $B = .05$, $p = .05$). The indirect effect was also significant for the link between father negligence and prosocial behavior via EC in both samples (offenders: $B = -.08$, $p = .03$; nonoffenders: $B = -.05$, $p = .03$). In relation to emotional instability, there were significant indirect effects from this variable and prosocial behavior via EC (offenders/nonoffenders: $B = -.04$, $p = .03$) and PT (offenders/nonoffenders: $B = -.08$, $p = .004$), in both samples. Finally, there were also significant effects from hedonistic reasoning to prosocial behavior via EC ($B = -.05$, $p = .04$) and internalized reasoning to prosocial behavior via EC ($B = .11$, $p = .005$) and PT ($B = .33$, $p = .01$), in the nonoffender group.

Discussion

The aim of this study was to examine the mediation role of EC and PT in the relations among parenting, emotional instability, and prosocial reasoning with prosocial behavior in a sample of Spanish adolescent offenders and nonoffenders. Our main interest was to delve into prosocial behavior in a population in which this type of behavior is not common: in adolescent offenders. Results provide important information about the relationships of these predictor variables with empathy and prosocial behavior in adolescent offenders.

As expected, there was evidence of mediation effects of EC and PT among parenting, emotional instability, prosocial reasoning, and prosocial behavior. Regarding parenting, we will discuss the findings for mothers and fathers separately. Maternal support was positively related to both empathetic concern and PT in the combined sample, while for offenders, maternal permissiveness was negatively related to both mediators. For fathers, permissiveness and negligence negatively related to PT and empathetic concern, respectively, in the combined sample. No other parenting variables were significant in the final, multigroup model.

This pattern of findings across parents might be related to the mother as the main attachment figure and attachment is related to empathy and prosociality (Eisenberg et al., 2006). Consistent with other studies (Davis & Carlo, 2019; Padilla-Walquer et al., 2016), a maternal relationship characterized by support provide, through EC and PT, is linked to prosocial behavior. Furthermore, mother's permissiveness is negatively linked with empathy, only in the offender group; this supports previous research which found negative or maladaptive parenting was related to behavioral problems and aggressive behavior (Calvete et al., 2014; Llorca, Samper, et al., 2017). Differences between adolescent offenders and nonoffenders in mother's permissiveness point to the need for parental education on autonomy

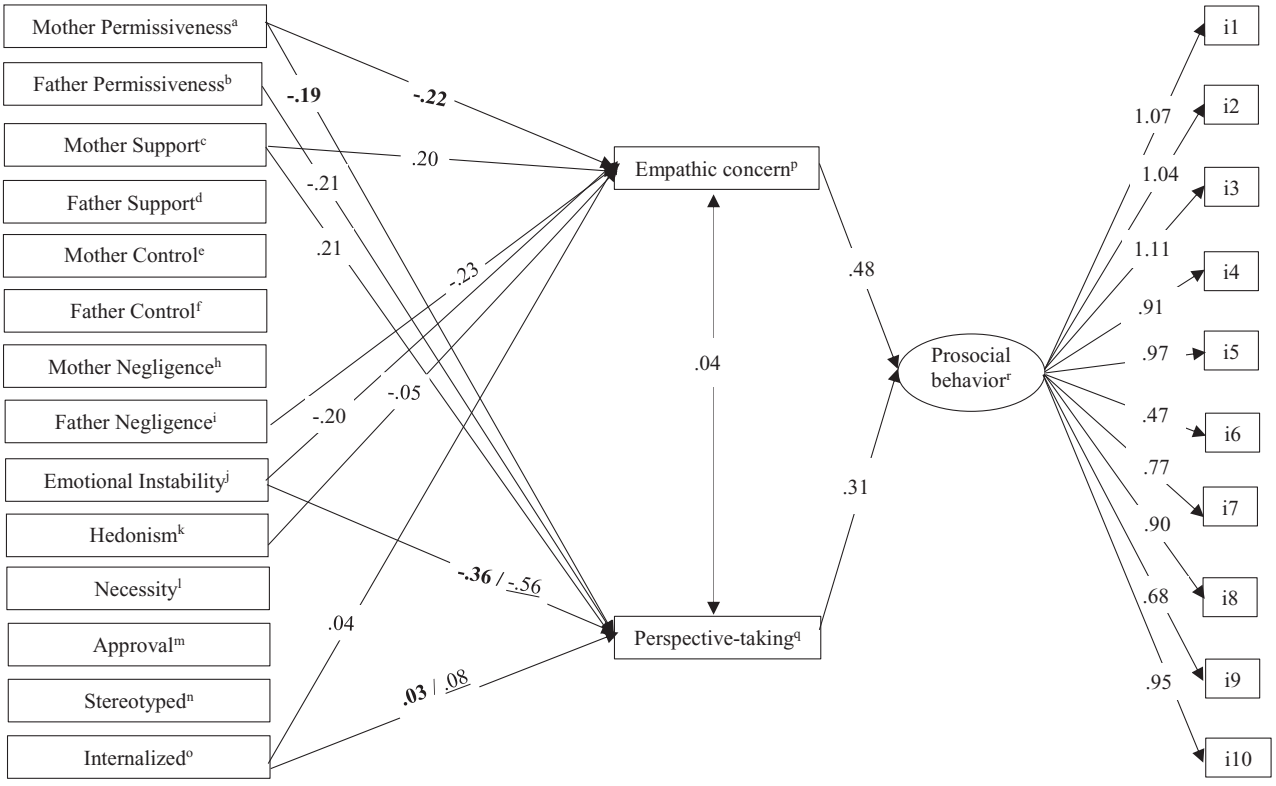

Figure 2. Unstandardized parameter estimates of the final model. Only statistically significant effects ($p < .05$) shown. Bold estimates belong to offenders specific estimates, underlined estimates belong to nonoffender group specific estimates. Correlations among exogenous variables are not shown.
Note. $N = 220$ young offenders and 220 young nonoffenders. [a]Mother permissiveness measured using 3 items; [b]Father permissiveness measured using 3 items; [c]Mother support measured using 19 items; [d]Father support measured using 19 items; [e]Mother control measured using 12 items; [f]Father control measured using 12 items; [g]Mother negligence measured using 4 items CRBI; [h]Father negligence measured using 4 items. Participants were asked to rate on a scale from 1 = *never* to 3 = *always*. [i]Emotional instability measured using 15 items and rated from 3 = *often* to 1 = *never*. [k]Hedonism = hedonistic reasoning measured using 5-item; [l]Approval = oriented to approval measured using 5 items; [m]Stereotyped measured using 5 items; [n]Internalized measured using 5 items; [o]Necessity = oriented to need measured using 5 items. Participants gave a value of 1 = *nonimportant* to 5 = *maximum importance*. [p]Empathic concern measured using 7 items and rated from 1 = *does not describe me at all* to 5 = *describes me perfectly*. [q]Perspective taking measured using 7 items and rated from 1 = *does not describe me at all* to 5 = *describes me perfectly*. [r]Prosocial behavior measured using 10 items and rated from 3 = *often* to 1 = *never*. CI 95% = mother permissiveness to empathic concern [−.42, −.05]; mother permissiveness to perspective taking [−.40, −.02]; father permissiveness to perspective taking [−.41, −.06]; mother support to empathic concern [−.44, .53]; mother support to perspective taking [−.10, .56]; father negligence to empathic concern [−.54, −.03]; emotional instability to empathic concern [−.38, −.006]; emotional instability to perspective taking [nonoffenders, −.80, −.27; offenders, −.71, −.09]; hedonism to empathic concern [−.71, −.09]; internalized to empathic concern [.22, .89]; internalized to perspective taking (nonoffenders, .25, .79; offenders, .22, .69); empathic concern to prosocial behavior [.27, .67]; and perspective taking to prosocial behavior [−.11, .45].

and responsibility and that provides personal resources to their children. In this way, children and adolescents will be able to grow personally and socially in an environment that favors empathy.

Regarding fathers, our results shows that their implication is also necessary to facilitate empathy and prosocial behavior. Their negligence and permissiveness produce less EC and less PT. Consistent with other studies, their participation increases empathy and has a positive impact on the acquisition of greater cognitive capacity (Hoeve et al., 2009, 2011; Ruíz-Hernández et al., 2019).

Regarding emotional instability, the findings show that there is a statistically significant and negative relationship with EC and PT. In the case of EC there are no differences between both groups. In the case of PT, there is a statistically significant and negative effect in both groups, but it is smaller in the offender group. These results are in accord with previous research which found that impulsiveness impedes empathy and it is a negative predictor of prosocial behavior (Carlo et al., 2012; Llorca, Malonda, et al., 2017; Tur et al., 2018).

As previously indicated (e.g., Mayer et al., 2018), offenders can be described during childhood as being emotionally unstable, impulsive, and prone to reactive aggression. This is coherent with our findings which conceptualize emotional instability as a tendency to exhibit rapid, unexpected, and intense emotional reactions. This type of response is mediated by EC and PT, which relate to prosocial behavior.

With respect to prosocial reasoning across the full sample, there are only statistically significant relations from hedonism to empathetic concern and internalized reasoning to both mediators. There are no differences between the group of offenders and nonoffenders. Specifically, greater hedonism, that is, self-benefit when deciding whether or not to help greater, relates to lower EC. Greater internalized reasoning relates to higher empathy, in both groups, and higher PT, particularly for the nonoffender group. Internalized reasoning involves personal moral principles, and the anticipation of consequences positive and/or negative that can be derived from a particular action (Caprara, 2014; Caprara et al., 2005), thus,

Table 2. Correlations Among Family Exogenous Variables.

	Mother permissiveness	Father permissiveness	Mother support	Father support	Mother control	Father control	Mother negligence	Father negligence
Mother permissiveness[a]	1							
Father permissiveness[b]	.42***	1						
Mother support[c]	.04	.01	1					
Father support[d]	.02	.13**	.50***	1				
Mother control[e]	−.12***	−.05	−.03	−.03	1			
Father control[f]	−.02	−.08*	.02	−.01	.45***	1		
Mother negligence[g]	.07*	.13***	−.19***	−.07	.25***	.19***	1	
Father negligence[h]	.05	.10***	−.08	−.13**	.19***	.20***	.40***	1

Note. $N = 220$ young offenders and 220 young nonoffenders. Participants were asked to rate on a scale from 1 = *never* to 3 = *always*.
[a]Mother permissiveness measured using 3 items.
[b]Father permissiveness measured using 3 items.
[c]Mother support measured using 19 items.
[d]Father support measured using 19 items.
[e]Mother control measured using 12 items.
[f]Father control measured using 12 items.
[g]Mother negligence measured using 4 items.
[h]Father negligence measured using 4 items.
***$p < .001$. **$p < .01$. *$p < .05$.

Table 3. Correlations Among Prosocial Reasoning Exogenous Variables.

	Hedonism	Approval	Stereotyped	Internalized	Necessity
Hedonism[a]	1				
Approval[b]	.58***	1			
Stereotyped[c]	.36***	.34***	1		
Internalized[d]	.23***	.25***	.56***	1	
Necessity[e]	.39***	.36***	.53***	.56***	1

Note. $N = 220$ young offenders and 220 young nonoffenders. Participants gave a value of 1 = *nonimportant* to 5 = *maximum importance*.
[a]Hedonism = hedonistic reasoning measured using 5 items.
[b]Approval = oriented to approval measured using 5 items.
[c]Stereotyped measured using 5 items.
[d]Internalized measured using 5 items.
[e]Necessity = oriented to need measured using 5 items.
***$p < .001$.

consistent with the necessary emotional and cognitive dimensions of the mediators. This pattern of findings is similar to other studies, in which it is not the approval of others but the categories of hedonism and internalized reasoning that predict empathy in Spanish adolescents (Tur-Porcar et al., 2016). It is important to highlight that this result is obtained in a sample of adolescent offenders, as it marks future lines of action in intervention and prevention of antisocial behavior.

Finally, EC and PT significantly and positively related to prosocial behavior in both groups. This brings more evidence about the importance of empathy as a motor of prosocial behavior (Batson, 2011; Carlo et al., 2012; Van der Graff et al., 2018) in any population, offenders or nonoffenders. These findings suggest possible avenues for intervention with adolescent nonoffenders through promotion of EC and PT.

Limitations

This is a cross-sectional study, so it is not possible to identify causal relationships between the factors or establish directionality of associations. Longitudinal studies with such samples are difficult as most adolescent offenders are in detention centers for a short period of time. In addition, all variables were obtained using self-report data, which can be subject of social desirability in responses. Finally, another limitation is the fact that the offenders' sample is a small sample due to difficulties in accessing this type of sample. Despite these limitations, future research can build on these findings with a larger, longitudinal sample of adolescent offenders to better understand cognitive, emotional, and behavioral processes that influence their psychosocial adjustment.

Conclusion

These results point out an important question to be taken into account, especially when designing interventions to support youth offenders. For example, the pattern of findings was largely similar across both groups, particularly in the link from empathetic concern and PT to prosocial behavior. Other studies also found no difference in prosocial behavior of individuals with and without a criminal record; offenders behaved as prosocially as the general population (Birkeland et al., 2014). In this sense, the study is that these results provide important information that can help to the public debate on crime prevention policies and reintegration of adolescent offenders into society.

The findings may also provoke reflection on how we talk about adolescents in general. As Navarro-Pérez and Pastor-Seller (2017) have suggested, we might think about adolescence in plural sense, recognizing that it is adolescents who shape them, turning them into plural, unequal, and complex processes (Blackmore & Mills, 2014; Curtis, 2015; Navarro & Uceda, 2014). In addition, this study provides useful to promote prosocial behavior in offender and nonoffender populations in Spain (e.g., Navarro-Pérez & Pastor-Seller, 2018), which may have implications for prevention of antisocial behaviors. The findings suggest interventions might focus on promoting maternal support, while reducing permissiveness and negligence by fathers, together with an internalized reasoning based on moral principles and actions that decrease impulsivity. Such efforts might work to strengthen empathy, in both affective and cognitive

dimensions, with positive implications for adolescent prosocial behaviors.

Funding

The author(s) disclosed receipt of the following financial support for the research of this article: This work was supported by R&D Projects for Research Teams of Excellence, PROMETEO Program, Department of Education of the Region of Valencia (GVPROMETEOII2015-003), and by R + D Project funded by the Ministry of Science, Innovation and Universities and co-financed with FEDER funds (PSI2016-78242-R-AEI/FEDER, UE).

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ijbd

International Journal of Behavioral Development
2021, Vol. 45(4) 310–316

DOI: 10.1177/0165025421995918
journals.sagepub.com/home/jbd

Parental incarceration affects children's emotional and behavioral outcomes: A longitudinal cohort study of children aged 9 to 13 years

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Abstract

Parental incarceration (PI) is negatively associated with emotional, educational, and psychological child outcomes. However, few studies explore potential mechanisms through which these outcomes are transmitted or the means by which prosocial outcomes might develop. This study used data from two waves of a population cohort study of children aged 9 years and followed up aged 13 years living in Ireland. Children and parents ($N = 8{,}568$) completed measures of PI, primary caregiver (PCG) depression, PCG-child relationship quality, and child behavioral adjustment. We then conducted a secondary analysis on this national longitudinal study of children in Ireland. Using sequential mediation models, we observed a mediated indirect effect of PI on prosocial outcomes via PCG depression and PCG-child relationship quality. PI at age 9 was associated with increased difficulties and reduced prosocial behavior at age 13. Additionally, PI at age 9 affected PCG depression and the PCG-child relationship quality. Additionally, child prosocial outcomes, and emotional and behavioral difficulties were less apparent where PI had a weaker effect on PCG depression and the quality of PCG-child relationship. Supports that can mitigate the impact of PI for vulnerable caregivers and children are discussed.

Keywords

Relationship quality, depression, parental incarceration, prosocial, longitudinal, SDQ

Growing up in a home affected by parental incarceration (PI) is associated with increased vulnerability for children across social, educational, and psychological domains (Murray et al., 2012). This association is particularly important in light of increases in prison populations (Wildeman, 2009), estimated to be over 11 million people worldwide (International Centre for Prison Studies, 2013). While research has demonstrated the detrimental child outcomes associated with PI, such as lower academic achievement, anti-social behavior, and poorer psychological well-being (Murray et al., 2012), the mechanisms through which PI affects developmental outcomes are poorly understood (Murray & Farrington, 2008). Additionally, research that explores the associations between PI and prosocial outcomes, such as volunteering or providing comfort, support or kindness to others, has remained largely absent (Haskins, 2015). We address these gaps first by evaluating the impact of PI on both child prosocial outcomes and emotional and behavioral difficulties in a nationally representative longitudinal cohort study, and second, by considering two possible mechanisms that may influence the PI-child outcome associations, namely primary caregiver (PCG) depression and the quality of the PCG-child relationship.

Existing research on the impact of PI for children reveals mixed results. Murray and colleagues (2012) found that PI had a negative consequence on children's educational, behavioral, and emotional outcomes, while others report null or even positive effects (Turanovic et al., 2012; Wildeman & Turney, 2014). Greater attention to the impact of PI on family systems may clarify the contexts in which PI leads to adverse child outcomes. Indeed, little research has attended to the impact of the other family members such as the partners of those incarcerated on child outcomes (Miller et al., 2013). The dearth in research is surprising given the emphasis within developmental psychology on the importance of family systems and relationships. PI by definition disrupts the caregiving environment for children (Poehlmann, 2010); however, it also comprises a stressor for the remaining parent. Thus, we propose that PI may confer an elevated risk of depression for the non-incarcerated parent. This in turn influences parent–child relationship quality, which in turn influences child outcomes (see Figure 1).

PI and PCG Depression

Unsurprisingly, PCGs of children impacted by PI are under particular strain and are at increased risk of physical and mental health difficulties (Chui, 2016). Arditti (2012) observed increased levels of stress in those caring for dependent children while also supporting an imprisoned partner. In a qualitative study, PCGs described isolation and disconnection from their own communities, and sometimes even their own families, because of the negative connotations associated with imprisonment (Bradshaw & Muldoon, 2019). PI has been associated with an increased risk of depression among the PCGs of children affected (Chui, 2016; Turanovic et al.,

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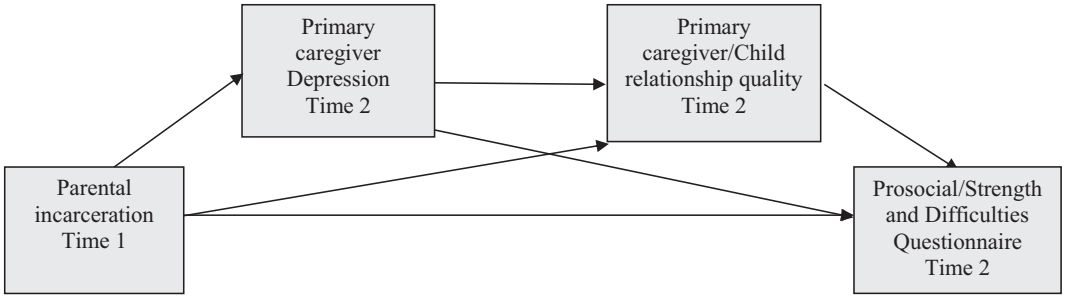

Figure 1. Proposed Serial Mediation Model of the Effect of Time 1 Parental Incarceration on Time 2 Strength and Difficulty Questionnaire Through Changes in Primary Caregiver Depression and Primary Caregiver–Child Relationship Quality ($N = 8{,}618$).

2012). Despite these potential adverse impacts, few studies have considered the potential disruption of one parent's imprisonment on the remaining parent's capacity to parent and the associated cost to children in their care.

One way in which PI may affect children is via disrupted caregiver–child relationships. PCG depression can undermine PCG-child relationships (Coyl et al., 2002). Previous research highlights how parental responsivity and sensitivity to a child's needs enhance positive PCG-child relationships (Bakermans-Kranenburg et al., 2003). Naturally, due to their confinement, imprisoned parents are restricted from engaging in day-to-day activities with their children. Equally, contextual stressors such as imprisonment of a partner may influence the PCGs well-being. For example, Richter (2004) argues that PCG depression can undermine PCGs' capacity to give proper care and attention to their children, the effects of which can have lasting influences on future disruptive adolescent behaviors. Consequently, we hypothesize that the adverse impact of PI on the remaining parent may reduce their ability to optimally parent children already made vulnerable by PI.

The Present Study

We use a national longitudinal cohort study to examine the impact of PI at age 9 on prosocial and emotional and behavioral outcomes in children at age 13 years old. Further, we focus on PCG depression and PCG-child relationship quality as potential mediators of associations between PI and child outcomes. The longitudinal design allows us to control for the effects of Time 1 (T1) measures of each of our attributes of interest, namely PCG depression, PCG-child relationship quality, prosocial, and emotional and behavioral outcomes at Time 2 (T2), allowing us to consider the unique effect of PI.

Importantly, children affected by PI are at increased risk of experiencing multiple social and economic stressors (Bradshaw et al., 2020). Gender differences in children's social and emotional development are well-established (e.g., Farrington et al., 2012); besides this, household socioeconomic status (SES), stressful life events (SLEs) (Kjellstrand et al., 2020), PCG age, and PCG level of education (Pogarsky et al., 2006) can all have negative consequences for children's emotional and behavioral development. Arditti (2012) maintains that this context of social inequality may exacerbate negative outcomes for families affected by PI. Therefore, in addition to demographic control variables (gender of the child, SES, PCG education, PCG age), we control for number of SLEs other than PI, as a measure of this wider risk environment. In summary, we test the hypothesis that there is a relationship between experience of PI by age 9 and child outcomes at age 13, which is serially mediated by PCG depression and PCG-child relationship quality. We test this for prosocial outcomes as well as for emotional and behavioral difficulties.

Method

Participants and Procedure

This study used data from the first two waves of the *Growing Up in Ireland National Longitudinal Study of Children* (GUI), a nationally representative cohort study of children living in the Republic of Ireland which commenced in 2007/2008 when the children were aged 9 (T1) and aged 13 (T2). A representative sample of 910 primary schools (82% response rate) agreed to participate; from these, 15,000 families were randomly selected and 8,568 (57%) agreed to participate. The second study wave was carried out in 2011/2012 (Wave 2) when the children were aged 13 with an 87% follow-up rate ($n = 7{,}423$). Data collection for children and PCGs was performed at each family's residence by trained interviewers. Informed consent was obtained from all participants. GUI was subject to ethical review by the Irish Health Research Board's Research Ethics Committee.

Measures

Control variables. *Socio-demographical* information was reported by the PCG and included age, gender, and highest level of education (primary, secondary, tertiary) of the PCG, whether the PCG was the biological parent of the child, and the percentage of the household's income (<50%, ≥50%) derived from social welfare payments.

Stressful life events. All PCGs indicated whether the study child had ever experienced 12 potentially stressful events (e.g., *"Has the study child experienced drugs in the immediate family" yes/no*). Individual items were summed to create a total SLEs score.

Predictor variable. *Parental incarceration* was measured at T1 by a single item. All PCGs indicated whether the study child had ever experienced PI, by answering yes or no to the question "*Has the child ever experienced a parent in prison?".*

Mediators. *PCG depression* was measured at both waves using an 8-item self-report version of the Center of Epidemiological Studies Depression Scale (CES-D) (Roberts & Vernon, 1983). The CES-D was developed as a screening instrument for use in the general

Table 1. Parental Incarceration vs. Non-Parental Incarceration Group Differences on Predictor, Mediator, and Outcome Variables.

	Parental incarceration ($n = 50$)		Non-parental incarceration ($n = 8{,}568$)				
	M (*SD*)	IQ range	*M* (*SD*)	IQ range	*t*	Cohen's *d*	Bca 95% CI [LL, UL]
Primary caregiver depression, Time 1	5.88 (5.25)	0–21	2.07 (3.29)	0–24	−4.58**	.87	[−5.49, −2.13]
Primary caregiver/child relationship quality, Time 1	43.30 (4.82)	30–50	44.82 (3.81)	10–50	2.23*	.35	[0.85, 2.89]
Prosocial outcomes, Time 1	8.64 (2.04)	2–10	8.89 (1.42)	0–10	0.86		
Emotional and behavioral difficulties, Time 1	12.52 (7.47)	1–31	7.36 (5.01)	0–37	−4.88**	.81	[−7.28, −3.03]
Primary caregiver depression, Time 2	5.87 (5.25)	0–18	2.38 (3.37)	0–24	−4.09**	.79	[−5.21, −1.76]
Primary caregiver/child relationship quality, Time 2	31.05 (3.19)	22–35	32.12 (3.28)	11–35	1.99*	.33	[0.02, 2.11]
Prosocial outcomes, Time 2	8.63 (1.79)	3–10	8.81 (1.50)	0–10	0.75		
Emotional and behavioral difficulties, Time 2	11.37 (6.90)	1–33	6.48 (5.02)	0–35	−4.36**	.81	[−7.15, −2.61]

Note. *$p = .05$. **$p < .001$ (2-tailed).

population. Items are summed to yield a total score (e.g., "I felt everything I did was an effort"). Lower scores indicate lower symptoms (GUI, 2010). Cronbach's α was .87 (Nixon, 2012).

Child-PCG relationship was measured using the Pianta Child-Parent Relationship Scale (Pianta, 1992) at T1 and T2. This is a 10-item scale assessing PCGs perceptions of their relationship with their child (e.g., "*I share an affectionate, warm relationship with my child"*). Items are rated on 5-point Likert-type scales and summed into a total score. Higher scores indicate higher relationship quality. If a participant did not answer more than one question belonging to a subscale, they did not get a score for that subscale. Cronbach's α was .75 (Thornton et al., 2016).

Outcome variables. *Prosocial behavior* was measured using the prosocial behavior subscale of the Strengths and Difficulties Questionnaire (SDQ) (Goodman et al., 1998). The SDQ is a 25-item behavioral screening questionnaire administered to children's PCG. This was completed by PCGs at both T1 and T2. The prosocial behavior subscale contains five items summed to give a total score (e.g., "*My child is kind to younger children*"). Responses to each item were measured on a Likert-type scale ranging from 0 (*not true*) to 2 (*certainly true*). Cronbach's α for prosocial behavior was .63 (Nixon, 2012).

Emotional and behavioral difficulties were measured using the difficulties subscales of the SDQ as above. The SDQ total difficulties score is calculated using the sum of the four "difficulties" subscales, with higher scores indicating more emotional and behavior problems (e.g., *"My child is often unhappy, down-hearted or tearful"*). If any of the four sub-scores is missing (because fewer than 3 of the 5 subscale items are completed), then the total difficulties score is counted as missing. As recommended by scale developers, prosocial behavior was not included in the total score as the absence of prosocial behaviors is conceptually different to the presence of psychological difficulties (Goodman et al., 1998). Cronbach's α for total difficulties was .79 (Nixon, 2012).

Analytic Approach

Means for independent, mediator, and dependent variables were compared across PI and non-PI groups using independent samples *t*-tests. Simple correlations were conducted for all variables at T1 and T2. We also examined associations between the variables across time while controlling for the independent effects of child gender and parental educational level and other SLEs using partial correlations (see Table 1). We tested our main hypotheses using a conditional process modeling program, PROCESS, to test for both direct and indirect effects (Hayes, 2012) using Model 6 for serial mediation. As such, in two separate models we tested for the direct effect of PI at T1 on prosocial behavior and emotional and behavioral difficulties at T2 in and for indirect effects via PCG depression and the child-PCG relationships. In both models, we controlled for the effect of T1 measures of mediator and outcome variables, so that we could examine the unique effect of PI. To establish the robustness of our model, we subsequently conducted our analysis controlling for PCG level of education, single parent household, household social welfare dependency, SLEs, and gender of study child.

Results

PCGs reported that PI had affected 50 children (0.9%) by the age of 9. Results also indicate that 51% of children were female and were cared for by female PCGs (98%), who were biological parents (98%) with an average age of 39 years. PCGs caring for children affected by PI reported higher mean levels of depression, and emotional and behavioral difficulties as well as lower levels of PCG/child relationship quality than those in the non-PI group at T1 and T2. There was no significant difference in prosocial behavior between groups (see Table 1). No information was available regarding gender of the incarcerated parent or previous living arrangements of the child.

PI, Depression, PCG-Child Relationship and Child Outcomes

PI was negatively associated with PCG-child relationship quality at T1 and T2. PI was positively associated with PCG depression T1 and T2, and with SDQ difficulties at T1 and T2. PI was not associated with child prosocial behavior at either time point.

Correlations also indicated that PCG depression T1 was significantly associated with PCG depression T2; PCG-child relationship T1 and T2; prosocial behavior T1 and T2; and SDQ difficulties T1 and T2. PCG-child relationship T1 was significantly associated with for PCG-child relationship T2, prosocial behavior T1 and T2, and SDQ difficulties T1 and T2. Partial correlations indicated that associations held when accounting for control variables (see Table 2).

Table 2. Descriptive Statistics and Correlations.

Variable	Full / Partial[#]	1	2	3	4	5	6	7	8	9
1	Parental incarceration	—	.04**	−.01	.02	−.01	.05**	−.01	.03*	.002
2	Primary caregiver depression Time 1	.08**	—	−.05**	.19**	−.05**	.37**	−.13**	.17**	−.06**
3	Relationship quality T1	−.03**	−.05**	—	−.25**	.36**	−.03**	.33**	−.16**	.23**
4	Strength and difficulty Time 1	.08**	.25**	−.25**	—	−.31**	.17**	−.36**	.61**	−.22**
5	Prosocial T1	−.01	−.05**	.37**	−.29**	—	−.03*	.29**	−.22**	.45**
6	Primary caregiver depression Time 2	.07**	.40**	−.04**	.24**	−.38**	—	−.21**	.24**	−.07**
7	Relationship quality Time 2	−.02*	−.08**	.34**	−.18**	.26**	−.11**	—	−.56**	.48**
8	Strength and difficulty Time 2	.07**	.21**	−.16**	.63**	−.21**	.29**	−.29**	—	−.36**
9	Prosocial T2	−.01	−.06**	.29**	−.21**	.45**	−.08**	.42**	−.35**	—
Count/mean		50^	2.09	44.81	7.39	8.89	2.40	32.11	6.51	8.82
SD		—	3.31	3.82	5.04	1.43	3.39	3.28	5.04	1.50
Range		—	0–24	10–50	0–37	0–10	0–24	11–35	0–35	0–10

Note. $N = 8{,}618$.
^Indicates a count rather than a mean value.
[#]Control variables included partner in the house, study child gender, stressful life events, PCG age, PCG education, and % of income derived from social welfare.
*$p = .05$ level (2-tailed). **$p < .001$ level (2-tailed).

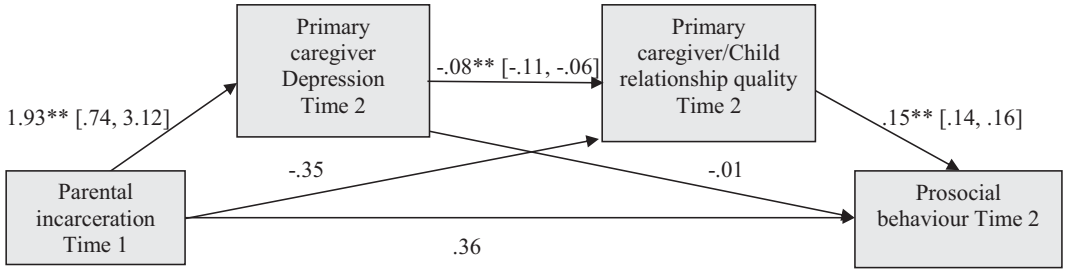

Figure 2. Serial Mediation Model of the Effect of Time 1 PI on Time 2 Prosocial Behavior Through Changes in PCG Depression and PCG-Child Relationship Quality. Unstandardized Coefficients β are Presented. *$p = .05$ level. **$p < .001$. ($N = 6{,}616$).
Note. 95% CI Appears in Brackets [LL, UL].

Predicting Prosocial Behavior

PI had no direct observable effect on prosocial outcomes at T2. However, supporting our first hypothesis, there was evidence of a significant sequentially mediated indirect effect ($b = -.02$, $SE = .01$; 95% CI: −.05: −.003) with experience of PI associated with increased levels of PCG depression ($b = 1.93$; 95% CI: .74, 3.12), which in turn was associated with poorer PCG-child relationship ($b = -.08$; 95% CI: −.11, −.06), which in turn was associated with lower prosocial behavior ($b = .25$; 95% CI: .14, .16). These effects were observed controlling for both T1 measures of these attributes and confounding variables (see Figure 2).

Predicting Emotional and Behavioral Difficulties

We also found the corollary was true in relation to emotional and behavioral difficulties ($b = .04$, $SE = .02$; 95% CI: .004: .09). PI had no direct observable effect on emotional and behavioral difficulties at age 13 when controlling for confounding variables. In contrast to prosocial outcomes, PCG depression was associated with increased levels of emotional and behavioral difficulties ($b = .17$, 95% CI: .15, .21). Additionally, experience of PI associated with increased levels of PCG depression ($b = 1.87$; 95% CI: .69, 3.05), which in turn was associated with poorer PCG-child relationship ($b = -.08$; 95% CI: −.10, −.05), which in turn was associated with higher total emotional and behavioral difficulties ($b = -.30$; 95% CI: −.33, −.27). These effects were apparent when controlling for T1 levels of these attributes and confounding variables (see Figure 3).

Discussion

Our hypothesis that the relationship between experience of PI at age 9 and prosocial and emotional and behavioral outcomes for children aged 13 is mediated by PCG depression and the quality of the PCG-child relationship was supported. Indeed, children who had experienced PI by the age of 9 had higher levels of emotional and behavioral difficulties at age 9 and 13. PI had no direct observable effect on prosocial outcomes at age 13. It is worth noting in the context of concerns around intergenerational transmission of criminality, that children affected by PI do not have significantly lower levels of prosocial behavior than those who have not experienced PI.

The effects of PI on children's development appear to be driven, at least in part, by its impact on the child's PCG. PI has an effect on PCG depression and the quality of the PCG-child relationship. PI can be seen to create a risky context that makes PCGs vulnerable, which in turn has an adverse effect on their ability to manage their relationship with their child. In this way, it shapes development

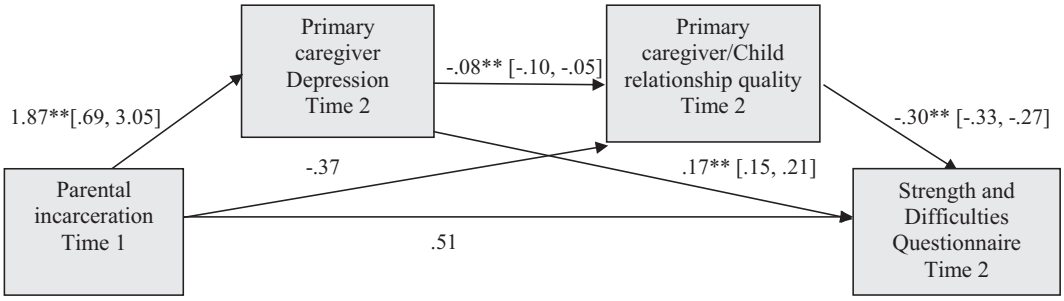

Figure 3. Serial Mediation Model of the Effect of Time 1 PI on Time 2 Emotional and Behavioral Difficulties Through Changes in PCG Depression and PCG-Child Relationship Quality. Unstandardized Coefficients β are Presented. *$P = .05$ level. **$P < .001$ level. ($N = 6{,}597$).
Note. 95% CI Appears in Brackets [LL, UL].

across middle childhood. These associations have consequences for both prosocial development and emotional and behavioral development. Our findings are consistent with previous research showing that PCG-child relationships mediate associations between maternal distress and child socio-emotional development in infancy (Mason et al., 2011) and in middle childhood (Dubois-Comtois et al., 2013). Taken together, these results emphasize the importance of supporting PCGs in order to protect the emotional and behavioral development of children affected by PI.

Studies examining positive outcomes, though fewer in number (Wang & Dix, 2015), also report that mothers' responsiveness to their children mediates the association between maternal depression and children's social competence. Our findings are comparable; poorer PCG mental health impacts child–caregiver relationship, which in turn affects our measure of prosocial outcomes. Stigma and depression of PCG could have a marked effect on prosocial development of this very at-risk group. Indeed, previous work highlights the impact of stigma on women and families affected by incarceration. Future research could usefully consider stigma as an antecedent of PCG well-being in order to understand this process more fully. Turanovic and colleagues (2012) suggest that stigma places caregivers' well-being at risk with consequent impact on children.

Turanovich and colleagues (2012) identify that the size and quality of the PCGs support network can mitigate potentially negative outcomes and offer possible avenues for future research. Our findings suggest that PCG depression may be an especially valuable target for intervention in families affected by PI. Supporting PCG well-being is likely to support children negatively impacted as a consequence of PI. Therefore, families characterized by PI, and PCGs of children in particular, warrant additional supports as they negotiate their unique challenges (McLaughlin et al., 2016). However, well-being and the PCG-child relationship have been identified in other studies as moderators of individuals' engagement with family systems-focused interventions, and thus, it may be important to think of them as moderators of intervention effects. For instance, Berlin et al. (2011) observed that associations between depression and engagement in early intervention programs might be attributable to the varying degrees of risk that characterize program participants. Therefore, examining the impact of PCG depression and PCG-child relationship quality on engagement with interventions to support families affected by PI is a worthwhile endeavor.

Several strengths of this study are noted. First, we use a population-based, longitudinal study to demonstrate the effects of PI across time. Our study was conducted in Ireland, where levels of incarceration are low relative to many other countries (International Center for Prison Studies, 2013). Thus, supports for families affected by PI may be less established, exacerbating the PI-related stigma (Murray et al., 2014). For example, a cross-national comparison study (Mulready-Jones, 2011) concluded that children with incarcerated parents in Sweden benefit from number and effectiveness of support services available. This rehabilitative approach may buffer against potential harm caused by stigma (Murray et al., 2014). Finally, we controlled for additional adversities experienced by children that are also implicated in maladaptive outcomes. Children affected by incarceration tend to differ from those not so affected on a number of risk-related variables other than PI status (Johnson & Easterling, 2012). The inclusion of comprehensive measures of cumulative stress in the GUI alongside the large population sample meant we could undertake meaningful controls for the effects of cumulative adversity. Finally, our study evaluated both prosocial behavior, and socio-emotional and behavioral difficulties within the same sample.

Some limitations are noted. First, few longitudinal data sets are designed to address the specific needs of families affected by PI (Ahalt et al., 2012). A relatively small proportion of the GUI sample had experienced PI which may limit the generalizability of study findings. However, this is representative of the low proportion of the population incarcerated in Ireland relative to other Western countries such as the U.S. Second, although the longitudinal study design facilitates evaluation of mediators of relationship between PI and children's outcomes, causality cannot be established. Importantly, PI is a precursor to the first measurement of PCG depression available in GUI; therefore, it is possible that PI has already influenced the onset of depression before T1 measurement. Third, detailed information relating to PI (e.g., the duration of or frequency of separate instances of PI, of gender of the incarcerated parent) was not collected. Lastly, all variables are assessed using PCG reports and are liable to reporter bias that potentially inflates associations among variables.

Nonetheless, this study usefully identifies parental depression and its link with PCG-child relationship as a mechanism underlying the impact of PI on prosocial behavior, as well as emotional and behavioral problems. Interventions targeting these factors,

particularly PCG depression, may lessen the adverse impact of PI on at-risk families.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research was funded by a Government of Ireland scholarship to the first author [GOIPG/2015/3721].

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ijbd

International Journal of Behavioral Development
2021, Vol. 45(4) 317–326

DOI: 10.1177/01650254211005561
journals.sagepub.com/home/jbd
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Examining discrimination and familism values as longitudinal predictors of prosocial behaviors among recent immigrant adolescents

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Abstract

The current study was designed to address gaps in the existing literature by examining the role of discrimination and familism values as predictors of multiple forms of prosocial behaviors across time in a sample of recent immigrant Latino/a adolescents. Participants were 302 recent immigrant Latino/a adolescents (53.3% male; average age 14.51 years, range = 13–17). Data were collected from adolescents in two U.S. cities: Los Angeles ($n = 150$) and Miami ($n = 152$). Adolescents completed measures of their own discrimination experiences, familism values, and tendency to engage in six forms of prosocial behaviors. Results indicated generally positive links between familism values and prosocial behaviors. Discrimination also positively predicted public prosocial behaviors and negatively predicted altruistic prosocial behaviors. We discuss the development of cultural processes and perceptions of discrimination experiences, and how these factors predict helping behaviors among immigrant adolescents.

Keywords

Discrimination, familism, prosocial behaviors, Latino/a adolescents

Systemic racism in the United States (U.S.) permeates institutions (including educational institutions) and impacts the experiences and trajectories of ethnic and racial minority youth and families, including U.S. Latino/a families (Levinson & Smith, 2016). Because of the historic bias and systemic discrimination facing many Latino/a families in the U.S., youth may be exposed to relatively high levels of discrimination. Research has highlighted the role of discrimination in negative outcomes, including depressive symptoms and academic motivations (Perreira et al., 2010; Sanchez et al., 2018). At the same time, understanding the role of discrimination in positive adjustment is also important in order to understand development from a holistic perspective while also mitigating deficit-based approaches of minority youth development (see Cobb et al., 2019; Davis & Carlo, 2019). Therefore, considering the role of discrimination in the development of positive social behaviors, including prosocial behaviors, is an important research question, particularly in contemporary U.S. society with a contentious political climate characterized by derogatory rhetoric surrounding Latino/a immigrants (Pierce & Selee, 2017).

Focusing on discrimination is particularly important among recent immigrant youth, as youth may experience discrimination based on multiple indicators (e.g., language use, skin color). These youth must navigate acculturative processes (process of adjusting to a new culture and community when the destination culture differs from the individual's traditional culture; see Berry, 1997, 2017) that can result in stressful experiences. Although substantial research has been conducted on discrimination, much of this work has focused on maladjustment, including internalizing and externalizing behaviors (Corral & Landrine, 2008; see Crockett et al., 2007), and research on discrimination and prosocial behaviors is still limited.

Prosocial behaviors represent one indicator of positive adjustment and refer to actions intended to benefit others (including a variety of helping behaviors in different situations and with differing motivations; Carlo & Randall, 2002). Prosocial behaviors include a multitude of helping behaviors such as comforting others, volunteering, helping others when asked, and donating time or resources (see Carlo & Randall, 2002).

Such behaviors are indicative of morality and care for others, and they are also an indicator of health and social well-being (see Carlo, 2014). Therefore, prosocial behaviors represent an important

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behavioral outcome from both individual and community health perspectives (Carlo, 2014; Randall & Wenner, 2014). There is evidence, for example, that prosocial behaviors among youth and emerging adults are positively associated with academic performance (Caprara et al., 2000), social competence and healthy relationships (Streit et al., 2018), and markers of physical and mental health (Carlo, 2014; Davis et al., 2016; Laible et al., 2004).

Prosocial behaviors are not a single construct and can be differentiated according to the helper's underlying motivation and situational characteristics. For example, there are differences between public and altruistic prosocial behavior. Public prosocial behaviors represent helping behaviors done in the presence of others, often with the expectation of recognition. Altruistic prosocial behaviors, in contrast, represent helping behaviors carried out with little or no expectation of reward to the self and are thus often a more costly form of helping (Carlo & Randall, 2002). Public prosocial behaviors are thought to be motivated by a desire to maintain a positive social image or to gain the approval of others, and are therefore considered to be relatively more selfishly motivated, whereas altruistic prosocial behaviors are primarily oriented toward benefitting others and are therefore selflessly motivated (Carlo & Randall, 2002). Additionally, helping behaviors can differ depending on situational characteristics. Dire prosocial behaviors include helping in emergency situations. Compliant prosocial behaviors include helping when asked. Emotional prosocial behaviors include helping in emotionally evocative situations, and anonymous prosocial behaviors include helping when others do not know, such as donating. Previous research with the current data set has suggested that the development of these prosocial behaviors follows distinct trajectories across adolescence, further supporting the need to examine these unique forms (McGinley et al., 2020; see the Method for an overview of these changes across time).

While it is important to examine the role of discrimination experiences in Latino/a adolescents' prosocial behaviors, it is also important to consider cultural values that might also predict such behaviors and provide a contextualized understanding of how such behaviors develop within specific cultural groups. One cultural value that has been the focus of research on Latino/a families is familism. Familism is defined as feelings of obligation toward one's family, viewing the family unit as part of the self, and prioritizing the needs of the family unit (Knight et al., 2010). Adolescence is an important developmental period to study familism values, as values tend to be internalized during adolescence (see Knight et al., 2010).

Theoretical Perspectives

Theoretical models have highlighted the role of cultural stressors, including discrimination experiences, as well as cultural processes in predicting developmental competencies among ethnic minority youth. Specifically, the *Integrative Model for the Study of Developmental Competencies in Minority Children* emphasized discrimination and oppression as salient predictors of developmental trajectories, ultimately shaping positive adjustment through contextual variables, such as neighborhood experiences, and family processes (García Coll et al., 1996). Extensions of this model have emphasized the diversity of Latino/a youth with regards to social experiences and have warned against relying on deficit perspectives to characterize Latino/a youth development (Fuller & García Coll, 2010).

Carlo and Conejo (2017) also developed a model specific to U.S. Latino/a prosocial behaviors that was inspired by these previous conceptual models. This model proposes that Latino/a youth exposed to discrimination and other perceived stressors (e.g., academic, family conflict, economic stressors) are posited to influence, and be influenced by, cognitive and emotive traits (e.g., empathy, ethnic identity, moral reasoning), which affect their subsequent prosocial behaviors. These models recognize the role of discrimination as a pervasive experience that can shape development but also emphasize cultural strengths that might promote competence, including traditional cultural values (Fuller & García Coll, 2010).

The current study aimed to test theoretical models focused on Latino/a developmental competencies by examining the role of discrimination and familism values as predictors of U.S. Latino/a recent immigrant adolescents' prosocial behaviors at six timepoints, spanning 3 years in time.

Discrimination and Prosocial Behaviors

As Latino/a youth progress into adolescence, they are exposed to increasingly complicated peer relationships (Bukowski et al., 2011) that might present more opportunities for perceptions of discrimination. There are also increases in social cognitive development (see Choudhury et al., 2006) that might contribute to deeper understandings of various forms of discrimination.

Stress and coping theories suggest that pervasive stressors can reduce cognitive and socioemotional resources, which may lead to reduced capabilities for positive social outreach (see Batson & Powell, 2003; Lazarus & Folkman, 1984). Discrimination experiences might negatively predict altruistic prosocial behaviors among recent U.S. Latino/a immigrant youth. Discrimination experiences during adolescence might lead to social isolation and marginalization because of the pervasive stress often associated with such experiences (Major & O'Brien, 2005; Smart Richman & Leary, 2009). Discrimination and the resulting social exclusion and marginalization might also lead to reduced motivations to engage in helping behaviors, particularly when such behaviors invoke a cost to the self, as is the case with altruistic prosocial behaviors because of the resources needed to engage in selfless helping behaviors. Low levels of prosocial behaviors, in turn, could contribute to social marginalization and isolation. More specifically, prosocial behaviors require cognitive and emotional resources as well as a connection with others (see Carlo, 2014).

Alternatively, discrimination experiences might not always negatively predict prosocial behaviors and might positively predict public prosocial behaviors. Scholars have argued that experiencing adversity and stress might promote emotional sensitivity to the plight of others, thereby ultimately promoting social responsibility and prosocial behaviors (Staub & Vollhardt, 2008). There is evidence that altruistic behaviors can result from trauma and stressful life events, consistent with the "altruism born of suffering" concept (Davis et al., 2018b; Taylor & Hanna, 2018). Therefore, experiencing discrimination might result in feelings of stress that promote care for others and ultimately selfless helping behaviors.

Moreover, Latino/a youth who experience discrimination may engage in specific forms of prosocial behaviors, such as public helping, in order to maintain a positive reputation or to gain the approval of others in an effort to combat negative stereotypes or in an effort to induce their own positive mood (McGinley et al., 2010; Snippe et al., 2018). Therefore, discrimination experiences might

impede some forms of helping but may actually promote other forms under certain circumstances. Such a proposition underscores the need to examine various types of prosocial behaviors rather than collapsing prosocial behavior into a single construct. Because the research on discrimination and prosocial behaviors is still relatively sparse, more evidence is needed to disentangle competing hypotheses, particularly when considering the role of discrimination in predicting altruistic prosocial behaviors.

Studies have documented longitudinal links between discrimination and prosocial behaviors among U.S. Latino/a adolescents. Brittian et al. (2013) examined the associations between discrimination and prosocial behaviors among a sample of U.S. Mexican adolescents. Results indicated that discrimination experiences in Grade 5 negatively predicted multiple forms of prosocial behaviors (including altruistic behaviors) in Grade 10. However, discrimination experiences in Grade 5 positively predicted public prosocial behaviors in Grade 10. There is evidence that perceived discrimination positively predicted depressive symptoms 6 months later. Depressive symptoms, in turn, negatively predicted altruistic helping behaviors 6 months later, controlling for initial levels of altruism, among a sample of recent immigrant Latino/a adolescents (Davis et al., 2016). Thus, the existing findings generally suggest that discrimination may be differentially related to helping behaviors with distinct underlying motivations, and that discrimination might be particularly detrimental for selfless helping behaviors but might not negatively predict public motivated prosocial behaviors. However, the number of studies is limited, so more work is needed to better disentangle these effects across time.

Familism Values and Prosocial Behaviors

In light of the risks associated with discrimination experiences, it is essential to identify factors that might also promote prosocial behaviors among recent immigrant youth. Familial factors and cultural values are important assets for immigrant youth and might promote prosocial behaviors (see Davis & Carlo, 2019). Because many Latino/a families endorse traditional cultural values rooted in interdependent values, including familism values, maintaining harmonious family relationships might be a priority among adolescents and might be important in shaping prosocial behaviors. When adolescents endorse familism values, they may be oriented to consider the needs of others (which is an inherent component of familism), which may in turn, foster their perspective taking skills (i.e., understanding the social situation of others), and ultimately behaviors aimed at helping others (Calderón-Tena et al., 2011). Familism values might most strongly predict helping behaviors that are common among family members and in the home environment, such as emotional, dire, and compliant prosocial behaviors (see Knight & Carlo, 2012).

While discrimination experiences might predict prosocial behaviors based on underlying motivations, familism values might predict prosocial behaviors depending on situational characteristics. There is evidence that familism values are associated with prosocial behaviors among U.S. Latino/a youth (Armenta et al., 2011; Calderón-Tena et al., 2011). Specifically, among Latino/a young adults, there is evidence that familism values positively predict public, emotional, compliant, and dire prosocial behaviors (Davis et al., 2018a). In a sample of U.S. Mexican adolescents, familism values in fifth grade positively predicted compliant and emotional prosocial behaviors, and increases in familism over time positively predicted public prosocial behaviors and dire prosocial behaviors (for girls only; Knight et al., 2018).

Study Hypotheses

In a prior study with the present data set, McGinley et al. (2020) investigated the relations between acculturation and growth in prosocial behaviors. In the present study, we examined how discrimination and familism uniquely predicted prosocial behaviors at each timepoint while controlling for the latent growth processes established by McGinley et al. (2020). Thus, the present study extends the current literature by examining the role of both discrimination experiences and familism values as predictors of recent immigrant Latino/a adolescents' multidimensional prosocial behaviors, after accounting for latent growth processes in prosocial behaviors (see Figure 1).

Specifically, we hypothesized that discrimination would be positively associated with public and negatively associated with altruistic prosocial behaviors at each timepoint after controlling for the latent growth process. We also hypothesized that familism values would be positively associated with multiple forms of prosocial behaviors, including emotional, dire, and compliant prosocial behaviors at each timepoint above and beyond the variance accounted for by the latent growth curve model. Finally, since these hypothesized relations may potentially change across time, we tested whether the relations between the time-varying covariates (discrimination, familism) and prosocial behaviors were equivalent across the six timepoints. However, we had no a priori hypotheses regarding whether the influence of these predictors on prosocial behaviors was comparable across time.

Methods

Participants

The present study was conducted using data from a longitudinal project entitled Construyendo Oportunidades Para los Adolescentes Latinos (COPAL [Building Opportunities for Latino Adolescents]; Schwartz et al., 2015a, 2015b). The goal of this longitudinal project was to examine cultural changes and health behaviors among recently immigrated Latino adolescents and their families (see Forster et al., 2015). Only adolescent data were used for the present study.

Participants were 302 adolescents, 53.3% male, and the average age was 14.51 years old (range = 13–17). Data were collected from adolescents in two U.S. cities: Los Angeles ($n = 150$) and Miami ($n = 152$). Participants from Los Angeles were predominantly from Mexico (70%), El Salvador (9%), Guatemala (6%), and other countries (15%), and the participants from Miami were predominantly from Cuba (61%), Dominican Republic (8%), Nicaragua (7%), Honduras (6%), Colombia (6%), and other countries (12%). The primary caregiver also reported on their education (Los Angeles sample mean = 8.84 years, $SD = 4.72$ years; Miami sample mean = 11.23 years, $SD = 3.67$ years). Seventy-one percent of adolescents were from two-parent homes, while 29% were from single-family homes. These two cities were selected because they are both home to large numbers of Latino adolescents. Per inclusion criteria, each target school was at least 75% Latino. We targeted densely Latino areas because many recent Latino immigrants tend to settle in ethnic enclaves (Portes & Rumbaut, 2006). The retention rate through

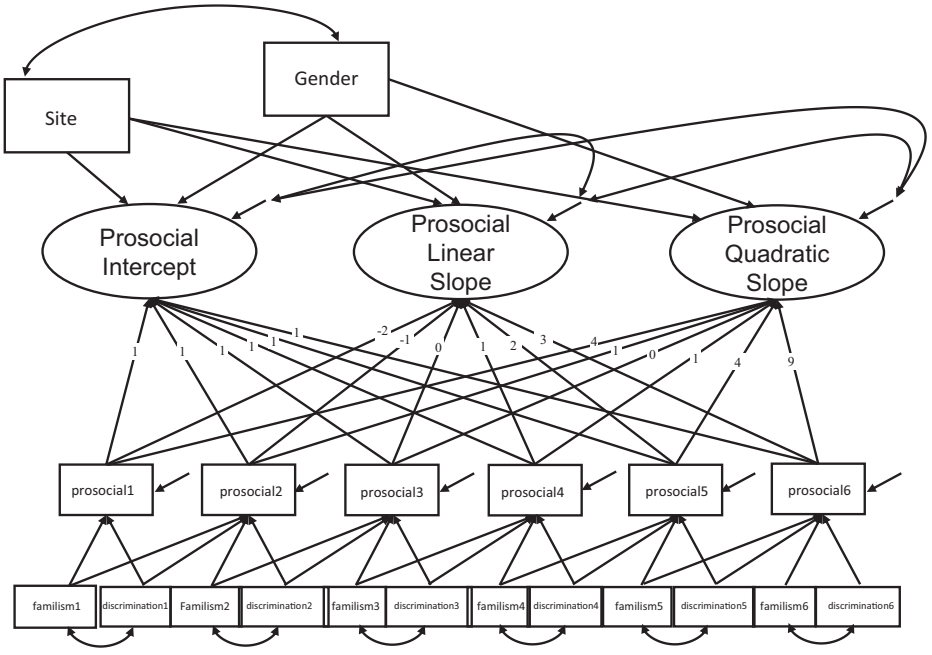

Figure 1. The Latent Growth Curve Model for Prosocial Behaviors with Time-Invariant and Time-Varying Predictors.
Note. The quadratic term was only included for the emotional prosocial behaviors model (see text). Additionally, covariances among the same type of time-varying predictors across time were freely estimated, and these time-varying covariates were regressed onto the time-invariant covariates. However, these paths were omitted from the model above to preserve clarity. Fam = Familism; Disc = Discrimination.

Time 6 was 80% ($n = 241$); however, the full sample was analyzed with the use of missing data analysis procedures.

Procedures

Adolescents were recruited from 13 schools in Los Angeles County and 10 schools in Miami-Dade County. Latino students were eligible to participate in the study if they had lived in the U.S. for 5 years or less and were entering or finishing the ninth grade at baseline. Data collection occurred at the schools, at the research centers, or at other locations convenient to families every 6 months for 3 years (Time 1–Time 6). Monetary incentives were provided to parents at each timepoint, and the youth received a movie ticket at each timepoint. Parents and adolescents were assessed in separate rooms. Surveys were administered via audio computer-assisted software. Participants indicated their responses on the computer. A button was provided for each response, and no prior computer experience was necessary. The Research Review Committees for each of the participating school districts and the University of Miami and the University of Southern California Institutional Review Boards approved this study.

Measures

Discrimination. At all timepoints, participants completed a measure assessing their perceptions of discrimination (Phinney et al., 1998). The measure consisted of seven items that asked about discrimination experiences in school, with peers, and in society generally (Time 1 $\alpha = .89$; Time 2 $\alpha = .92$; Time 3 $\alpha = .93$; Time 4 α .94; Time 5 $\alpha = .94$; Time 6 $\alpha = .95$). Sample items include: "How often do teachers treat you unfairly or negatively because of your ethnic background?" "How often do people your age treat you unfairly or negatively because of your ethnic background?" "To what extent do you feel that you are not wanted in American society?" Participants rated each item on a scale from 0 = *Not at all* to 4 = *Almost always.* This scale and items from this scale have demonstrated convergent and divergent validity, as well as good reliability in studies with Latino youth (Phinney et al., 1998; Szalacha et al., 2003).

Familism. At all timepoints, participants completed a measure of familism designed specifically for Latino populations (Lugo Steidel & Contreras, 2003). The measure consisted of 18 items reflecting the participants' attitude of familism (Time 1 $\alpha = .89$; Time 2 $\alpha = .90$; Time 3 $\alpha = .92$; Time 4 $\alpha = .92$; Time 5 $\alpha = .92$; Time 6 $\alpha = .93$). Sample items include: "A person should rely on his or her family if the need arises," and "A person should cherish time spent with his or her relatives."

Prosocial behaviors. At all six timepoints, adolescents completed a measure of their tendency to engage in six forms of prosocial behaviors: emotional, dire, compliant, anonymous, altruistic, and public prosocial behaviors (assessed using an adapted version of the Prosocial Tendencies Measure-Revised; Carlo et al., 2003). Emotional prosocial behaviors (4 items; Time 1: $\alpha = .76$, 3 items; Time 2 $\alpha = .80$; Time 3 $\alpha = .77$; Time 4 $\alpha = .81$; Time 5 $\alpha = .83$; Time 6 = .86) include helping behaviors in emotionally evocative situations (e.g., "I feel better when I am able to comfort someone who is very upset"). Dire prosocial behaviors (3 items; Time 1: $\alpha = .77$, 3 items; Time 2 $\alpha = .76$; Time 3 $\alpha = .73$; Time 4 $\alpha = .73$; Time 5 $\alpha = .77$; Time 6 = .85) include helping in emergency situations (e.g., "I like to help people who are in a real crisis or need"). Compliant prosocial behaviors (2 items; Time 1: $\alpha = .53$, 3 items; Time 2 $\alpha = .53$; Time 3 $\alpha = .53$; Time 4 $\alpha = .57$; Time 5 $\alpha = .57$; Time 6 = .74) include helping others when asked (e.g., "When

Table 1. Means (Standard Deviations) for the Six Prosocial Behaviors, Familism, and Discrimination Across the Six Timepoints.

	T1	T2	T3	T4	T5	T6
Altruistic	2.72 (1.09)	2.74 (1.12)	2.82 (1.05)	2.73 (1.09)	2.80 (1.16)	2.84 (1.13)
Public	1.53 (1.10)	1.37 (1.15)	1.26 (1.16)	1.20 (1.13)	1.15 (1.22)	1.11 (1.16)
Emotional	2.25 (0.98)	2.35 (1.00)	2.28 (0.98)	2.26 (1.00)	2.28 (1.05)	2.12 (1.10)
Dire	2.53 (0.99)	2.61 (.98)	2.59 (0.95)	2.46 (0.94)	2.53 (1.00)	2.24 (1.11)
Compliant	2.48 (1.02)	2.53 (1.03)	2.55 (1.02)	2.56 (1.00)	2.59 (1.02)	2.43 (1.15)
Anonymous	1.87 (1.08)	2.01 (1.12)	1.98 (1.10)	2.13 (1.05)	2.10 (1.15)	2.04 (1.14)
Familism	3.05 (0.50)	2.93 (0.57)	2.87 (0.60)	2.82 (0.65)	2.86 (0.64)	2.82 (0.62)
Discrimination	0.78 (0.79)	0.84 (0.94)	0.94 (0.97)	0.99 (0.99)	0.95 (0.98)	0.92 (0.99)

Note: $N = 302$ at Time 1 and 241 at Time 6. Participants responded on a scale from 0 = *Does not describe me at all* to 4 = *Describes me greatly*.

people ask me to help them, I help them as quickly as I can"). Anonymous prosocial behaviors (3 items; Time 1: $\alpha = .80$, 3 items; Time 2 $\alpha = .83$; Time 3 $\alpha = .81$; Time 4 $\alpha = .82$; Time 5 $\alpha = .85$; Time 6 $= .86$) include helping without the knowledge of others (e.g., "Most of the time, I like to help others when they do not know who helped them"). Altruistic prosocial behaviors (3 items; Time 1: $\alpha = .69$, 3 items; Time 2 $\alpha = .76$; Time 3 $\alpha = .73$; Time 4 $\alpha = .78$; Time 5 $\alpha = .81$; Time 6 $= .81$) include helping behaviors with no expectation for personal reward (e.g., "I believe I should receive more recognition for the time and energy I spend helping others" [reversed]). Public prosocial behaviors (4 items; Time 1 $\alpha = .84$; Time 2 $\alpha = .84$; Time 3 $\alpha = .86$; Time 4 $\alpha = .85$; Time 5 $\alpha = .88$; Time 6 $= .87$) include helping in the presence of others (e.g., "I am best at helping others when everyone is watching"). Participants rated each item on a scale from 0 = *Does not describe me at all* to 4 = *Describes me greatly*.

Results

Data Analysis Plan

Descriptive statistics and correlations were examined in SPSS at each of the six timepoints. Next, linear latent growth curve models with time-invariant and time-varying covariates for the six prosocial behaviors across the six equally spaced timepoints (centered at the third timepoint) were examined using Mplus 8.0 (Muthén & Muthén, 1998–2017). Figure 1 depicts the tested model. The intercept and slope for prosocial behaviors, as well as the time-varying predictors, were regressed onto time-invariant control variables (gender, site). We controlled for gender because of the documented differences in responses to stress among boys and girls as well as differences in prosocial behaviors (Taylor et al., 2000). Previous research has found that girls tend to be more likely to engage in care-based helping behaviors, while boys are more likely to engage in pragmatic prosocial behaviors (Carlo et al., 2003). Prosocial behaviors at the six timepoints were regressed onto the contemporaneous set of time-varying predictors (familism, discrimination). Correlations among the time-varying predictors (within construct, across timepoints, and across construct, within timepoints) were also estimated to account for method variance (Brown, 2006).

We again note that the latent growth curve models for prosocial behaviors with this data set have been previously established (see McGinley et al., 2020). In this study, the linear growth curve model provided the best fit to the data for all prosocial behaviors except for emotional prosocial behaviors. For emotional prosocial behaviors, a latent growth curve model accounting for quadratic growth provided the best fit to the data. Overall, a negative mean linear slope was found for public and dire prosocial behaviors, and a positive mean linear slope was established for anonymous prosocial behaviors. The mean linear growth for emotional, altruistic, and compliant prosocial behaviors was not significant. However, for every prosocial behavior examined, the variance for the linear slope was statistically significant, suggested that the rate in change varied across participants. Finally, a mean negative quadratic mean was established for emotional prosocial behaviors, suggesting a deceleration in emotional helping by the final timepoints. The variance term for this quadratic growth was marginally significant. These latent growth curve models established by McGinley et al. (2020) served as the initial latent growth curve models in the current analysis.

Guidelines provided by Hu and Bentler (1999) regarding the root-mean-square error of approximation (RMSEA), comparative fit index (CFI), and standardized root mean residual (SRMR) were adopted to evaluate model fit. Models were characterized as fitting the data well if they produced values of CFI $\geq .95$, RMSEA $\leq .06$, and SRMR $\leq .08$ (Hu & Bentler, 1999). Finally, we note that models were estimated using full information maximum likelihood estimation (FIML-robust estimator) to make use of all available data.

Descriptive Statistics

Means and standard deviations for the six prosocial behaviors, discrimination, and familism across the six timepoints can be found in Table 1. Bivariate correlations within constructs across timepoints were positive and significant (p's $< .01$) for familism (r's = .20–.54), discrimination (r's = .26–.58), altruistic prosocial behaviors (r's = .31–.64), public prosocial behaviors (r's = .37–.65), emotional prosocial behaviors (r's = .38–.53), dire prosocial behaviors (r's = .28–.50), compliant prosocial behaviors (r's = .29–.51), and anonymous prosocial behaviors (r's = .21–.47). Bivariate correlations within timepoints and across constructs were then examined. At all timepoints, bivariate correlations among discrimination and altruistic prosocial behaviors were negative and significant (r's = −.20 to –.40, p's $< .001$), and bivariate correlations among discrimination and public prosocial behaviors were positive and significant (r's = .14–.36, p's $< .05$). Generally, no significant relations were found among discrimination and other prosocial behaviors, with the exception of negative and significant correlations among anonymous prosocial behaviors at Time 2 and Time 4 (r's = .17 and .19, respectively, p's $< .01$). Bivariate correlations among familism and prosocial behaviors (except for altruistic prosocial behaviors) were typically significant and positive (r's = .13–.40, p's $< .05$), though correlations between familism and

Table 2. Unstandardized Latent Growth Curve Model Results (95% Confidence Intervals).

	Altruistic	Public	Emotional	Dire	Compliant	Anonymous
Latent growth curve						
Means						
Intercept	2.56** (2.08, 3.05)	1.27** (0.76, 1.78)	0.95** (0.36, 1.55)	0.88** (0.43, 1.33)	1.24** (0.80, 1.68)	0.70** (0.20, 1.19)
Slope	−.04 (−.24, .15)	.04 (−.16, .25)	−.03 (−.25, .19)	−.10 (−.29, .09)	−.05 (−.26, .15)	−.07 (−.27, .13)
Quadratic	—	—	−.11 (−.23, .01)	—	—	—
Residual variances						
Intercept	.46** (.36, .55)	.54** (.44, .64)	.47** (.36, .58)	.28** (.22, .35)	.32** (.26, .39)	.37** (.29, .45)
Slope	.02** (.01, .04)	.02** (.01, .04)	.02** (.01, .03)	.01 (.00, .02)	.01 (.00, .02)	.02* (.00, .03)
Quadratic	—	—	.01** (.00, .01)	—	—	—
Time-invariant covariates						
Intercept						
Gender[a]	.35** (.18, .52)	−.38** (−.57, −.19)	.19 (.00, .38)	.23** (.08, .37)	.06 (−.09, .22)	−.11 (−.28, .06)
Site[b]	.15 (−.03, .32)	−.10 (−.28, .09)	.06 (−.13, .25)	−.02 (−.17, .13)	.00 (−.15, .15)	.20* (.04, .37)
Slope						
Gender[a]	.05 (−.01, .11)	.00 (−.05, .06)	−.04 (−.10, .01)	−.04 (−.09, .01)	−.02 (−.07, .03)	.02 (−.04, .08)
Site[b]	.02 (−.04, .07)	−.04 (−.10, .02)	.07* (.01, .12)	.10** (.05, .14)	.07** (.02, .12)	.03 (−.03, .09)
Quadratic						
Gender[a]	—	—	−.01 (−.04, .02)	—	—	—
Site[b]	—	—	.02 (−.01, .05)	—	—	—
Time-varying covariates						
T1: Prosocial on discrimination	−.14 (−.28, .01)	−.01 (−.15, .14)	.09 (−.03, .21)	.01 (−.11, .13)	.08 (−.04, .21)	.04 (−.11, .18)
T2: Prosocial on discrimination	−.32** (−.46, −.19)	.20** (.06, .34)	.11* (.00, .21)	.09 (−.01, .18)	.11* (.01, .21)	.21** (.10, .33)
T3: Prosocial on discrimination	−.20** (−.31, −.08)	.21** (.07, .34)	.05 (−.05, .16)	−.01 (−.10, .09)	−.01 (−.12, .09)	.06 (−.05, .18)
T4: Prosocial on discrimination	−.31** (−.41, −.20)	.22** (.11, .33)	−.01 (−.11, .10)	.09 (−.02, .20)	.00 (−.11, .10)	.18** (.06, .30)
T5: Prosocial on discrimination	−.33** (−.44, −.23)	.28** (.16, .41)	.07 (−.03, .18)	−.03 (−.13, .08)	−.06 (−.18, .05)	.13* (.02, .23)
T6: Prosocial on discrimination	−.20** (−.33, −.07)	.13* (.01, .26)	.01 (−.10, .13)	−.08 (−.21, .04)	−.17* (−.30, −.04)	.02 (−.10, .14)
T1: Prosocial on familism	−.11 (−.28, .06)	.31** (.14, .48)	.41** (.23, .60)	.44** (.28, .59)	.38** (.21, .54)	.34** (.18, .50)
T2: Prosocial on familism	−.08 (−.21, .06)	.21** (.07, .36)	.36** (.24, .49)	.46** (.33, .58)	.39** (.26, .53)	.35** (.21, .48)
T3: Prosocial on familism	−.09 (−.21, .02)	.17** (.06, .29)	.32** (.19, .45)	.49** (.39, .59)	.42** (.32, .53)	.38** (.26, .50)
T4: Prosocial on familism	−.10 (−.22, .02)	.14* (.02, .26)	.36** (.24, .49)	.42** (.31, .52)	.42** (.30, .53)	.39** (.27, .51)
T5: Prosocial on familism	−.11 (−.25, .03)	.13 (−.02, .28)	.44** (.32, .56)	.49** (.35, .63)	.44** (.30, .58)	.40** (.25, .55)
T6: Prosocial on familism	−.15 (−.32, .02)	.16 (−.02, .35)	.58** (.40, .76)	.42** (.24, .60)	.42** (.24, .60)	.42** (.24, .61)

Note: $N = 302$ at Time 1 and 241 at Time 6. For the prosocial behavior measure, participants responded on a scale from 0 = *Does not describe me at all* to 4 = *Describes me greatly*. For the discrimination measure, participants responded on a scale from 0 = *Not at all* to 4 = *Almost always*. For the familism measure, participants responded on a scale from 0 = *strongly disagree* to 4 = *strongly agree*.

[a]Gender is coded as 0 = Boys, 1 = Girls.

[b]Site is coded as 0 = Miami, 1 = Los Angeles.

**$p < .01$. *$p < .05$.

public prosocial behaviors were not significant at Time 3 and Time 4. Bivariate correlations between familism and altruistic behaviors ranged from negative and significant to not significant (r's = −.15 to +.01, $p < .05$ for r's $\leq$ −.12).

Latent Growth Curve Modeling with Time-Varying Covariates Results

The altruistic prosocial behavior model fit the data well (χ^2 [114] = 143.50, $p = .03$; CFI = .98, RMSEA = .03, SRMR = .07; Table 2). Being female was related to a higher mean intercept for altruistic prosocial behaviors. Except for Time 1, discrimination was negatively related to altruistic prosocial behaviors. No paths between familism and altruistic prosocial behaviors were significant. The Satorra–Bentler chi-square difference tests suggested that the relations among discrimination and altruistic prosocial behaviors (S-Bχ^2 [5] = 9.96, $p > .05$) and familism and altruistic prosocial behaviors (S-Bχ^2 [5] = 4.30, $p > .05$) were equivalent at each timepoint.

The public prosocial behavior model fit the data well (χ^2 [114] = 170.69, $p < .01$; CFI = .96, RMSEA = .04, SRMR < .08). Being female was related to a lower mean intercept for public prosocial behavior. Both discrimination (Time 2–6) and familism (T1–T4) were positively related to public prosocial behaviors. The Satorra–Bentler chi-square difference tests suggested that the relations among discrimination and public prosocial behaviors (S-Bχ^2 [5] = 11.90, $p < .05$) and familism and public prosocial behaviors (S-Bχ^2 [5] = 15.46, $p < .01$) were not equivalent across the six timepoints. We freely estimated discrimination at Time 1 since this relation was not statistically significant in the completely unconstrained model. The Satorra–Bentler chi-square difference test was no longer statistically significant after freeing this path (S-Bχ^2 [4] = 3.84, $p > .05$). These results indicated that the relation between discrimination and public prosocial behaviors was weaker (and nonsignificant) at Time 1 compared to the relations across Time 2–6. Next, we freely estimated familism at Time 6 since this relation was not statistically significant and had the largest standard error. The Satorra–Bentler chi-square difference test was no longer statistically significant after freeing this path (S-Bχ^2 [4] = 8.27, $p > .05$). Thus, the relation between familism and public prosocial behaviors was weaker at Time 6 compared to the relations across Time 1–5.

The emotional prosocial behavior model fit the data well (χ^2 [108] = 110.45, p = .42, CFI = 1.00, RMSEA = .01, SRMR = .05). Being female was related to a less negative slope in emotional prosocial behavior. Typically discrimination was not related to emotional prosocial behaviors, excepted at Time 2 when a positive relation was observed. At Times 1–6, familism was positively related to emotional prosocial behaviors. The Satorra–Bentler chi-square difference tests indicated that the relations among discrimination and emotional prosocial behaviors (S-Bχ^2 [5] = 3.77, p > .05) and familism and emotional prosocial behaviors (S-Bχ^2 [5] = 5.82, p > .05) were equivalent at each timepoint.

The dire prosocial behavior model fit the data well (χ^2 [114] =138.61 [114], p = .06, CFI = .98, RMSEA = .03, SRMR = .05). Being female was related to a higher mean intercept, and participants residing in Los Angeles and a higher mean slope for dire prosocial behavior. Discrimination was not related to dire prosocial behaviors. At Times 1–6, familism was positively related to dire prosocial behavior. The Satorra–Bentler chi-square difference tests suggested that the relations among discrimination and dire prosocial behaviors (S-Bχ^2 [5] = 8.51, p > .05) and familism and dire prosocial behaviors (S-Bχ^2 [5] = 9.54, p > .05) were equivalent at each timepoint.

The compliant prosocial behavior model fit the data well (χ^2 [114] = 129.35, p = .15, CFI = .99, RMSEA = .02, SRMR = .06). Participants residing in Los Angeles and a higher mean slope for compliant prosocial behaviors. Typically discrimination was not related to compliant prosocial behaviors, excepted at Time 2 when a positive relation was observed, and at Time 6, when a negative relation was observed. At Times 1–6, familism was positively related to compliant prosocial behaviors. The Satorra–Bentler chi-square difference tests suggested that the relations among discrimination and compliant prosocial behaviors (S-Bχ^2 [5] = 11.90, p < .05) were not equivalent across the six timepoints. We freely estimated discrimination at Time 6 since this relation was the strongest in the completely unconstrained model. The Satorra–Bentler chi-square difference test was no longer statistically significant after freeing this path (S-Bχ^2 [4] = 6.02, p > .05). These results indicated that the relation between discrimination and compliant prosocial behaviors was stronger (and significant and negative) at Time 6 compared to the relations across Time 1–5. Finally, the Satorra–Bentler chi-square difference test suggested that the relations among familism and compliant prosocial behaviors (S-Bχ^2 [5] = 1.71, p > .05) were equivalent at each timepoint.

The anonymous prosocial behavior model fit the data well (χ^2 [114] = 125.45, p = .21, CFI = .99, RMSEA = .02, SRMR = .05). Participants residing in Los Angeles and a higher mean intercept for anonymous prosocial behaviors. Discrimination was positively related to anonymous prosocial behaviors at Times 2, 4, and 5. At Times 1–6, familism was positively related to anonymous prosocial behaviors. The Satorra–Bentler chi-square difference tests indicated that the relations among discrimination and anonymous prosocial behaviors (S-Bχ^2 [5] = 10.00, p > .05) and familism and anonymous prosocial behaviors (S-Bχ^2 [5] = 0.67, p > .05) were equivalent at each timepoint.

Discussion

The results of the current study highlight the role of both discrimination experiences and familism values as predictors of recent immigrant adolescents' prosocial behaviors. Interestingly, discrimination consistently predicted prosocial behaviors based on underlying motivation (i.e., public and altruistic), while familism values were related to prosocial behaviors that can be distinguished by situational characteristics (i.e., emotional, dire, and compliant). The findings demonstrate support for conceptual models that emphasize familial factors as assets and highlight the importance of simultaneously considering discrimination experiences in predicting recent immigrant youth outcomes.

Discrimination was negatively associated with altruistic prosocial behaviors across 3 years. These findings extend prior evidence that discrimination experiences are negatively associated with altruistic prosocial behaviors among U.S. Latino/a adolescents (Brittian et al., 2013; Davis et al., 2016) by demonstrating this association in a sample of recent immigrant adolescents across multiple timepoints. It may be that when recent immigrant adolescents experience discrimination, they become socially isolated and potentially depleted of the cognitive and emotional resources needed to suppress their own needs and engage in selfless helping behaviors (see Lazarus & Folkman, 1984; Major & O'Brien, 2005). Discrimination experiences might be particularly salient for recent immigrant youth as they adapt to a new context. Consistent with our hypotheses, discrimination was also positively associated with public prosocial behaviors, but only after the first timepoint. These findings might suggest that youth engage in public prosocial behaviors as a way to protect their self-image and maintain a positive reputation (McGinley et al., 2010; Snippe et al., 2018). These findings are consistent with previous research (Brittian et al., 2013), including one study with recent immigrant Latino/a adolescents using the COPAL data (Davis et al., 2016). The Davis and colleagues (2016) study examined prosocial behaviors only at Time 3, and the results of the current study extend those findings by demonstrating the links between discrimination and altruistic and public prosocial behaviors at six timepoints while controlling for the latent growth processes for these prosocial behaviors.

While discrimination most consistently predicted altruistic and public prosocial behaviors, there was also a positive link between discrimination and emotional prosocial behaviors at Time 2, compliant prosocial behaviors at Time 2, and anonymous prosocial behaviors at Times 2, 4, and 5. Discrimination might predict these forms of helping less consistently but might still be meaningful for understanding helping behaviors that require a connection with others, such as emotional and compliant helping. Immigrant youth who are experiencing discrimination might also be more motivated to engage in anonymous prosocial behaviors, as such behaviors might contribute to positive mood and might be a relatively low-cost form of helping. Anonymous helping can also be done with little social interaction (donating), so this form of helping might be comfortable for youth if they feel socially isolated or marginalized. Interestingly, there was also a negative link between discrimination and compliant prosocial behaviors only at Time 6. While this finding warrants further investigation, it might be that discrimination is costly over time for youth, as the stress from such experiences compounds (Taylor et al., 2018). More research is needed to better understand how discrimination predicts these multidimensional forms of helping.

Familism was also associated with multiple forms of prosocial behaviors but tended to most consistently predict prosocial behaviors that are commonly directed toward family members in the home environment (see Knight & Carlo, 2012). Specifically, familism was consistently positively associated with emotional, dire,

compliant, and anonymous prosocial behaviors at all timepoints. Familism values might promote an orientation to the needs of others, fostering perspective taking, and promoting other-oriented behaviors, including prosocial behaviors (Calderón-Tena et al., 2011). Because emotional, dire, and compliant prosocial behaviors are relatively common and occur frequently in families (see Knight & Carlo, 2012), familism values might play a direct role in predicting these specific forms of helping. Additionally, the links with anonymous prosocial behaviors suggest that familism values might promote prosocial behaviors in situations where no one is aware of the helping behavior, such as donating. These findings are consistent with previous research documenting links between familism and multiple forms of prosocial behaviors, including emotional, dire, and compliant prosocial behaviors among Latino/a adolescents and emerging adults (Davis et al., 2018a; Knight et al., 2018). Interestingly, familism values also positively predicted public prosocial behaviors at earlier timepoints, and there is also prior evidence that familism values are positively associated with public prosocial behaviors (Davis et al., 2018a). Because immigrant youth who endorse familism values may prioritize harmony in relationships, public helping might be one way to maintain a positive image and promote a positive reputation.

Interestingly, there were differences in the slopes of multiple forms of prosocial based on location, such that participants in Los Angeles had higher mean slopes for dire, compliant, and anonymous prosocial behaviors. While more research is needed to better understand these results, there might be differences in sample characteristics (e.g., levels of acculturation, socioeconomic status) that account for these differences. The Miami sample consists primarily of Cuban immigrant youth, while the Los Angeles sample consists primarily of immigrant youth from Mexico. The samples also differ with regards to socioeconomic status, as the Miami sample reported higher levels of maternal education than the sample from Los Angeles (Los Angeles sample mean = 8.84 years, $SD = 4.72$ years; Miami sample mean = 11.23 years, $SD = 3.67$ years). There is evidence in previous research that economic stressors can promote prosocial behaviors among Latino/a youth (Davis et al., 2020), so it may be that experiencing economic disadvantage is a catalyst for multiple forms of prosocial behaviors.

There were also notable gender differences in prosocial behaviors. Specifically, being female was related to a higher mean intercept for altruistic prosocial behaviors, a lower mean intercept for public prosocial behavior, a higher mean intercept for dire prosocial behaviors, and a less negative slope in emotional prosocial behavior. Overall, these results are consistent with previous research, which demonstrates gender differences in prosocial behaviors such that girls tend to engage in higher levels of altruistic and care-based helping (e.g., emotional prosocial behaviors) and lower levels of public prosocial behaviors than boys (Carlo et al., 2003). These results add longitudinal evidence among immigrant Latino/a youth for the role of gender in prosocial behaviors.

Limitations and Future Directions

Although the present study contributes to our understanding of the role of discrimination and familism values in predicting prosocial behaviors at six timepoints across 3 years, some limitations should be considered. Although we utilized a longitudinal design across 6 timepoints, we can draw *predictive*—but not *causal*—conclusions. An experimental design is generally required to assume causality. Further, all data were gathered using adolescent self-reports; therefore, shared method variance and self-presentation biases might have affected our findings. Future studies should utilize multiple reporters, behavioral tasks, and independent behavioral observations to account for these potential biases. Additionally, although we used data from recent immigrant youth in two U.S. cities, the findings may not generalize long-term or later generation U.S. Latino/a immigrant subgroups or to Latino/a youth migrating to "nontraditional" destinations in the U.S. (e.g., the Midwest, Mountain West, Northwest, or Deep South). Our sample also consisted of immigrants living in communities and attending schools with relatively large populations of Latino/as; therefore, future research should examine immigrant populations in a variety of receiving contexts and families living in varying socioeconomic conditions.

Conclusions

Despite these limitations, the present results contribute to our understanding of factors that might promote or mitigate prosocial behavior among recent Latino/a adolescents immigrating to the U.S. Results suggest that familism might be a traditional cultural value that promotes multiple forms of prosocial behaviors, while discrimination might promote helping in front of others and might mitigate selfless helping. This study contributes to the literature on prosocial behaviors among Latino/a youth by demonstrating discrimination as a predictor of motivations for helping and familism values as a predictor of helping in specific situations.

These findings lead us to more sophisticated characterizations of recently immigrated Latino/a youth and their associated outcomes, which has important implications for practitioners and policy makers. Intervention efforts aimed at strengthening traditional cultural values of recently immigrated youth, including youth who experience discrimination, can promote prosocial behaviors among these vulnerable Latino/a adolescents. Particularly, efforts should be focused on promoting higher levels of familism values in youth, while also focusing on reducing experiences of discrimination. Promoting familism values among recent immigrant youth might be a particularly important area for intervention in order to foster prosocial behaviors.

Authors' Note

Gustavo Carlo is currently at University of California–Irvine, USA; Seth J. Schwartz is currently at University of Texas at Austin, USA.

Acknowledgements

We would like to thank Maria-Rosa Velazquez, Tatiana Clavijo, Mercedes Prado, Alba Alfonso, Aleyda Marcos, Daisy Ramirez, Lissette Ramirez, and Perlita Carrillo for their hard work conducting assessments and tracking families. We would also like to thank Dr. Judy Arroyo for her guidance and wisdom. Finally, we would like to thank the study families for sharing their experiences with us.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The research presented here was supported by National Institute on Drug Abuse grant DA026594 (Seth J. Schwartz and Jennifer B. Unger, Principal Investigators).

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ijbd

International Journal of Behavioral Development
2021, Vol. 45(4) 327–336

DOI: 10.1177/0165025420935630
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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.

Keywords

School-based prosocial behavior, heterogeneity, early childhood antecedents, protective and risk antecedents, individual and contextual domains

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 (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).

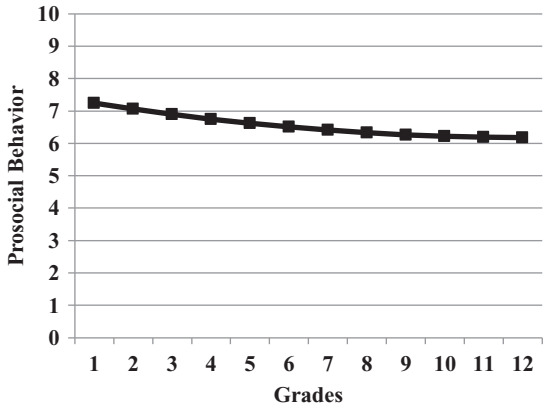

Figure 1. Normative Developmental Trajectory for Prosocial Behavior From Grades 1 to 12.
Note. $N = 784$.

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.

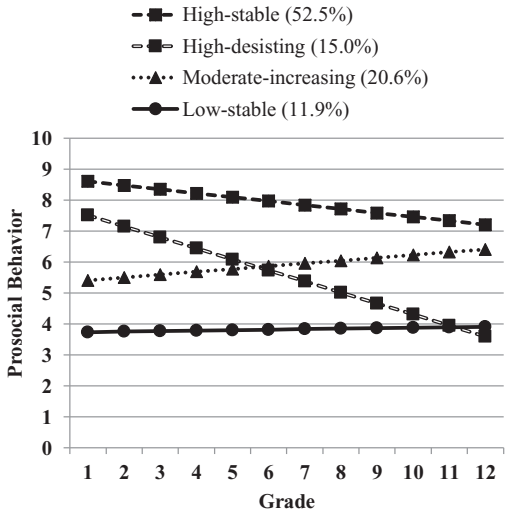

Figure 2. Differentiated Developmental Trajectories (and Class Percentages) for Prosocial Behavior From Grades 1 to 12.
Note. $N = 784$.

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.

Acknowledgments

The authors thank Dr. Jan Hughes for providing our team access to the data set, the research staff responsible for data collection, and the families who participated in this study.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research program was supported by Grant R01 HD39367 to Dr. Jan Hughes from the National Institute of Child Health and Human Development (NICHD).

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Supplemental material

Supplemental material for this article is available online.

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ijbd

International Journal of Behavioral Development
2021, Vol. 45(4) 337–344

DOI: 10.1177/0165025420935619
journals.sagepub.com/home/jbd
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Out-group prosocial giving during childhood: The role of in-group preference and out-group attitudes in a divided society

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Abstract

Amid protracted conflict, children are raised in divided contexts that shape the development of their intergroup attitudes and behaviors. Social identity development theory (SIDT) suggests that in-group preference may contribute to more negative out-group attitudes and behaviors in middle childhood. In such contexts, in-group favoritism may shape resource distribution, a key indicator of prosocial behavior. This study examined the predictors of resource distribution among 387 children (age: $M = 9.59$, $SD = 2.34$) of majority (Jewish) and minority (Arab-Muslim) groups in Israel. Rooted in SIDT, a multiple-group chain mediation found that the effect of age on out-group prosocial giving was serially mediated by the child's in-group symbol preference and negative out-group attitudes. The mediation held across both majority and minority groups, highlighting the underlying developmental process of prosocial giving across group lines in a divided society.

Keywords

Out-group prosocial behavior, intergroup conflict, resource distribution, children, Israel

Children's prosocial behaviors may be an antecedent of peacebuilding in historically conflicted societies (Taylor, 2020; Taylor et al., 2014; Taylor et al., 2019a). Yet, experimental studies demonstrate that young children are selective about with whom, and when, they engage in prosocial behavior depending on characteristics of the recipient and the situation (for a review, see Martin & Olson, 2015). For instance, children are more likely to engage in prosocial behavior when the recipient is more familiar (Young et al., 1999), has previously been kind or helpful to them or others (Dunfield & Kuhlmeier, 2010), or is a member of their in-group (Dunham et al., 2011). Thus, understanding the mechanisms underlying prosociality is especially important in children with a history of exposure to intergroup conflict and zero-sum political narratives in their day-to-day experiences (e.g., Bar-Tal, 2007), as can be the case in divided societies such as Israel.

The current study models the predictors of out-group prosocial giving in two ethnic groups in Israel. Rooted in social identity development theory (SIDT; Nesdale, 2004), we examined whether, with age, in-group preference would relate to negative out-group attitudes, and if those attitudes would influence prosocial giving based on group membership. Moreover, examining children from Jewish and Arab-Muslim backgrounds in this context of protracted conflict will shed light on whether the same process predicts prosocial giving for members of both majority and minority groups. Understanding factors that promote positive behaviors across group lines among children may inform peacebuilding initiatives within Israel and other historically divided societies (O'Driscoll et al., 2018; Taylor et al., 2014).

Development of Intergroup Attitudes

Children attend to social category distinctions from infancy and use social information to navigate their social worlds. By the age of four, children identify out-group individuals and display social preferences based on ethnicity (e.g., Aboud, 1988; Nesdale, 2001). However, ethnic awareness and preferences for in-group members do not necessarily develop into negative out-group attitudes (Nesdale, 2004).

SIDT suggests a developmental pathway, taking into account environmental influences, by which children's social categorization and in-group preferences may develop into out-group prejudice in attitudes and actions. SIDT outlines four phases: (1) undifferentiated (before 3 years)—ethnic group membership is not yet salient; (2) ethnic awareness (at about 3 years)—awareness of ethnic cues emerges; (3) ethnic preference (at about 4 years)—preference of in-group over out-group appears; and (4) ethnic prejudice (at about 7 years)—sometimes negative attitudes about the out-group may emerge (Nesdale, 2004). Prejudice may develop when children not only identify with their in-group, but also when negative attitudes toward an out-group are a social norm, or when children observe tense intergroup relations or perceive threats to group status (Nesdale, Maass et al., 2005). Under such conditions, negative out-group attitudes may continue into late childhood (Nesdale, Griffith et al., 2005). This may be the case in Israel, where young children absorb conflict-supporting contents which may persist even later in life (Nasie et al., 2016).

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In Israel, the ethno-religious categories "Jew" and "Arab" describe an extremely salient social dichotomy in the society due to historical and political reasons. The dichotomy also reflects socioeconomic gaps in status of the Jewish majority and the Arab minority, where the latter has, on average, lower education, employment, and wages. Consistent with SIDT, children in this region demonstrate awareness of ethnic categories at a young age, as early as age three (Bar-Tal, 1996); they also demonstrate negative stereotyping of out-group ethnic members (Slone et al., 2000).

The current study builds on the limited research that has explicitly examined intergroup relations during childhood for both minority and majority groups in conflict-affected settings (Reidy et al., 2015). Although differences have been found between minority and majority group members in terms of felt security (Taylor et al., 2017), intentions to discriminate (Ajduković & Čorkalo Biruški, 2008), and ethnic socialization within the family (Štambuk et al., 2019), children's intergroup attitudes have been insufficiently explored in such contexts. Exposure to in-group symbols, however, has been found to differently affect out-group attitudes as a function of majority/minority group affiliation for adults (Razpurker-Apfeld & Shamoa-Nir, 2015; Shamoa-Nir & Razpurker-Apfeld, 2019a, 2019b). Although Nesdale (1999) suggested that majority group children may show stronger in-group preference compared to minority group children, SIDT does not specify if the link from in-group preference to out-group prejudice might unfold differently for minority and majority children. Therefore, we explore the role of out-group attitudes in the link from preference to prejudice for minority and majority groups in Israel. Moreover, complementing the focus of previous research largely on discrimination, we focus on intergroup prosocial behaviors.

Development of Prosocial Giving

Children have a basic motivation to be prosocial (Hay, 1994), and value equality and fairness (Tomasello & Vaish, 2013). However, children also display selectivity in prosociality (Dunfield & Kuhlmeier, 2010) and may distribute resources strategically in favor of their in-group to improve their group's position or solidify links with group members (Fehr et al., 2008). Although increasingly able to weigh both egalitarian concerns and group dynamics in their resource allocation decisions with age (Rutland & Killen, 2017), children still tend to give more resources to in-group members when an egalitarian response is unavailable or when facing competitive intergroup dynamics (O'Driscoll et al., 2018).

While each of these factors can be present in settings of protracted conflict, the literature linking SIDT processes, such as in-group preferences and out-group attitudes, to children's prosocial giving has rarely been studied in these environments. Of the few studies that have explored this relationship between out-group attitudes and helping intentions, the results have been mixed. Sometimes more *negative* attitudes about ethnic out-groups are associated with more prosocial intentions and behaviors (e.g., Sierksma et al., 2018). Sometimes more *positive* attitudes about an out-group are related to helping intentions of majority children toward an immigrant (Vezzali et al., 2015) but not actual prosocial giving (Taylor & Glen, 2019). Among adolescents, a positive cross-lagged relationship from out-group attitudes and out-group prosocial behavior was found in Northern Ireland, a society of protracted conflict (Taylor et al., 2014). At times, children's out-group attitudes do not correlate with their prosocial intentions or behaviors toward the out-group (Renno & Shutts, 2015). These discrepancies in findings lie in the diversity in children's ages, type of prosocial task, and whether the children are raised in a setting of intergroup conflict. The current study expands on past research to explore relations among in-group preferences, out-group attitudes, and resource distribution as a prosocial behavior in a context of intergroup conflict.

Current Study

This study examined how age relates to children's preference for in-group social, religious, and cultural symbols and the implications of that preference for intergroup attitudes and actions. Rooted in SIDT and studies in contexts of intergroup conflict (O'Driscoll et al., 2018; Tomovska et al., 2019), we hypothesized that age would relate to greater preference for in-group symbols (e.g., language, clothing, activities). Due to salience and importance of social categories in Israel, we hypothesized that this in-group preference would link to more negative out-group attitudes, and those attitudes would influence out-group prosocial giving (O'Driscoll et al., 2018; Taylor et al., 2019a). Although generally children become less inclined to express explicit out-group prejudice during late childhood (for a meta-analysis see, Raabe & Beelmann, 2011), in-group preference (i.e., bias) has been shown to increase with age in a setting of protracted conflict (e.g., Merrilees et al., 2018). Therefore, we hypothesized that in-group preference and negative out-group attitudes would mediate the link from child age to intergroup prosocial behaviors during middle and late childhood. Given the context of social divide, we also examined whether this pattern of results would unfold similarly for children from majority and minority groups.

Method

Participants

The age range selected captured the potential shift in SIDT from ethnic preference, phase 3, to ethnic prejudice, phase 4. Power analyses indicated that a total sample size of 190 children would provide a power of .95 in testing hypotheses in our hypothesized model. Using WhatsApp community groups and Facebook in a region in northern Israel, we recruited 387 children: 180 Jewish (105 girls, 75 boys; $M = 9.87$, $SD = 2.48$, 97% 6–13 years old) and 207 Arab-Muslim (115 girls, 92 boys; $M = 9.35$, $SD = 2.19$, 95% 6–13 years old). Most of the children (99% Jewish, 99% Arab-Muslim) attended homogeneous educational systems and lived in their own respective communities. We received written parental consent and child assent. This study was approved by the institutional ethics committee (ZAC #401-2018).

Procedure

Trained researchers worked with children one-on-one in the child's home, with at least one parent in a nearby room. Research assistants of the same ethno-religious group as the child conducted the study in the child's mother tongue. Researchers administered tasks on laptops via Qualtrics by reading the on-screen text; children verbalized or pointed to their answer. Testing sessions lasted about 15 min and all children were given a small prize and certificate of participation. The data in this short report were part of a larger cross-cultural study that included other measures. The three tasks

were always presented in the same order: in-group symbol preference, prosocial giving, and out-group attitudes. After the preference task, there was a short pause, during which children picked a sticker as an incentive.

Materials and Design

In-group symbol preference. A variety of symbols were pretested with adults; those rated as strongly representing either the Arab-Muslim background or the Jewish background were included. Thus, materials included 42 images of symbols (21 pairs; one associated with each ethno-religious background) which represented different aspects of social, cultural, and religious life (e.g., traditions, religious symbols, sports; see examples in Appendix A; adapted from Tomovska et al., 2019). Each child was presented with a random subset of 10 pairs in a randomized order. The researcher presented and labeled each of two symbols (e.g., "These are Arabic letters. These are Hebrew letters") and asked children which they liked better. If the child chose an in-group symbol (e.g., Arab child chose Arabic letters), the item was coded 1; if the child chose an out-group symbol (e.g., Arab child chose Hebrew letters), the item was coded 0. Higher scores indicated greater in-group symbol preference.

Out-group prosocial giving. Adapted from previous work in a divided society (O'Driscoll et al., 2018), children were presented with two gender-matched cartoon stick figures wearing white T-shirts, one with a Jewish symbol and one with a Muslim symbol. Each figure was labelled with the respective religious label and a name, for example, "This girl is Muslim. Her name is Fatma." The side of the screen each figure was presented on was randomized across children. The researcher explained that there were seven extra stickers leftover to give away to these children in Israel. Children were explicitly told that as long as all stickers were shared they could distribute the stickers in any way (e.g., all to one person or shared between) and that there was no right or wrong answers. Children dragged the stickers to their chosen figure on screen. The number of stickers given to either child could range from zero to seven. For this variable, the number of stickers given to the out-group member was recorded, with higher scores indicating greater out-group prosocial giving. This measure reveals an out-group/in-group bias in prosocial sharing.

Negative out-group attitudes. Children were presented with four cartoon stick figures (two males and two females) wearing white T-shirts with a symbol of the participant's ethnic out-group and labelled as members of the out-group with a category label and ethnically stereotypical names (e.g., a Muslim participant would view Jewish children wearing the Star of David named Rutie, Hila, Daniel, and Avi). Children were then asked how much they (1) like the out-group children, (2) trust the out-group children, and (3) want to play with the out-group children (adapted from Nesdale et al., 2009). The three questions were presented in random order. Children responded on a 4-point scale thumbs up/down scale ranging from 0 (*I like/trust/want to play with them a lot*) to 3 (*I do not like/trust/want to play with them at all*). Scores were totaled, ranging from 0 to 9 ($\alpha = .90$), with higher scores indicating more negative out-group attitudes.

Data Analytic Plan

The hypothesized models were tested using path analysis in Mplus 6 (Muthén & Muthén, 1998–2011) with maximum likelihood estimation under the assumption that data are missing at random. Bootstrapped chain mediation with 1,000 replications and a 95% confidence interval was used to estimate the indirect effects. Manifest variables were used for all constructs, including child's gender and ethnic group. Age was the primary exogenous predictor, with in-group symbol preference and negative out-group attitudes entered as sequential mediators; out-group prosocial giving was modeled as the outcome of interest. Given past research has found gender differences in prosocial behaviors (Eisenberg et al., 2006), we also controlled for child gender in the following models (results were largely the same without controlling for gender). Model fit was assessed using the following guidelines: Tucker–Lewis Index (TLI) and comparative fit index (CFI) $\geq .90$, root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR) $\leq .08$ (Hu & Bentler, 1999).

Three nested models were tested. First, the fully constrained model (Model 1) estimated the chain mediation for the entire sample. Second, the fully unconstrained model (Model 2) allowed all paths to be estimated freely for both ethnic groups. Third, to assess whether the processes unfolded similarly for both groups of children, a multiple group framework with a step-up approach was used (Model 3; Brown, 2006). In this procedure, the structural paths are constrained one-by-one across groups and model fit is assessed with a χ^2 difference test. In other words, if a path is constrained to be equal across groups and the model fit does not worsen, that constraint is retained, and the next path is tested. This comparative approach yields the most parsimonious model, while allowing for significant group differences.

Results

Table 1 presents descriptive statistics and bivariate correlations for each group. Given the possible range of zero to seven, the mean of out-group prosocial giving is low for both groups (see also Appendix B). Significant correlations include the link from age to in-group symbol preference for the Arab, and from age to negative out-group attitudes for the Jewish sample; in both groups, there is a significant negative correlation between negative out-group attitudes and prosocial giving.

First, Model 1 tested the chain mediation fully constraining all paths to be equal across Arab-Muslim and Jewish children. The proposed model was a good fit to the data (Model 1: $N = 387$, $\chi^2(2) = 1.45$, $p = .49$; CFI = 1.00; TLI = 1.02; SRMR = .013; RMSEA = .000 [CI: .000, .092]), and there was a significant indirect effect from child age to out-group prosocial giving, through in-group symbol preference and negative out-group attitudes. ($b = -.007$, 95% CI: $-.014$, $-.001$). Second, Model 2 tested the same chain mediation with a multiple group framework which allowed all structural paths to be estimated separately by group. This fully unconstrained model also had acceptable model fit (Model 2: $N_{\text{Muslim}} = 207$, $N_{\text{Jewish}} = 180$, $\chi^2(4) = 4.99$, $p = .22$; CFI = .99; TLI = .96; SRMR = .027; RMSEA = .036 [CI: .000, .119]) and a significant indirect effect for Arab-Muslims ($b = -.018$, 95% CI: $-.047$, $-.000$) but not for Jews ($b = -.004$, 95% CI: $-.029$, .003).

Third, the step-up approach was applied to Model 2. The χ^2 difference tests compared nested models, as each structural path was constrained to be equal across groups to examine whether there

Table 1. Means, Standard Deviations, and Bivariate Correlations for All Study Variables ($N = 387$).

	Arab-Muslim ($n = 207$)							Jewish ($n = 180$)						
	M	*SD*	1	2	3	4	5	*M*	*SD*	1	2	3	4	5
1 Female	44% male, 56% female		—	.08	.10	.06	.04	42% male, 58% female		—	.07	.04	−.14	.14
2 Age	6.39	2.16		—	.25***	−.05	−.09	6.87	2.47		—	.10	−.24**	.05
3 In-group symbol preference	7.73	1.44			—	.12	−.07	8.02	1.37			—	.038	−.02
4 Negative out-group attitudes	5.33	2.86				—	−.40***	6.27	2.50				—	−.54***
5 Out-group prosocial giving	1.81	1.35						1.81	1.37					—

Note. **$p < .01$; ***$p < .001$.

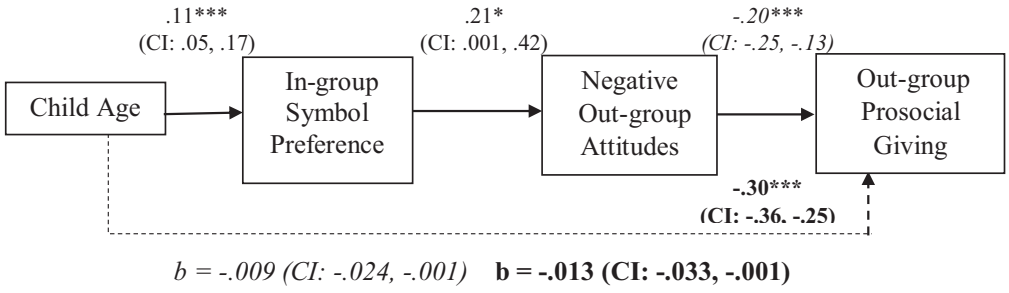

Figure 1. Chain Mediation Path Model (Model 3) Demonstrating the Indirect Effect of Child Age on Out-Group Prosocial Giving Through In-Group Preference and Negative Out-Group Attitudes for Arab-Muslim ($n = 207$) and Jewish Children ($n = 180$) in Israel.
Note. Control variable of gender is not depicted for readability. Indirect effects are depicted with dotted lines. Unstandardized regression coefficients with 95% confidence intervals in parentheses are reported. Structural coefficients were constrained to be equal across groups, therefore, there is only one estimate; the exception is the structural path from negative out-group attitudes on out-group prosocial giving which is different for Jews (in boldface) and Arab-Muslims (in italics). *$p < .05$; ***$p < .001$.

are differences in how the process unfolds for majority and minority groups. In the final model (Model 3), all structural paths, including the control variable of gender, were constrained, except for the path from negative out-group attitudes to out-group prosocial behavior. That is, when this path was constrained to be equal, there was worse model fit. Therefore, this path was estimated separately for each group and was stronger for Jewish ($\beta = -0.55$, $p < .001$) children compared to Arab-Muslims ($\beta = -0.41$, $p < .001$). The indirect effects for both groups (Arab-Muslim: $b = -.009$, 95% CI: $-.024$, $-.001$; Jewish: $b = -.013$, 95% CI: $-.033$, $-.001$) were significant in the final step-up model, which was a good fit to the data (Model 3: $N_{\text{Muslim}} = 207$, $N_{\text{Jewish}} = 180$, $\chi^2(10) = 10.96$, $p = .36$; CFI = .99; TLI = .99; SRMR = .047; RMSEA = .022 [CI: .000, .083]). Moreover, Model 3 was a significantly better fit to the data that Model 1 or 2 and explained 18% and 30% of the variance in tendency to discriminate for Arab-Muslims and Jews, respectively.

Figure 1 depicts the direct and indirect structural paths for Model 3. For both groups, age was positively related to in-group symbol preference, which was related to more negative out-group attitudes. Lower negative out-group attitudes, however, were linked with greater out-group prosocial giving (i.e., a reduced sharing bias against the out-group was observed). The remaining direct effects from child age and gender to out-group prosocial giving were non-significant. Thus, there was support for the hypothesized chain mediation model; with age, children's preferences, and attitudes change, which influences their bias in out-group giving.

Discussion

This study extends previous research on how group processes influence children's social exclusion and resource-allocation decisions (Killen et al., 2017), in particular in groups with long-standing histories of conflict (O'Driscoll et al., 2018). Framed by SIDT (Nesdale, 2004), the current study examined whether in-group symbol preference affects out-group attitudes and willingness to give them resources. For both Jewish majority and Arab-Muslim minority children in Israel, the effect of age on out-group prosocial giving was serially mediated by the child's in-group symbol preference and negative out-group attitudes. Consistent with previous research which found in-group prosocial favoritism by 5 years old (Dunham et al., 2011; Rutland et al., 2015), this effect is persistent across middle childhood in the current study. The multiple group analyses only revealed a difference in one path: for Jewish majority children, there was a stronger association between negative out-group attitudes to out-group prosocial giving, compared to Arab-Muslim minority children. As in other contexts of risk (O'Driscoll et al., 2018), the findings suggest that group processes may shape the development of prosocial giving (McGuire et al., 2017).

The present research was conducted in a social context characterized by risk related to social division and intergroup tension. Factors such as ethnic identification and group status may shape in-group favoritism (Verkuyten, 2007), leading eventually to prosocial behavior in favor of a child from one's in-group over a child from the out-group (O'Driscoll

et al., 2018). Examining this process across *both* majority and minority groups is essential in such settings (Adjuković & Corkalo Biruski, 2008). For example, there are socioeconomic gaps in the status of the Jewish majority and the Arab minority, where the latter has a larger family size and lower education, employment, and wages. Indeed, while minority group members can be expected to relate to their unique ethnic identification (Liebkind, 1989), at the same time, the lower status of minority group members may prevent them from positively differentiating their group from the majority (Ellemers et al., 1997). This partial lack of differentiation may explain why the minority in this study demonstrated a weaker relationship between negative out-group attitudes and prosocial out-group giving compared with the majority. Yet, despite this difference, the overall mediation was the same for both groups. This is consistent with a previous study with majority Dutch and minority Turkish children ages 10 to 12 that demonstrated similar effects of in-group favoritism on feelings of self-worth (Verkuyten, 2007). This finding suggests that SIDT may be capturing an underlying developmental process in a divided society.

Limitations and Future Research

Despite the study's strengths, such as including both majority and minority perspectives in the same model, there are a number of limitations that could be addressed in future research. First, the order of the tasks in this study was not counterbalanced, so the results may have been influenced by order effects. Second, despite the direction of effects in the current model being based on theory, the study tests mediation with cross-sectional data, which may bias estimates (Maxwell & Cole, 2007); testing alternative directions, or 'reversing the arrows', with the current design is not advised (Thoemmes, 2015). Therefore, future research should employ an experimental approach to investigate causation or a longitudinal design to make inferences about the direction of effects. Third, given the context of social division, future research could explore whether children's perception of the broader conflict or intergroup tension (Taylor et al., 2019b), their intergroup contact (McKeown & Taylor, 2017) or characteristics of out-group counterparts in imagined contact (Razpurker-Apfeld & Shamoa-Nir, 2020) have an effect on the model. Fourth, the current study was conducted in a relatively stable environment in terms of conflict. Future research should focus on the most intense conflict in this region examining Jewish Israelis and Arab-Palestinian societies (e.g., Gaza, the West Bank, East Jerusalem). Finally, recent research has found that compared to Arab-Christians, Arab-Muslims expressed higher intergroup anxiety and more negative stereotypes about the Jewish majority (Shamoa-Nir & Razpurker-Apfeld, 2019a; Shamoa-Nir & Razpurker-Apfeld, 2020). Therefore, replication of this study among other minorities living in Israel such as Arab-Christians or Druze should be considered.

Implications for Practice and Policy

The current findings indicate that children favor the in-group over the out-group when sharing resources. The findings also show that out-group attitudes predict out-group sharing bias. This contrasts with previous research showing that attitudes did not relate to intergroup prosociality (Renno & Shutts, 2015), suggesting that social context may play a crucial role in this relation. The existence of an ongoing intergroup conflict in Israel may have shaped the link from negative attitudes to sharing bias. This idea is reinforced by Bauer and colleagues (2014) who found that exposure to war increased both children's in-group favoritism and out-group derogation.

Practically speaking, our findings may help promote prosocial behavior. Sharing resources with a former rival is essential to building a shared future. Therefore, identifying the processes relating to greater out-group giving and less bias against them has implications for programs aiming to improve intergroup relations. For example, conducting interventions targeting early attitudes may help to reduce bias in prosocial giving. Indeed, programs in elementary Israeli schools that emphasized social–emotional learning have shown to decrease out-group prejudice and discrimination (Berger et al., 2016). In addition, these findings may have longer-term implications for policy; that is, in conflict settings, a zero-sum mindset often prevents collaboration and cooperation. Understanding how to promote resource distribution across group lines, even among children, may not only help to improve relations between Jews and Arabs who live in Israel, but potentially, future peacebuilding initiatives between Israel and the Palestinians.

In conclusion, this article contributes to understanding the development of prosocial behaviors across group lines in a setting of protracted conflict. Despite differences in group status, the overall chain mediation rooted in SIDT held for both Jewish and Arab-Muslim children. Fitting in the growing body of work at the interface of social and developmental psychology (Killen et al., 2017), this article extends the implications to peace psychology, lending insight to how prosocial giving might be further encouraged for later peacebuilding potential (McKeown & Taylor, 2017).

Acknowledgments

Our thanks to the many families who participated, to Risa Rylander, the project coordinator for *Helping Kids*! (http://helpingkidsqub.com/), and to the Israeli Social Cognition Laboratory.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This study was financially supported by DFEGCRF17-18/Taylor, GCRF-GIAA18-19/Taylor, and British Psychological Society, Social Psychology Section, Pump-priming and Dissemination Fund Application, and Zefat Academic College internal institutional grants: 76-2018/Razpurker-Apfeld and 77-2018/Shamoa-Nir.

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Appendix A

Example Symbol Pairs.

Jewish	Arab-Muslim
א ב ג ד ה ו ז ח ט י כ ל מ נ ס ע פ צ ק ר ש ת ך ן ם ף ץ	أ ب ت ث ج ح خ د ذ ر ز س ش ص ض ط ظ ع غ ف ق ك ل م ن هـ و لا ء ي
	
	

Appendix B

Out-Group Prosocial Giving: Out-Group Sticker Distribution by Arab-Muslim and Jewish Children.

Number of stickers distributed to the out-group	Percentage of Arab-Muslim ($n = 207$)	Percentage of Jewish ($n = 180$)
0	25.1	28.9
1	16.4	12.8
2	18.4	11.7
3	32.9	41.7
4	6.3	5.0
5	1.0	0
6	0	0
7	0	0

Note. All seven stickers had to be distributed between out-group and/or in-group. Therefore, 0% of 7 stickers distributed to the out-group, means that all 7 stickers were distributed to the in-group.

Empirical Paper

ijbd

International Journal of Behavioral Development
2021, Vol. 45(4) 345–354

DOI: 10.1177/0165025421992868
journals.sagepub.com/home/jbd

SAGE

A longitudinal study of early pretense: Metarepresentational or not

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Abstract

The metarepresentational aspect of early pretend play (make-believe activities where children create or participate in creating a new situation different from a real one) has been theoretically debated. In the present longitudinal study of $N = 83$ children, we tested for predictive relations of shared attention at 12–18 months, implicit false belief (FB) at 18 months, and pretend production at 18 months, as well as comprehension at 24 months. We also tested for long-term predictive relations of pretense production and comprehension with theory of mind (ToM) at the age of 4–5 years. Only pretense production directed toward others (but not self) was specifically related to infancy measures of shared attention. Early pretense, either production or comprehension, was not related to implicit FB or later ToM measures. The findings are discussed in terms of different theoretical accounts of early pretense.

Keywords

Early pretense, metarepresentation, theory of mind, joint attention, longitudinal, implicit false belief

From an early age, children engage in pretend play, make-believe activities where children create or participate in creating a new situation different from a real one. Children spontaneously produce pretense around 18 months of age (e.g., Nielsen & Dissanayake, 2000) and are able to understand others' pretense around 24 months of age (e.g., Harris & Kavanaugh, 1993). A great number of research studies have documented an importance of pretense in its relation to children's social and cognitive development and academic performance (Bergen, 2002; Lillard, 1993, for reviews). Theoretically, the nature of cognitive mechanisms of young children's pretense, particularly whether it is metarepresentational or not, has been the focus of a debate in the fields of developmental psychology, cognitive science, and philosophy. In the present research, we tested the theoretical accounts of early pretense by examining longitudinal relationships between early pretense (both comprehension and production) and early precursors of theory of mind (ToM), particularly joint attention as well as implicit ToM and later ToM itself.

Theoretical Accounts of Pretense

According to a metarepresentational account of pretense (Meta account, hereafter), young children's pretense involves from the start a "decoupling process" of separating a pretense representation from a representation of a reality and is therefore essentially metarepresentational, that is, it involves representing a propositional attitude toward reality, an ability which also characterizes "theory of mind" (see Leslie, 1987; Perner, 1991) (e.g., Friedman & Leslie, 2007; Leslie, 1983, 1987, 2002). The Meta account argues that children are capable of comprehending and recognizing others' pretense as well as producing solitary pretense because of the same innate mental concept of "pretend"—although children do not necessarily have to be aware of a representational aspect of pretense nor do they have to have an explicit concept of mental states. Important implications of the Meta account are (Friedman & Leslie, 2007), first, that there is a developmental link between pretense production and comprehension. Second, solitary pretense and social pretense are assumed to be developmentally linked. Finally, children's pretense is intimately related to later ToM development.

By contrast, according to a non-metarepresentational account of pretense (Non-Meta hereafter), young children's pretense does not involve an understanding of the representational relation between a pretense scenario and reality, but rather young children produce and understand others' pretense behaviorally, in the sense of "acting-as-if" (e.g., Harris, 1994; Jarrold et al., 1994; Lillard, 1993, 2001; Nichols & Stich, 2000, 2003; Perner, 1991). That is, children can distinguish between pretense and reality without construing a representational relation between the two and they understand others' pretense in light of a pretender's appearance or behaviors rather than a pretender's mental states. Empirical studies show that young children fail to understand others' pretense especially when a pretender's behaviors conflict with mental states (Lillard, 1998, Richert & Lillard, 2002; but Friedman et al., 2010, for counterevidence).

Shared Intentionality Account

A "shared intentionality" account of pretense (SI account, hereafter) argues that young children's pretense involves intention reading—albeit not full-blown mental state understanding in the sense

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of understanding propositional attitudes (Rakoczy, 2008; see also Lillard, 2001). Rakoczy and his colleagues in a series of experimental studies provided supporting evidence (e.g., Rakoczy et al., 2004, 2006; Rakoczy & Tomasello, 2006). For example, Rakoczy and Tomasello (2006) demonstrated that children as young as 2 years old responded differently toward a model who tried but failed to achieve a certain goal (pouring water from a container to a cup) versus a model who pretended to produce the same demonstrated action. They themselves tried to achieve the model's intended goal in the first case (even using a different tool) whereas they did not do so in the latter case. Moreover, although the SI account is typically treated as a version of the Non-Meta account (e.g., Friedman & Leslie, 2007), importantly, the account uniquely and explicitly argues that early pretense goes beyond an understanding of an individual's intentionality and involves shared or "we" intentionality. To participate in, and appropriately respond to, pretense scenarios particularly those that involve others, one is required to understand and act on *jointly created* pretended mental states.

Relation Between Pretense and ToM

An important source of evidence relevant to the theoretical debate about pretense concerns a relation between pretense and ToM, especially false belief (FB) tasks tested around 4–5 years of age—given that FB is claimed to be diagnostic of the metarepresentational aspect of ToM (Dennett, 1978). In fact, empirical findings of a relation between ToM and pretense (e.g., Bruell & Woolley, 1998; Custer, 1996; Hickling et al, 1997; Hughes & Dunn, 1997; Youngblade & Dunn, 1995; Taylor & Carlson, 1997) are often taken as supporting evidence for the Meta account (but see, e.g., Perren et al., 2019; Rosen et al., 1997, for counter-evidence). However, because a majority of these studies tested a concurrent relationship between FB and pretense, the theoretically postulated relation between *early* pretense and later ToM is not well understood. On the Meta account, because the same cognitive mechanism of the decoupling process guides both pretense and FB understanding, and the concept of pretense is innate, even the early pretense should be metarepresentational. By implication, early pretense should be longitudinally related to later ToM. However, there are only a handful of longitudinal studies of pretense and they provide a conflicting picture. Youngblade and Dunn (1995) reported that children's social pretense, "role enactment" in particular, tested at 33 months predicted FB performance at 40 months (see also Astington & Jenkins, 1995; Taylor et al., 1993). Jenkins and Astington (2000) tested a longitudinal sample of children between 3 and 4 years of age and found that children's ToM predicted role assignment in pretend play but a reversed relationship was not observed. Moreover, only two longitudinal studies examined pretense comprehension or production at the age of 2 years or earlier. Charman et al. (2000) tested a very small number of children ($n = 13$) for pretense production at 20 months (along with joint attention and imitation) and a battery of ToM tasks at 44 months and found no longitudinal relationship between pretense and ToM. Lillard and Kavanaugh (2014) examined early pretense production and comprehension at around 25 months in relation to ToM at 4 and 5 years of age and revealed that the underlying common source of the relationship was specific to symbolic understanding, but the study did not provide conclusive evidence for a relationship between early pretense and later ToM.

Implicit ToM

Investigations into a developmental origin of ToM using a nonverbal task of FB have generated empirical evidence that young infants have *implicit* FB understanding (e.g., Buttelmann et al., 2009; Onishi & Baillargeon, 2005; Southgate et al., 2007). The Meta account assumes a conceptual continuity between an implicit and a later, explicit FB understanding (Wang & Leslie, 2016). Consistent with this view, several studies suggest a longitudinal relationship between implicit FB and later FB understanding (Kloo et al., 2020; Low, 2010; Sodian et al., 2020). On the other hand, the SI account argues that implicit and explicit FB tasks recruit different social–cognitive abilities (Tomasello, 2018): the implicit one can be solved by merely tracking an individual's mental states and predicting behaviors accordingly which may explain Apes' as well as infants' success in implicit FB tasks whereas older children's success in the explicit FB tasks is explained by shared intentionality (i.e., both parties jointly attending to something with different perspectives). Thus, because the two accounts posit a different nature of infant capacity on the implicit FB task, they generate different predictions concerning a relation between implicit FB and early pretense. On the Meta account, implicit FB should be related to early pretense since both implicit FB understanding and pretense are supposed to be metarepresentational and based on the "decoupling" mechanism. In contrast, the SI account does not posit this relationship. While an investigation of the relationship between implicit FB and early pretense will contribute to the theoretical debate on early pretense, however, to our knowledge, no empirical studies examined a relationship between implicit FB and early pretense.

Early Precursors of ToM: Joint Attention

Theoretically, shared intentionality particularly joint attention has been identified as a conceptual precursor of a ToM (Rochat & Stiano, 1999; Tomasello, 1995, 2018; Tomasello & Rakoczy, 2003; see also, Baron-Cohen, 1989). Empirically, declarative joint attention production (children informing others about an interesting object or event by pointing) at 12 months, but not imperative joint attention production (children pointing to obtain an object from others; see Camaioni et al., 2004), uniquely predicted later ToM (Sodian & Kristen-Antonow, 2015; see also Brink et al., 2015; Charman et al., 2010; Nelson et al., 2008). Moreover, infants are able not only to initiate joint attention by producing declarative pointing but also to use joint attention cues (e.g., gaze direction) to infer others' goal and to engage in joint action. For example, Moll and Tomasello (2004) demonstrated that both 12- and 18-month-old infants were more likely to locomote behind a barrier and look at an object (infants' view was blocked due to the barrier) if an experimenter looked behind the barrier than if she looked at the barrier. Given its relation to ToM theoretically and empirically, declarative joint attention in its relation to early pretense will provide further insight into the nature of early pretense. The SI account in particular argues that joint attention should be related to early pretense because both rely upon shared intentionality understanding. Lillard and her colleagues provide some indirect evidence that shared attention (and social referencing) might be implicated in young children's understanding of others' pretense (e.g., Lillard et al., 2007). To our knowledge, one existing study directly tested the relationship between joint attention and pretense (Rutherford et al., 2007). The study tested normally developing children (pretense production along with joint

attention, imitation, executive function, and other abilities tested at 20 months and retested at 30 months) and children with autism as well as children with other developmental disorders (matched in mental age). They found that children with autism compared to typically developing children or children with other developmental disorders produced spontaneous pretense and scaffolded pretense (i.e., by verbal prompt/behavioral modeling) less frequently. Importantly, however, joint attention longitudinally predicted spontaneous pretense in all three groups.

In sum, there is little evidence for a developmental relation of early pretense around 18–24 months and later ToM, specifically FB understanding around the age of 4–5 years. In addition, we know almost nothing about the developmental relation between early pretense and implicit FB in infancy. We also know very little about the relation between early pretense and shared intentionality. We aimed to fill in this gap in the literature by longitudinally examining the developmental relations between early pretense and ToM around 4–5 years on the one hand and early pretense and implicit ToM as well as shared intentionality in infancy (i.e., joint attention) on the other. By doing so, we aimed to test the theoretical accounts of early pretense.

Predictions From the Theories

Predictions concerning a developmental relation between early pretense and ToM distinguish between the Meta and the Non-Meta account. On the Meta account, there should be a relation between early pretense and later ToM as well as between early pretense and implicit ToM (see Wang & Leslie, 2016). Both the SI and the Meta account link pretend play to mental state understanding. The Meta account, however, explicitly assumes the same metarepresentational abilities to underlie pretense and later ToM (here FB specifically) and, therefore, predicts a *direct* relation of pretense and later FB understanding across a variety of ToM tasks—without assuming its relation to shared intentionality. The SI account, on the other hand, emphasizes that shared intentionality understanding guides early pretense and thus predicts a direct relationship between shared intentionality (here joint attention) and early pretense. Given that on the SI account later ToM is acquired via social interactions and communications particularly involving coordination of social partners' different perspectives (Tomasello, 2018), however, although shared intentionality is an overarching conceptual precursor of ToM, SI does not posit a full-blown ToM understanding on the early pretense. Thus, on the SI account, the direct relationship between early pretense and later ToM might be absent. On the SI account, moreover, early pretense may not relate to implicit FB because it argues early pretense has a shared intentionality component but infants' success in the implicit FB task (unlike children's success in the explicit FB task) is achieved by simply tracking an individual's mental states and predicting behaviors accordingly.

The shared aspect of pretense uniquely distinguishes SI from the other two accounts. That is, SI predicts the relationships between pretense and shared intentionality measures (and/or later ToM) are specific to other-engaging or other-directed pretense. Neither the Meta nor the Non-Meta account predicts this. On the Meta account, in particular, because the same metarepresentational abilities underlie all kinds of pretense production, different types of pretense are not acknowledged in terms of its relation to other ToM-related measures. On this account, moreover, based on the same reason, pretense production and comprehension should be also related (Friedman & Leslie, 2007), whereas no such specific predictions are made on either the Non-Meta or the SI account.

Table 1. Mean Ages, Range, and *SD* at Each Measurement Point.

	N	*M*	*SD*	Range
12 months	83	12.00	.22	11.43–12.60
15 months	77	15.12	.35	14.23–16.53
18 months	76	18.03	.25	17.60–18.80
24 months	77	24.04	.26	23.60–24.83
50 months	66	50.64	.85	49.70–54.57
60 months	64	60.54	.73	59.29–63.01
70 months	60	70.44	.58	69.80–73.00

Note. N = number of participants; M = mean; SD = standard deviation.

Present Research

Those tasks of shared intentionality in infancy that are theorized to be related to later ToM were selected: We tested infants' joint attention production, declarative and imperative pointing, at 12 months (see Camaioni et al., 2004) and another joint attention task (Moll & Tomasello, 2004) at 18 months, the age at which above-chance performance was documented in the study. Nielsen and Dissanayake (2004) reported that a majority of children produced pretense around 18 months of age and not earlier. Pretense comprehension, on the other hand, appears around 24 months of age, not earlier (e.g., Harris & Kavanaugh, 1993). We, therefore, tested children's pretense production at 18 months and comprehension at 24 months. Based on predictions concerning self versus other pretense as discussed earlier, we assessed pretense directed toward self versus others separately. We also administered the intention-based imitation task (Meltzoff, 1995) at 15 months, given that the inference of others' intention is considered to be involved in understanding others' pretense (e.g., Rockoczy, 2008; Lillard, 2001) and the ability of inferring the goal of an incomplete, failed action of others appears around 15 months of age (Meltzoff, 1999). Theory of mind abilities were tested by two standard FB tasks—a location FB (explicit FB task) and a content FB (smarties FB task) at 50, 60, and 70 months—and a real-apparent emotion task at 50, 60, and 70 months. These tasks were taken from the ToM scale by Wellman and Liu (2004). Importantly, we also tested an implicit FB at 18 months. Finally, we included maternal educational level as a control measure, as well as sentence comprehension skills in preschool age (Sprachentwicklungstest für Kinder [SET-K] at 50 months), both of which are relevant for ToM (see Milligan et al., 2007; Peers & Moses, 2003).

Method

Sample

The sample consisted of $N = 83$ (40 girls, 43 boys) monolingual German-speaking children from an urban region in Germany. See Tables 1 and 2 for *n*s and mean ages at various measurement points, as well as descriptive values of key study measures. Maternal education was obtained via parental report at the first measurement point. Scores were given ranging from 0 (*no degree*), through

Table 2. Descriptives of Key Study and Control Variables.

	N	Mean or frequency	*SD*
1. Pretense production self-score at 18 months	69	1.88	3.11
2. Pretense production other-score at 18 months	69	1.96	2.35
3. Pretense comprehension score % at 24 months	48	57%	27%
4. Declarative point production score at 12 months	76	0 = 49% 1 = 26% 2 = 25%	
5. Imperative point production score at 12 month	82	0 = 26% 1 = 44% 2 = 30%	
6. Intention-based imitation score at 15 months	52	0.81	0.71
7. Joint attention barrier task at 18 months	53	0 = 47% 1 = 53%	
8. Implicit FB score at 18 months	47	0.16	0.87
9. FB sum score at 50–70 months	55	3.96	1.30
10. Real-apparent emotion sum score at 50–70 months	46	1.41	0.88
11. Language at 50 months	63	57.98	10.42
12. Maternal education	83	6.84	1.97

Note. Missing values due to fuzziness or technical errors. *N* = number of participants; *SD* = standard deviation; FB = false belief.

degrees: 1 (*basic secondary school*; from Year 5 to Year 9), 2 (*mid-level secondary school*; from Year 5 to Year 10), 3 (*A-levels*), and 4 (*university degree*) to 5 (*postgraduate degree such as PhD*). Seventy-five percent of mothers had A-levels or above. Children were recruited via lab database lists. The present study was approved by the ethics committee of the Faculty of Psychology and Education, Ludwig Maximilian University, Munich, Germany, and there is no registration number.

General Procedure

The testing took place in a lab. Every child had a warm-up phase to be familiarized to an experimenter and the surroundings before testing at each measurement point. All the testing was video-recorded.

Key Measures

Below we introduce the key measures. A detailed description of the tasks and coding can be found in the Supplementary Material.

Joint Attention Tasks at 12 Months

The tasks were adapted from Camaioni et al. (2004).

Declarative point production task. Infants' production of a declarative pointing gesture, defined as an arm and index-finger extension toward the stimulus, with the remaining fingers curled tightly or lightly under the hand (Franco & Butterworth, 1996), was measured.

Imperative point production task. Infants' production of an imperative pointing gesture (pointing at the stimulus while producing request-like gestures) was assessed.

Intention-Based Imitation Task at 15 Months

In a modified version of the reenactment task by Meltzoff (1995), children's target behavior of producing the experimenter's intended behavior was assessed.

Joint Attention Barrier Task at 18 Months

The task was adapted from Moll and Tomasello (2004) and children were tested for their tendency to follow an experimenter's gaze behind a cardbox barrier to a target object (plastic toy).

Pretense Production (Self and Other) at 18 Months

The Fewell Play Scale, 5th edition (Fewell & Rich, 1987), was used to measure pretense production. In coding, we differentiated between pretense produced without prompts versus pretense produced upon verbal only prompts versus pretense produced upon verbal and demonstration prompts. We also differentiated between self-directed versus other-directed pretense.

Pretense Comprehension at 24 Months

We adopted the task of Kavanaugh and Harris (1994) (Experiment 1) in which an experimenter performed a pretend action to transform the state of an animal or an object and children were asked to choose a picture that accurately depicted the transformed state.

Implicit FB Task 18 Months

Infants viewed a movie involving an agent's belief on a location of a car between two boxes. The agent's FB was established by the agent looking away, during which the location of the car was switched. Infants' accurate anticipatory looking was measured.

Explicit FB Tasks at 50, 60, and 70 Months

Two FB tasks were administered at 50, 60, and 70 months, using the official German version of the ToM scale (Hofer & Aschersleben, 2007) adapted from Wellman and Liu (2004). The content FB task involved children's predictions about another person's FB about the hidden contents of a container. The location FB task (also called explicit FB task) involved an explicit verbal description of a boy's FB.

Real-Apparent Emotion Task at 50, 60, and 70 Months

In this task, children were asked to identify the hidden emotion of a boy who displayed an apparently different emotion (Hofer & Aschersleben, 2007).

Control Measures

The Sprachentwicklungstest für 3-5jährige Kinder (Grimm, 2001) is a standardized and norm-referenced instrument which examines the language proficiency of German-speaking preschool children between 3:0 and 5:11 years of age. It has been found to have high

validity and reliability (with Cronbach's α between .65 and .92 for the subscales). In this study, the version for 4- and 5-year-olds was used to measure linguistic comprehension at 50 months: the subtest "Understanding of Sentences" was used measuring the ability to comprehend 15 sentences of varying complexity. If children answered a test question correctly, they received a score of 1; otherwise, a score of 0 and standardized values of sum scores were used in the analyses. Cronbach's α was .99. Maternal education level was also included as a control measure (see the Sample section).

Statistical Analyses

First, we conducted correlational analyses. Our important aims were first to identify (1) infancy correlates of pretense (shared intentionality measures: joint attention barrier and joint attention declarative pointing) and (2) the relationship between pretense and ToM (i.e., implicit FB, later FB sum scores, and real-apparent emotion sum scores). Based on the correlational results, we conducted two sets of regression analyses.

Results

As mentioned in the sample description, there were missing values. A missing completely at random test including all key study and control variables yielded a nonsignificant result ($\chi^2 = 205.011$, $df = 204$, $p = .467$) (Little, 1988), thus indicating that the case exclusions were valid for our sample, and the subpopulation can be regarded as representative of the larger sample.

Preliminary Analyses

Gender was not related to study variables (*p*s ranging from −.025 to .928).

Correlational Analyses

Table 3 presents the Pearson correlation coefficients and the Point-biserial correlation coefficients reflecting the relations among the study variables. While pretense production-self skills at 18 months and pretense comprehension skills at 24 months had no infancy correlates, pretense production-other skills at 18 months were related to declarative point production skills at 12 months and concurrent joint attention barrier task skills at 18 months. These correlates of pretense production-other skills were also significantly related to each other. Implicit FB did not relate to the pretense or any other infancy measures, including, notably, joint attention measures. Intention-based imitation skills at 15 months were not related to any correlates of pretense skills, nor directly to pretense skills.

In regard to relations between pretense and later ToM skills (i.e., FB sum scores and real apparent emotion sum scores), pretense production-self or -other and pretense comprehension were not directly related to FB or real-apparent emotion scores. Note that both implicit FB and declarative pointing were related to later FB which was related to real apparent emotion. Implicit FB was also related to real apparent emotion.

In regard to control variables, language at 50 months and maternal education were related to later FB sum scores and were thus included in regression analyses predicting FB scores (see

Table 3. Zero-Order Pearson Correlations Among Study Variables.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Pretense production self-score at 18 months	—											
2. Pretense production other-score at 18 months	.08 (69)	—										
3. Pretense comprehension score at 24 months	−.08 (45)	.11 (45)	—									
4. Declarative point production score at 12 months	.15 (63)	.28* (63)	.20 (46)	—								
5. Imperative point production score at 12 months	.02 (68)	.21 (68)	.14 (48)	.42** (75)	—							
6. Intention-based imitation score at 15 months	.07 (45)	.16 (45)	.14 (33)	−.02 (49)	−.10 (52)	—						
7. Joint attention barrier task at 18 months	[a].19 (52)	[a].40** (52)	[a]−.13 (38)	[a].33** (50	[a].34** (53)	[a].17 (38)	—					
8. Implicit FB score at 18 months	−.03 (43)	−.16 (43)	−.26 (31)	.07 (45)	−.10 (46)	−.20 (29)	−.14 (30)	—				
9. FB sum score at 50–70 months	.15 (51)	.12 (51)	−.07 (35)	.36** (35)	.09 (54)	.20 (39)	.26 (40)	.36** (33)	—			
10. Real-apparent emotion sum score at 50–70 months	−.09 (42)	−.21 (42)	.22 (28)	.08 (42)	−.04 (45)	.05 (34)	.04 (34)	.56** (27)	.43** (43)	—		
11. Language at 50 months	−.16 (57)	.07 (57)	.00 (41)	.05 (57)	.15 (62)	−.08 (43)	[a].18 (46)	.13 (36)	.52** (54)	.32* (43)	—	
12. Maternal education	.08 (55)	.22 (55)	−.10 (40)	.00 (56)	−.11 (62)	−.11 (58)	.05 (44)	.14 (34)	.42** (54)	.21 (45)	.45** (59)	—

Note. Number of participants in parentheses. The scale of measures required us to use point-biserial coefficients. FB = false belief.
[a] r_{pbi}.
*$p < .05$ (two-sided significance level). **$p < .01$ (two-sided significance level).

Table 4. Linear Regression (Inclusion Method) Predicting the Pretense Production-Other Score at 18 Months.

	β	t	p	CI lower bound	CI upper bound
Declarative point production score at 12 months	.209	1.516	.136	−0.217	1.538
Joint attention barrier task at 18 months	.353	2.561	.014	0.381	3.175
Constant		1.853	.070	−0.083	2.006

Note. $n = 49$, 95% confidence interval (CI). $F(2, 46) = 6.264$, $p = .004$. $R^2 = .214$.

Table 5. Linear Regression (Inclusion Method) Predicting the FB Sum Score From 50 to 70 Months.

	β	t	p	CI lower bound	CI upper bound
Declarative point production score at 12 months	.266	2.338	.028	0.048	0.752
Implicit FB score at 18 months	.148	1.274	.214	−0.137	0.583
Language 50 months	.664	5.328	.000	0.048	0.752
Maternal education	.063	0.534	.598	−0.222	0.378
Constant		−1.289	.209	−2.829	0.651

Note. $n = 30$, 95% confidence interval (CI). $F(4, 25) = 14.437$, $p = .000$. $R^2 = .698$. FB = false belief.

below). Finally, children's language skills and maternal education scores were not related to pretense.

Regression Analyses

When all significant correlates were entered into the linear regression analyses (inclusion method), in regard to the prediction of pretense production-other scores at 18 months, joint attention barrier skills remained as a significant correlate of pretense other skills at 18 months with the overall model explaining 21% of variance. Declarative point production skills at 12 months were no longer significant (see Table 4).

Note that declarative pointing was related to pretense-other and also to later FB, but in the above regression analysis, it became nonsignificant when controlling for joint attention barrier skills. With regard to the relation between implicit FB and pretense, Table 3 presents that implicit FB was related to later FB, but neither to pretense-other nor to declarative pointing. We asked whether or not later FB shares the same primary correlates as pretense-other and conducted a regression analysis with implicit FB and declarative pointing, as well as other correlates of later FB (i.e., language and maternal education) as predictors and later explicit FB sum scores as an outcome variable. Only language at 50 months and declarative pointing skills at 12 months contributed unique variance with the overall model explaining 70% of variance (see Table 5). Thus, declarative pointing and language remained as important predictors of later FB, while joint attention barrier skill was an important predictor of pretense-other.

Discussion

In the present research, we aimed to test the theoretical accounts of early pretense by conducting a longitudinal study from the age of 12–70 months. We specifically assessed (1) a relation between pretense (production at 18 months both self- and other-directed and comprehension at 24 months) and implicit ToM skills as well as precursors of ToM, particularly shared intentionality in infancy, that is, joint attention measures and (2) a relation between pretense and ToM measured at 50–70 months (FB and real-apparent emotion task). The main findings are the following. Other-directed pretense production was related to declarative joint attention at 12 months and also to the joint attention barrier at 18 months. Neither the self-directed pretense nor the pretense comprehension was related to these shared intentionality measures in infancy. Pretense production (either self or other directed) was not related to implicit FB as well as later ToM measures, neither FB nor real-apparent emotion. Pretense comprehension at 24 months was not related to joint attention measures, implicit FB or later ToM. Finally, pretense production either self-directed or other-directed was not related to pretense comprehension. Below, we discuss these findings in more detail.

The present research is novel in two major ways. First, the present research investigated early pretense in its relation to ToM (concurrent implicit as well as later explicit FB and real-apparent emotion) in such a long developmental span. The longitudinal relationship between ToM and pretense provides valuable information about the Meta versus Non-Meta representational nature of early pretense and yet there are only a few existing studies with mixed results. The present research in a larger sample corroborates Charman et al. (2010) by documenting no relation between early pretense production (or comprehension) and ToM (implicit FB, later explicit FB, or later real-apparent emotion understanding). Similarly, recent evidence suggests a distinct processing of pretense versus FB understanding at a neural level in both adults and children (Kuühn-Popp et al., 2013; Meinhardt et al., 2012). Thus, pretense and FB understanding do not seem to share representational demands, as proposed by the Meta account.

Second, the present research further investigated the theoretical accounts of pretense by looking at the relation between early pretense and shared intentionality measures. The predictive relation between declarative joint attention and pretense observed in the present research is consistent with Rutherford et al. (2007) documenting the relationship in both normally developing children and children with autism. Moreover, in the present research, declarative joint attention, not imperative joint attention, was significantly related to other-directed pretense. The joint attention barrier task taps on the infants' mentalistic understanding of others' visual attention—understanding others' looking as

perceptually attending to and intending—and demonstrates that infants are able to follow others' gaze direction and engage in joint attention based on a gaze directed at a location that the infant cannot see (Moll & Tomasello, 2004). The task performance, like performance on the declarative joint attention task at 12 months, was specifically related to other-directed pretense in the present research. Taken together, the finding that these measures of shared intentionality were significantly related to other-directed pretense, and not to self-directed, suggests that early pretense has a shared intentionality component and provides support for the SI account. The present findings seem, however, incompatible with the Meta account's claim on the developmentally "yoked" relation between solitary pretense and pretense involving others and also one between comprehension and production (see also Lillard & Kavanaugh, 2014, for similar findings of no relation between pretense production and comprehension).

Note that both declarative joint attention and joint attention barrier skills were related to other-directed pretense but in the regression analysis only the joint attention barrier remained significant in predicting other-directed pretense. While both declarative joint attention and joint attention barrier tasks tap on joint attention in infancy, each may emphasize different aspects of joint attention: declarative joint attention concerns infants' initiating joint attention, whereas joint attention barrier requires understanding and engaging in others' joint attention by following their eye gaze. The contribution of the barrier task in predicting pretense-other then may suggest that pretense directed toward others involves engaging in jointly attended pretense states. On the other hand, declarative joint attention, not joint attention barrier, was related to later FB sum scores. Moreover, while implicit FB was a correlate of later ToM (both FB and real-apparent emotion), neither implicit nor later ToM was related to other-directed pretense. In fact, no pretense measure (production or comprehension) was related to either implicit FB or later ToM. Finally, in a regression analysis, declarative joint attention remained as a significant predictor for later FB while implicit FB became nonsignificant.[1] Thus, although both pretense and FB understanding appear to be rooted in joint attention, early pretense does not seem to be developmentally related to FB understanding. It is possible that at this young age (18–24 months), a mentalistic understanding is not yet coherently formed (e.g., Yott & Poulin-Dubois, 2016), while later pretense (in 3-year-olds) may involve a metarepresentational understanding and function as a precursor to a full-blown ToM. Thus, the present findings are consistent with the idea that a representational ToM is only gradually developed via social experiences of coordination of different perspectives (Tomasello, 2018).

We found that early pretense was not related to intention-based imitation. This seems inconsistent with the SI account according to which the intention understanding is involved in early pretense. Empirical findings showed that children around the age of 2 years distinguished between a failed but pretended act versus a nonpretended, failed act (e.g., Rakoczy & Tomasello, 2006). Moreover, intention understanding is also typically understood as related to declarative pointing production (not imperative pointing) (Camaioni et al., 2004). In contrast, in our study, there was no significant relationship between intention inference and joint attention variables (either declarative pointing or joint attention barrier), but a significant relationship between pretense and these variables and these relationships were specific to other-directed pretense, not self-directed. While the present research suggests the significance of joint attention for the production of pretense engaging others, given that the present data seem inconsistent with the importance of intention understanding on the SI account, future research should further systematically investigate the developmental interplay between pretense production, an understanding of individual intention, and sharing intention and attention.

Notably, prior studies of a relationship between pretense and ToM concern specific types of pretense, particularly, socially constructed pretense as in role-play or role assignments (e.g., Jenkins & Astington, 2000; Jester & Johnson, 2016; Nielsen & Dissannayake, 2000; Rosen et al., 1997; Schwebel et al., 1999; Youngblade & Dunn, 1995; see Harris, 2000). In addition, ToM in its relation to pretense seems to be specific in direction. For example, although Jenkins and Astington (2000) found a relationship between role pretend play and ToM, ToM predicted pretense but not in a reverse direction. By implication, not all kinds of pretend play may require the same ToM understanding. The different and inconsistent findings across existing studies in terms of the absence versus presence of the pretense and ToM relationship, therefore, may be accounted for by the specific nature of the relationship between ToM and pretense including diverse types of pretense assessed in the studies (see also Jarrold et al., 1994, for a similar discussion).

Some limitations of the present research should be mentioned. First, in our investigation, pretense production and comprehension were measured once and each using a specific type of task. In addition, some null findings in our research should be carefully interpreted. First, as discussed above, the absence of a relation between pretense and ToM may indicate an issue of task specificity. Thus, using a different kind of early pretense task, especially tapping on more mature pretense, may provide a stronger support for the Meta account than what we found in the present research. On the other hand, it is important to note that the present study uniquely assessed pretense in the age of 18–24 months, earlier than the existing studies of assessing the relationship between pretense and later FB. Thus, it is also possible that the type of pretense as was assessed in the present research if administered across multiple time points might yield a positive relationship between pretense and FB at a later time point. Given the recent evidence of a distinct neural processing of pretense versus FB both in adults and 6- to 8-year-old children (Kuühn-Popp et al., 2013; Meinhardt et al., 2012) together with the absence of a concurrent relationship between early pretense and implicit FB in the present research, however, future studies demand for using different ToM tasks as well as a variety of pretend scenarios. The same issue of the pretense task type might explain the absence of relationship between pretense comprehension and production (but see Lillard & Kavanaugh, 2014, for the same null finding). Second, we found no relation between pretense and language. Lillard and Kavanaugh (2014) also documented no relations between language and early pretense at 25–30 months, but given that in their longitudinal study, language was related to some (still not all) pretend types later in the development, it is possible that the relation between pretense and language similar to its relationship with ToM may become gradually related with age. Third, the joint attention barrier task did not replicate the group performance level of the original study, with 53% of the infants classified as competent (success in at least one trial) in the present study, whereas in the original study almost 90% of the infants succeeded in at least one trial (Experiment 1) and the mean performance score was reported as 2.83 (of 4 trials) in Experiment 2 (the breakdown of the participant number was not provided). Similarly, infants in our implicit FB task did not perform above chance on a group level, but

note that the chance-level performance on the group level is unlikely to be due to random variation since 33 of 47 infants (70%) received the score of either −1 or 1 and, more importantly, since implicit FB was related to later explicit FB. Finally, our sample exclusively concerned children from Western-European families and from a fairly advantaged social economic background. Cross-cultural studies as well as diverse samples will further shed light on the nature of pretense development.

The present research was the first to investigate infant joint attention and implicit as well as explicit FB understanding as correlates of early pretense. It highlights the relationship between joint attention and pretense, particularly the importance of sharing the perspectives, and as discussed above provides fruitful directions for future research. By doing so, we believe our study moves forward, and further facilitates, our understanding of the nature of early pretense in the field.

Acknowledgments

We thank Diane Poulin-Dubois for her valuable comments on the manuscript.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by the German Research Council (DFG) [grant number SO213/27-1,2]

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Supplemental Material

Supplemental material for this article is available online.

Note

1. At a quick glance, this may seem to challenge some prior findings of continuity between implicit and explicit false belief (FB; e.g., Kloo et al., 2020), but what the findings rather indicate is that both declarative joint attention and implicit FB predict later explicit FB and when general cognitive function is controlled for, declarative joint attention is a stronger predictor.

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ijbd

International Journal of Behavioral Development
2021, Vol. 45(4) 355–367

DOI: 10.1177/01650254211005567
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An ecological latent class model of adolescent risk and protective factors: Implications for substance use and depression prevention

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Abstract

To provide a comprehensive view of the unique contexts shaping adolescent development in the U.S., we utilized latent class analysis (LCA) with indicators of risk and protection across multiple domains (family, peers, school, neighborhood) and examined how latent class membership predicted heavy episodic drinking, illicit substance use, and depression in adolescence and 6 years later when participants were young adults. Data came from Wave 1 (W1) and Wave 3 (W3) of the nationally representative U.S.-based Add Health study (N = 6,649; M_{age} W1 = 14.06; M_{age} W3 = 20.38; 53.8% female; 56.1% White/European American, 22.8% Black/African American, 9.5% Hispanic, 6.7% Biracial, Asian or Pacific Islander 4.2%, American Indian/Native American 0.7%). A six-class solution was selected with classes named: Two Parent: Low Risk, Two Parent: Relationship Risks, Two Parent: Neighborhood Risks, Single Parent: Low Risk, Single Parent: Relationship Risks, and Single Parent: Multidimensional Risk. Subsequent analyses suggested that adolescent social relationships are particularly important for prevention interventions as the classes marked by substance using peers and a lack of closeness to parents and teachers in adolescence (Two Parent: Relationship Risks and Single Parent: Relationship Risks) had consistently poorer outcomes in adolescence and young adulthood.

Keywords

Adolescent development, latent class analysis, risk and protective factors, substance use, depression

Adolescence is often a time of transition, marked by shifting family relationships, decreased parental monitoring, the crystallization of peer relationships, and the emergence of new risk and protective factors (Catalano et al., 2012). Adolescent risk and protective factors occur across multiple domains of influence (e.g., family, neighborhood) and carry important implications for later alcohol and substance use and depression (Stone et al., 2012; Thapar et al., 2012). While risk factors often accumulate across domains resulting in a cascading effect on development (Catalano et al., 2012), it is important to recognize that risk in one domain does not guarantee risk in another and protective factors in one domain can offset risk in another (Leventhal & Brooks-Gunn, 2000). Exploring the influence of combinations of risk and protection on concurrent and later outcomes is a critical step in understanding adolescent development more comprehensively. In this study, we use a person-centered approach (latent class analysis [LCA]) to identify patterns of adolescent risk and protective factors across multiple domains and examine how these patterns predicted heavy episodic drinking, illicit substance use, and depression in adolescence and young adulthood.

Risk and Protective Framework

Masten's (2001) risk and protective framework describes development as being influenced by both risk and protective factors. Risk factors increase the likelihood of undesirable outcomes and protective factors buffer against risks, promote resilience, and decrease the likelihood of undesirable outcomes (Cairns et al., 2014). In some instances, risk and protective factors can represent opposite ends of a spectrum. For example, low parental warmth and involvement are both seen as risk factors for multiple negative outcomes during adolescence (e.g., adolescent alcohol initiation; Ryan et al., 2010), but high parental warmth and involvement have been shown to offset some of the risks that accompany growing up in an economically disadvantaged neighborhood (Benzies & Mychasiuk, 2009).

Bioecological Model

The multidimensionality of risk and protective factors can be understood from a bioecological perspective (Bronfenbrenner & Morris, 2006), which presents a series of interrelated nested systems that influence human development. The microsystem consists of interpersonal relationships experienced in the immediate environment of the individual (e.g., family, school, peers); the exosystem represents influences through the broader environment (e.g.,

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government policies); the macrosystem can be thought of as the cultural environment (e.g., norms and values); and the mesosystem consists of interactions within and across systems (e.g., interactions parents have with teachers; Bronfenbrenner & Morris, 2006). Development is shaped by the interactions between and within these different developmental domains. The following sections outline risk and protective factors that are theoretically relevant for understanding the context and systems shaping adolescent development and summarize past empirical research linking the specific risk and protective factors to drinking, illicit substance use, and depression in adolescence and young adulthood.

Family structure and parenting. Parents influence development in a variety of ways and both the number of parents and parenting style have been found to carry important implications for adolescent development. The influence of family structure (i.e., single-parent and two-parent families) can be understood from a Family Stress Model (Conger & Elder, 1994) theoretical perspective, which argues that the economic instability associated with single parenthood can negatively impact adolescent development through increased parent–adolescent conflict and harsh and uninvolved parenting (Conger et al., 2010). Family structure in adolescence has been shown to relate to both adolescent and young adult drinking, substance use, and mental health, with adolescents and young adults from single-parent families typically viewed as being at a higher risk for these negative outcomes (Barrett & Turner, 2005; Brown & Rinelli, 2010; Hemovich et al., 2011).

Baumrind (1991) classified parenting styles along the dimensions of warmth/responsiveness versus control/demandingness, which remains a popular theoretical explanation of the implications of parent–adolescent interactions. Parental warmth and involvement are central to healthy development for adolescents as both dimensions help adolescents appropriately manage increased autonomy, internalize rules and behaviors endorsed by their parents, form prosocial peer networks, and hold a positive self-concept (Wang et al., 2014). Warmth and involvement in adolescence are negatively associated with both concurrent and later substance use and poor mental health and the two factors in concert may be particularly protective, as parental involvement in adolescence has been shown to be more effective in preventing problem behaviors when paired with parental warmth (Wang et al., 2014).

Peers. Adolescence is often accompanied by increasing value placed on peer relationships (Viner et al., 2012). Peer influences can be explained by the social development model (Hawkins & Weis, 1985), which posits that adolescents' behaviors are learned through observing the behaviors of those they bond with socially. When adolescents feel attached to an individual or group, they are likely to adopt similar behaviors to maintain the social bond. Bonds with prosocial peers have been shown to be protective, whereas affiliation with substance using or antisocial peers has been linked to substance use and poor mental health (Sussman et al., 2007).

School. Ainsworth (1969) and Bowlby (1988) initially outlined the importance of secure parent–child attachments, but new attachments formed in adolescence (i.e., attachments to teachers) have become an important area of study (Groh et al., 2014). When adolescents experience a secure attachment, they internalize feelings of self-worth and feel confident in managing the increased autonomy that accompanies the adolescent period (McElhaney et al., 2009). Empirically, a positive teacher–adolescent attachment has been shown to promote resilience (Pianta et al., 2003) and decrease the likelihood of emotional, behavioral, and alcohol and substance use problems (Yeung & Leadbeater, 2010).

Teachers can also foster a connection to the school and promote feelings of belonging (Anderman, 2003). Stage-environment fit (Eccles et al., 1997) stresses the importance of schools meeting students' developmental needs to promote student engagement. When there is a good stage-environment fit, adolescents are likely to feel they belong at school (Shochet et al., 2006). When there is a misfit, adolescents often question whether they belong and disengage from school—first psychologically then physically (Eccles & Roeser, 2003). This disengagement can culminate in school dropout, which dramatically limits opportunities and has a strong impact on health and well-being (Freudenberg & Ruglis, 2007). Consistent with this rationale, school belonging during adolescence has been shown to longitudinally predict substance use (Rostosky et al., 2003) and mental health (Turner et al., 2014).

Neighborhood and poverty. As autonomy increases in adolescence, the neighborhood becomes more important (Viner et al., 2012). Neighborhood influences can be understood from a social disorganization theoretical perspective. Social disorganization theory (Shaw & McKay, 1969) was initially developed to explain how characteristics of an environment promote criminality but is now presented as a systems theory, where disorganized neighborhoods result from structural factors (e.g., poverty) and disorganization leads to diminished health of the neighborhood and its residents (Kubrin & Weitzer, 2003). Adolescents' neighborhoods affect their development, resources, supervision received, and social connections and influence both their immediate and later health and well-being outcomes, including substance use and depression (Murry et al., 2011; Viner et al., 2012).

Patterns of Risk and Protection

Most research on adolescent risk and protective factors has used variable-centered approaches in which the effect of a risk or protective factor is studied in isolation. However, adolescents experience multiple influences simultaneously. Adolescents have families and peers, attend schools, and live in neighborhoods; all of which can shape their development directly and interact with other factors to increase or decrease the likelihood of a given outcome. While the literature on patterns of adolescent risk and protective factors is not as extensive as the research on individual factors, there is evidence that risk factors can accumulate to have a cascading effect on development and protective factors can offset risks. For example, adolescents growing up in poverty are more likely to experience high levels of family conflict, associate with delinquent peers, and receive a lower quality education, which combine to dramatically increase their risk for multiple negative mental, emotional, and behavioral outcomes (Murry et al., 2011). However, the increased risk that accompanies living in high-poverty neighborhoods can be offset by more proximal protective factors at the family, peer, and school domains (Leventhal & Brooks-Gunn, 2000). More specifically, while growing up in an economically disadvantaged neighborhood increases the risk for multiple negative outcomes later in life, economically disadvantaged parents may still be warm and highly involved in their adolescents' lives, both of which have been shown to buffer against neighborhood risks (Pearce et al., 2003). Similarly, adolescents who are at an increased risk for substance use and depression due to parenting risk factors are significantly

less likely to abuse substances or develop depression when they attend a high-quality school (Guibord et al., 2011).

One way to identify patterns of risk and protection is to use person-centered analyses (e.g., LCA), which enables the identification and examination of the effect of unique patterns of variables. LCA has previously been effective in identifying adolescents' profiles of risk (e.g., Lanza et al., 2010; Syvertsen et al., 2010). For example, Syvertsen and colleagues (2010) uncovered latent classes of protective factors in adolescence and found classes with substance using peers and poor parent–adolescent relationships were associated with the greatest odds of alcohol and cigarette use; however, analyses were cross-sectional and risk factors at the neighborhood level were not included. Our study aims to build on extant studies by including risk and protective factors across multiple domains of influence and incorporating longitudinal data to investigate how membership in these subgroups during adolescence predicts outcomes during adolescence and into young adulthood.

Current Study

Given the multidimensional nature of risk and protective factors, it is important to identify patterns of factors to provide a more comprehensive view of adolescent development. Additionally, examining associations between these patterns of risk and protection and adolescent and young adult outcomes can inform prevention efforts by providing evidence for when and where best to direct effective interventions (e.g., family-based interventions). In the current study, we (1) utilized LCA to identify unique subgroups from a large sample of adolescents based on their combinations of risk and protective factors. We chose indicators from family, school, peer, and neighborhood domains based on their theoretical relevance and empirical evidence of their importance for later outcomes and (2) assessed how latent class membership predicted heavy episodic drinking, illicit substance use, and depression in adolescence and 6 years later when participants were young adults. Outcomes were selected based on their high prevalence during young adulthood and links to adolescent risk factors (Catalano et al., 2012; Stone et al., 2012).

Although our LCA was somewhat exploratory, we hypothesized we would find latent classes demonstrating an absence and accumulation of risk, as well as classes with domain specific risks (e.g., adolescents with only school risk factors; Hypothesis 1). We also formed tentative hypotheses based on our anticipated latent class model. We expected classes with multiple risk factors to have significantly worse drinking, substance use, and depressive outcomes than classes with an absence of risk (Hypothesis 2a). Additionally, we thought certain combinations of risk factors would be particularly problematic. For example, we anticipated adolescents from latent classes with substance using peers would struggle with substance use as adolescents and young adults (Hypothesis 2b). Similarly, we anticipated adolescents from latent classes without positive relationships would be at an increased risk for depression (Hypothesis 2c). Finally, consistent with previous literature, we expected latent classes with risk factors in distal domains (i.e., at the neighborhood level) and protective factors in proximal domains (i.e., parents and peers) to have relatively comparable outcomes to latent classes with an absence of risk (Hypothesis 2d).

Method

Participants

Data came from the National Longitudinal Study of Adolescent to Adult Health (Add Health Add Health; Harris et al., 2009), a large, nationally representative sample of adolescents in Grades 7–12 in the U.S., recruited in 1994–1995. Participants were followed into adulthood through four waves of data collection (Harris et al., 2009). We included data from participants and their parents (90% of adolescents had a parent participate) who were aged 12–16 at Wave 1 (W1) and provided data 6 years later at Wave 3 (W3; 25% attrition between the waves; adolescent $N = 6{,}649$; M_{age} W1 = 14.06; M_{age} W3 = 20.38; 53.8% female; 56.1% White, 22.8% Black/African American, 9.5% Hispanic, 6.7% Biracial, Asian or Pacific Islander 4.2%, American Indian/Native American 0.7%; parent $N = 5{,}975$; 93% mothers). To account for attrition and missing data, we conducted all analyses with the W3 longitudinal weight, which adjusted for bias related to nonresponse and the sampling design (Chen & Chantala, 2014).

Measures

W1 LCA indicators. Indicators of multidimensional risk and protective factors came from W1 adolescent and parent reports. U.S. census tract data were used to determine neighborhood poverty. Eight indicators came from single items on a continuous scale. In many cases, these variables were skewed, with six indicators having skewness values above 2.0, which is thought to be the acceptable value for large sample studies (West et al., 1995). Skewed continuous variables often result in spurious latent subgroups (Asparouhov & Muthén, 2015) and do not capture the full range of the scale (Vasilenko & Espinosa-Hernandez, 2019). Because categorical indicators can be used to represent the presence or absence of a given factor (e.g., peers use substances or they do not) and yield conceptually distinct classes with a more parsimonious solution, we recoded indicators into nominal variables.

Family structure. A family structure variable was created using adolescent reports. When responding to maternal and paternal relationship items (could be a biological parent, stepparent, or other caregiver), adolescents were given the option to indicate that they did not have a mother or father figure in their life. If an adolescent reported having both a mother and father figure in their life, they were coded as growing up in a two-parent family. If they reported not having a mother figure (3.8%) or father figure (28.2%), then they were coded as growing up in a single-parent family. Family structure was coded as 1 = *single parent* (31.3%) and 2 = *two parent* (68.7%).

Parental warmth. Adolescents reported how warm their mothers and fathers were on a 5-point scale with responses ranging from 1 (*strongly agree*) to 5 (*strongly disagree*; e.g. "Most of the time, your mother is warm and loving toward you"). We coded responses as 1 = *not warm* (*not sure*, *disagree*, *strongly disagree*; 7.6% of mothers, 10.1% of fathers), 2 = *somewhat warm* (*agree*; 34.6% of mothers, 29.2% of fathers), 3 = *very warm* (*strongly agree*; 54.0% of mothers, 32.6% of fathers), or 4 = *no mother/no father* (3.8% of mothers, 28.2% of fathers). We then recoded adolescents based on the number of highly warm parents they had in their life (0 = *no very warm parents*, 39.3%; 1 = *one very warm parent*, 34.9%; 2 = *two very warm parents*, 25.8%).

Parental involvement. Variables for parents' involvement were created from adolescents' reports of whether they had engaged in an activity with their mother/father in the past 4 weeks (e.g., "worked on a project for school"). We coded responses 0 (had not occurred in the past week) or 1 (had occurred), summed responses, and created a separate involvement variable for mothers and fathers: 1 = *no involvement* (zero *yes* responses; 9.4% of mothers, 18.3% of fathers), 2 = *some involvement* (one *yes* response; 30.5% of mothers, 22.1% of fathers), 3 = *high involvement* (two or more *yes* responses; 56.3% of mothers, 31.5% of fathers), and 4 = *no mother/no father* (3.8% of mothers, 28.2% of fathers). As with parental warmth, we then recoded adolescents based on the number of highly involved parents in their life (0 = no highly involved parents, 37.2%; 1 = one very involved parent, 37.8%; 2 = two very involved parents, 25.0%).

Peer substance use. Adolescents were prompted to think of their three best friends, then asked, "how many smoke at least 1 cigarette a day?" and "how many drink at least once a month?." Responses were categorized 0 (no best friend who drank or smoked; 69.5%) or 1 (at least one best friend who drank or smoked 30.5%).

Teacher caring. Adolescents responded to the item, "How much do you feel that your teachers care about you?," on a 5-point scale ranging from 1 (*not at all*) to 5 (*very much*). We dichotomized responses as 0 = *teachers do not care much* (*not at all*, *very little*, and *somewhat*; 45.2%) or 1 = *teachers care* (*quite a bit* and *very much*; 54.8%).

School belonging. Adolescents reported how strongly they agreed with the statement, "I feel like I am part of this school," on a 5-point scale, with responses ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). We dichotomized responses as 0 = *does not feel they belong* (*strongly disagree*, *disagree*, *neither agree nor disagree*; 22.9%) or 1 = *feels they belong* (*agree*, *strongly agree*; 77.1%).

Neighborhood safety and drugs. Adolescents responded to the statement, "I feel safe in my neighborhood." Responses were given on a 5-point scale ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). We dichotomized responses as 0 = *not safe* (*strongly disagree*, *disagree*, *neither agree nor disagree*; 9.0%) or 1 = *safe* (*agree*, *strongly agree*; 91.0%).

Parents were asked "in this neighborhood, how big a problem are drug dealers and drug users?" Responses were given on a 3-point scale (1 = *no problem at all*, 2 = *a small problem*, 3 = *a big problem*). We dichotomized responses as 0 = *not a problem* (60.5%) or 1 = *a problem* (*a small problem* or *a big problem*; 39.5%).

Poverty. Parents reported their combined household income (M = US$46,486). Incomes at or below US$16,000 were coded 1 (in poverty; 18.7%) and incomes over US$16,000 were coded 0 (not in poverty; 81.3%); US$16,000 was roughly the poverty threshold for a family of four in 1994 when the data were collected (Lee et al., 2009; U.S. Bureau of the Census, 1994).

Census tract data were used to determine poverty areas. Consistent with the census definition (U.S. Bureau of the Census, 1994), neighborhoods were classified as poverty areas if 20% or more of households were at or under the poverty line. Participants were coded as 0 if they were not in a poverty area (73.5%) or 1 if they were in a poverty area (26.5%).

Dependent variables. Outcome variables came from W1 and W3 data. W3 data were collected approximately 6 years after W1. As is common in the Add Health data set, some questions were not asked in an identical fashion at all waves. For example, at W1, there were 19 items from The Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977), but only 9 items at W3. In the interest of continuity, we scored the W1 and W3 dependent outcomes in the same manner (i.e., we used the same 9 items from the CES-D at both W1 and W3). All outcomes were determined using self-reports.

Heavy episodic drinking. At W1, participants were asked "over the past 12 months, on how many days did you drink 5 or more drinks in a row?." Response options ranged from 1 (*every day or almost every day*) to 7 (*never*). To be consistent with the W3 measure, we estimated how likely participants were to engage in heavy episodic drinking in the past 2 weeks at W1. We recoded the variable into 0 = *no heavy episodic drinking in past 2 weeks* (*once a month*, *1 or 2 days in the past 12 months*, *never*, or participant reported never drinking, 90.4% of participants) and 1 = *any heavy episodic drinking in the past 2 weeks* (*every day or almost every day*, *3–5 days a week*, *1 or 2 days a week*, 2 *or 3 days a month*, 9.6%). At W3, participants were asked to report the number of times they engaged in heavy episodic drinking in the past 2 weeks, with heavy episodic drinking defined as five or more drinks for men and four or more drinks for women in a single occasion (National Institute on Alcohol Abuse and Alcoholism, 2004). W3 responses were dichotomized as 0 = *no heavy episodic drinking* (66.6%) or 1 = *any heavy episodic drinking* (33.4%).

Illicit substance use. At W1 and W3, participants reported how many times in the past 30 days they used "cocaine," "meth," and "LSD, PCP, ecstasy, mushrooms, inhalants, ice, heroin, or prescription medicines not prescribed for you." Participants who reported any use in the past 30 days were coded 1 (W1: 4.7%, W3: 7.3%); no use was coded 0 (W1: 95.3%, W3: 92.7%).

Depression. Depression was calculated using 9 items from The CES-D (Radloff, 1977), a valid and reliable measure of depressive symptoms (Beekman et al., 1997; Radloff, 1977; W1 $\alpha = .83$; W3 $\alpha = .81$). Participants were asked to rate on a 4-point scale (0 = *never or rarely*, 3 = *most of the time or all of the time*) how often a statement was true for them in the past 7 days (e.g., "You felt that people disliked you."). The CES-D contains 20 items with a score of 16 (mean score of .80 per item) indicating potential depressive symptomology (Radloff, 1977). As Add Health only used a subset of items, we rescaled the cutoff level that corresponded to depressive symptomology as 7 (mean score of .78 per item). We dichotomized the variable as 0 = *not depressed* (W1: 68.1%, W3: 74.4%) and 1 = *depressed* (W1: 31.9%, W3: 25.6%).

Plan of Analysis

Our analyses consisted of (1) conducting LCA with dichotomous indicators to identify unique subgroups of adolescents based on the presence of risk and protective factors across domains at W1, (2) identifying any differences in demographics across classes as a mechanism to better conceptualize the latent classes, and (3) utilizing the three-step weighted analysis introduced by Bolck et al. (2004; Bolck, Croon, & Hagenaars [BCH]) to perform weighted logistic regression with adolescent latent classes predicting

Table 1. Fit Indices for Models 1 Through 12.

Number of classes	*df*	AIC	BIC	CAIC	Smallest class size (%)
1	15,100	83,365.50	83,459.57	83,471.57	—
2	15,087	78,562.04	78,758.00	78,783.00	48
3	15,074	77,640.02	77,937.89	77,975.89	14
4	15,061	76,961.02	77,360.8	77,411.80	12
5	15,048	76,510.18	77,011.86	77,075.86	9
6	15,035	76,333.23	76,936.81	77,013.81	9
7	15,022	76,177.35	76,882.83	76,972.83	7
8	15,009	76,066.69	76,874.08	76,977.08	5
9	14,996	75,985.63	76,894.91	77,010.91	4
10	14,983	75,967.84	76,979.03	77,108.03	3
11	14,970	75,969.42	77,082.51	77,224.51	3
12	14,957	75,966.41	77,181.41	77,336.41	3

Note. Six-class model was selected. AIC = Akaike information criterion; BIC = Bayesian information criterion; CAIC = consistent AIC.

drinking, substance use, and depression outcomes at W1 when participants were adolescents and 6 years later when participants were young adults. Note that dichotomous indicators were used for our LCA. This was done both for the measurement issues discussed above in the measures section and because keeping indicators continuous and running latent profile analysis resulted in a large number of profiles (i.e., 11 profile solution) that were not statistically distinct on the indicators (e.g., multiple profiles did not differ significantly on parental warmth or involvement, no profiles differed from the sample mean by more than 1 *SD* on the friends using substances variable) making it difficult to interpret differences in profiles. Posterior probabilities were used to weight participants' likelihood of membership in each latent class and dependent variables were regressed on class membership controlling for participants' age, race/ethnicity, and gender, as well as the dependent variable at Time 1 (e.g., W1 heavy episodic drinking controlled when W3 heavy episodic drinking was the outcome). All analyses were run with Latent Gold 5.1 (Vermunt & Magidson, 2016) and models were run with 1,000 random start values.

Results

Model Selection

Table 1 includes Bayesian information criterion (BIC), Akaike information criterion (AIC), and consistent AIC (CAIC) fit information for 1–12 latent class models. AIC indicated a 10-class solution fit the data best, but BIC indicated an 8-class solution and CAIC indicated a 7-class solution. We also took into account the interpretability and distinctness of the different classes. For example, the six-class solution resulted in a distinct class characterized by single parents with no risk factors at any level. The seven-class solution broke up this class into two smaller single parent, lower risk classes, where one was slightly more likely to feel like their teachers cared and also had some higher neighborhood risk factors. Because these two classes were similar and the seven-class solution led to classes that seemed less differentiated (more posterior probabilities fell into the .40–.60 range), we opted to select the more parsimonious six-class solution which had similar fit indices to the eight-class solution (e.g., six-class BIC: 76,936.81; eight-class BIC: 76,874.08).

Latent Classes

Consistent with our first hypothesis, we identified latent classes with an absence of risk, an accumulation of risk, and domain-specific risks. We named classes based on their distinct patterns of risk and protective factors as determined by the item response probabilities. Three latent classes consisted of two-parent families and three were single-parent families (Table 2). We labeled the three 2-parent classes as Two Parent: Low Risk (34% of the sample), Two Parent: Relationship Risks (20%), and Two Parent: Neighborhood Risks (9%) and the three single-parent classes as Single Parent: Low Risk (18%), Single Parent: Relationship Risks (11%), and Single Parent: Multidimensional Risk (9%). The Two Parent: Low Risk class had multiple protective factors (e.g., two warm and involved parents, safe neighborhood) and no measured risk factors. Adolescents from the Two Parent: Relationship Risks class did not have a highly warm or involved parent, were likely to have a close friend using substances, felt that teachers did not care about them, but had protective factors at the neighborhood level. Parents from the Two Parent: Neighborhood Risks class were relatively evenly distributed across the different levels of warmth and involvement and had protective factors in the peer and school domains; however, these families were likely to be living in impoverished neighborhoods where drugs and safety were a concern. The Single Parent: Low Risk class was very similar to the Two Parent: Low Risk class except that it was likely to be a single-parent family. The Single Parent: Relationship Risks class was similar to the Two Parent: Relationship Risks class; adolescents from this class did not have a highly warm or involved parent, they were likely to have a close friend using substances, and they did not feel like their teachers cared about them. Finally, the Single Parent: Multidimensional Risk class had risk factors at multiple levels. Parents were unlikely to be highly warm or involved, adolescents did not feel like their teachers cared about them, and families were likely to be impoverished, living in impoverished neighborhoods, and experiencing concerns regarding drugs and safety in the neighborhoods. The only protective factors for this class were that adolescents' close peers were not likely to be using substances and adolescents reported feeling like they belonged at school.

Age, race and ethnicity, and gender across latent classes. Before examining how latent class membership predicted our outcomes

Table 2. Item Response Probabilities for Six Latent Classes.

	Two-parent families			Single-parent families		
Indicator	Two Parent: Low Risk (34%)	Two Parent: Relationship Risks (20%)	Two Parent: Neighborhood Risks (9%)	Single Parent: Low Risk (18%)	Single Parent: Relationship Risks (11%)	Single Parent: Multidimensional Risk (9%)
Family structure						
Single parent	0.00	0.00	0.00	**0.83**	**0.81**	**0.88**
Two parent	**1.00**	**1.00**	**1.00**	0.17	0.19	0.12
Parental warmth						
No highly warm parents	0.17	**0.56**	0.39	0.39	**0.68**	**0.54**
One highly warm parent	0.26	0.28	0.27	**0.61**	0.32	0.46
Two highly warm parents	**0.58**	0.16	0.34	0.00	0.00	0.00
Parental involvement						
No highly involved parents	0.19	0.46	0.38	0.38	**0.62**	**0.53**
One highly involved parent	0.27	0.33	0.33	**0.62**	0.38	0.47
Two highly involved parents	**0.54**	0.21	0.28	0.00	0.00	0.00
Friends use substances						
No	**0.88**	0.47	**0.69**	**0.80**	0.40	**0.53**
Yes	0.12	**0.53**	0.31	0.20	**0.60**	0.47
Belong at school						
No	0.09	0.39	0.22	0.10	**0.53**	0.32
Yes	**0.91**	**0.61**	**0.78**	**0.90**	0.47	**0.68**
Teachers care						
No	0.22	**0.77**	0.39	0.28	**0.83**	**0.56**
Yes	**0.78**	0.23	**0.61**	**0.72**	0.17	0.44
Safe neighborhood						
No	0.00	0.00	0.46	0.00	0.00	**0.60**
Yes	**1.00**	**1.00**	**0.54**	**1.00**	**1.00**	0.40
Drugs in the neighborhood						
No	**0.79**	**0.68**	0.00	**0.69**	**0.69**	0.00
Yes	0.21	0.32	**1.00**	0.32	0.31	**1.00**
Family poverty						
No	**0.96**	**0.91**	**0.85**	**0.65**	**0.73**	0.39
Yes	0.04	0.09	0.15	0.35	0.27	**0.61**
Neighborhood poverty						
No	**0.87**	**0.86**	0.45	**0.60**	**0.80**	0.37
Yes	0.13	0.14	**0.55**	0.40	0.20	**0.63**

Note. Item response probabilities above .5 are bolded to indicate it is more likely than not that a participant from that class would possess that characteristic. Adolescent $N = 6{,}649$, parent $N = 5{,}975$.

of interest, we were interested in understanding any potential differences in demographics across classes as a mechanism to better conceptualize the latent classes. As such, we examined how class membership varied as a result of W1 participants' age, race and ethnicity, and gender. Results indicated that class membership varied significantly across age and race and ethnicity (both $p < .001$) but not gender ($p = .95$). There were multiple significant differences between classes in terms of age. The youngest class was the Two Parent: Low Risk class ($M = 13.80$, $SD = 1.00$; significantly younger than Two Parent: Relationship Risks, Single Parent: Relationship Risks, and Single Parent: Multidimensional Risk), then the Single Parent: Low Risk ($M = 13.96$, $SD = 1.04$; significantly younger than Two Parent: Relationship Risks, Single Parent: Relationship Risks, and Single Parent: Multidimensional Risk), Two Parent: Neighborhood Risks ($M = 14.10$, $SD = 1.07$; significantly younger than Two Parent: Relationship Risks, Single Parent: Relationship Risks, and Single Parent: Multidimensional Risk), Single Parent: Multidimensional Risk ($M = 14.16$, $SD = 1.02$), Two Parent Relationship Risks ($M = 14.36$, $SD = 0.99$), and Single Parent: Relationship Risks ($M = 14.42$, $SD = 1.00$) classes. The largest age difference was between the Two Parent: Low Risk and Single Parent: Relationship Risks class (about 7 months) and all classes were within 1 *SD* of each other indicating that classes were relatively comparable in terms of age.

Significant differences in race and ethnicity seemed to be driven primarily by a high percentage of European American/White adolescents in the Two Parent: Low Risk (81%; 6% Hispanic; 5% African American), Two Parent: Relationship Risks (79%; 8% Hispanic; 4% African American), and Single Parent: Relationship Risks (66%; 11% Hispanic; 10% African American) classes. All other classes demonstrated more diversity in terms of race and ethnicity as there were at least two race/ethnicity groups comprising over 20% of the subgroup (Single Parent: Low Risk: 50% European American/White, 32% African American, 11% Hispanic, Two Parent: Neighborhood Risks: 52% European American/White, 22% African American, 12% Hispanic, and 10% Biracial; Single Parent: Multidimensional Risk: 44% African American, 32% European American/White; 10% Biracial; 9% Hispanic).

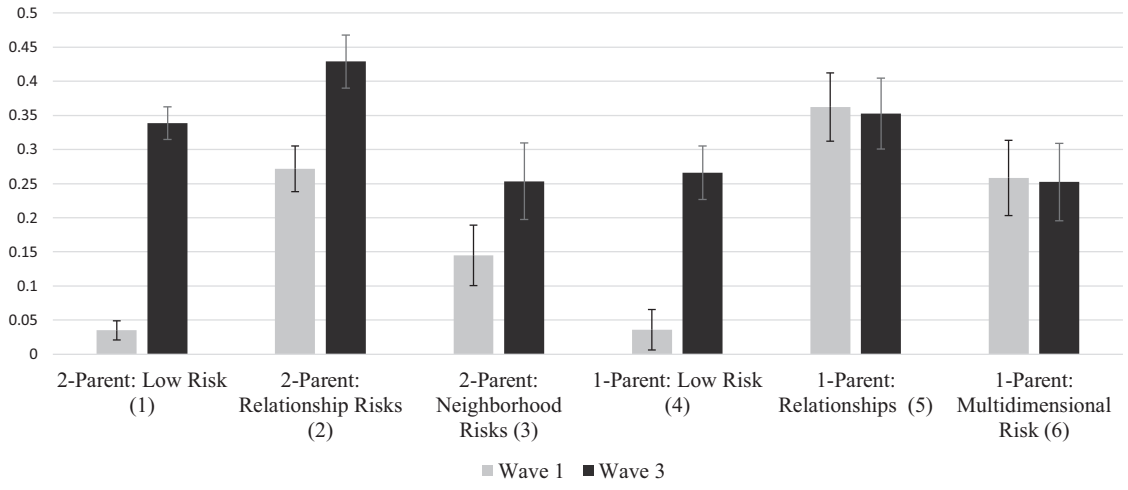

Figure 1. Proportion of Participants Reporting Heavy Episodic Drinking in the Past 2 Weeks.
Adolescent $N = 6{,}649$.
Note. Whiskers denote 95% confidence intervals.
Wave 1: 1 < 2***, 3***, 5***, 6***; 2 < 5**; 3 < 2***, 5***, 6*; 4 < 2***, 3**, 5***, 6***; 6 < 5*
Wave 3: 1 < 2***; 3 < 1*, 2***, 5*; 4 < 1***, 2***, 5*; 5 < 2*; 6 < 2***, 5*
***$p < .001$. **$p < .01$. *$p < .05$.

Predicting Young Adult Outcomes

Participants were weighted based on their probability of latent class membership and weighted logistic regressions using the BCH approach were conducted to examine associations between latent class membership and W1 and W3 heavy episodic drinking, illicit substance use, and depression controlling for participants' age, race and ethnicity, and gender. Results revealed latent class was a significant predictor for all outcomes of interest at both W1 and W3 (heavy episodic drinking in the past 2 weeks W1: Wald = 112.28, $p < .001$; W3: Wald = 28.54, $p < .001$; illicit substance use W1: Wald = 12.57, $p < .05$; W3: Wald = 30.61, $p < .001$, depression W1: Wald = 200.22, $p < .001$; W3: Wald = 57.88, $p < .001$) indicating prevalence rates differed significantly across latent classes.

Heavy episodic drinking. Consistent with our hypothesis, classes with the fewest risk factors (i.e., the Two Parent and Single Parent: Low Risk) had the lowest rates of heavy episodic drinking at W1 (both low-risk classes around 4%; significantly lower than all other classes; Hypothesis 2a). Conversely, adolescents from the classes that were characterized by substance using peers and an absence of protective factors in proximal domains were the most likely to report heavy episodic drinking at W1 (i.e., Two Parent: Relationship Risks: 27%; Single Parent: Relationship Risks: 36%; Single Parent: Multidimensional Risk: 26%; all significant differences reported in Figure 1; Hypothesis 2b).

At W3, our hypotheses for heavy episodic drinking were only partially supported. As expected, rates remained high among the Two Parent: Relationship Risks (43%; significantly higher than all other classes; Figure 1) and Single Parent: Relationship Risks (35%; significantly higher than the Single Parent: Low Risk, Two Parent: Neighborhood Risks, and Single Parent: Multidimensional Risk; Hypothesis 2b) classes. However, young adults from the seemingly lowest risk class, Two Parent: Low Risk, showed the greatest increase in heavy episodic drinking between W1 and W3, with 34% reporting drinking heavily in the past 2 weeks at W3 (significantly higher than the Single Parent: Low Risk and Two Parent: Neighborhood Risks classes and not statistically different from the Single Parent: Relationship Risks and Single Parent: Multidimensional Risk classes). Similarly, participants from the Single Parent: Low Risk class reported a marked increase in heavy episodic drinking between W1 and W3. At W3, 27% of young adults from the Single Parent: Low Risk class reported heavy episodic drinking in the past 2 weeks, a rate that did not differ significantly from the Two Parent: Neighborhood Risks (25%) or Single Parent: Multidimensional Risk (25%) classes.

Illicit substance use. The prevalence rates of illicit substance use were largely consistent with our hypotheses; classes with fewer risk factors and more protective factors in proximal domains had lower reported rates of illicit substance use (Hypotheses 2a and 2d). At W1, the lowest rates of illicit substance use were in the two low-risk classes (both slightly above 0% and significantly lower than the Two Parent: Relationship Risks, Single Parent: Relationship Risks, and Single Parent: Multidimensional Risk classes). The highest rates of illicit substance use occurred in the Two Parent: Relationship Risks (10%; significantly higher than all other classes except Single Parent: Relationship Risks) and Single Parent: Relationship Risks (14%; significantly higher than all other classes; Figure 2).

The differences in rates of illicit substance use were largely extended to W3. The Two Parent: Low Risk, Single Parent: Low Risk, Two Parent: Neighborhood Risk, and Single Parent: Multidimensional Risk classes all had rates of illicit substance use around 4% or 5% and these classes did not differ significantly from one another. Young adults from the Two Parent: Relationship Risks (12%) and Single Parent: Relationship Risks (14%) had considerably higher rates of illicit substance use, which were significantly higher than all other classes (Figure 2).

Depression. Consistent with our Hypothesis 2c, the highest rates of depression at W1 fell in classes that were characterized by a lack of positive relationships (i.e., Two Parent: Relationship Risks, 54%;

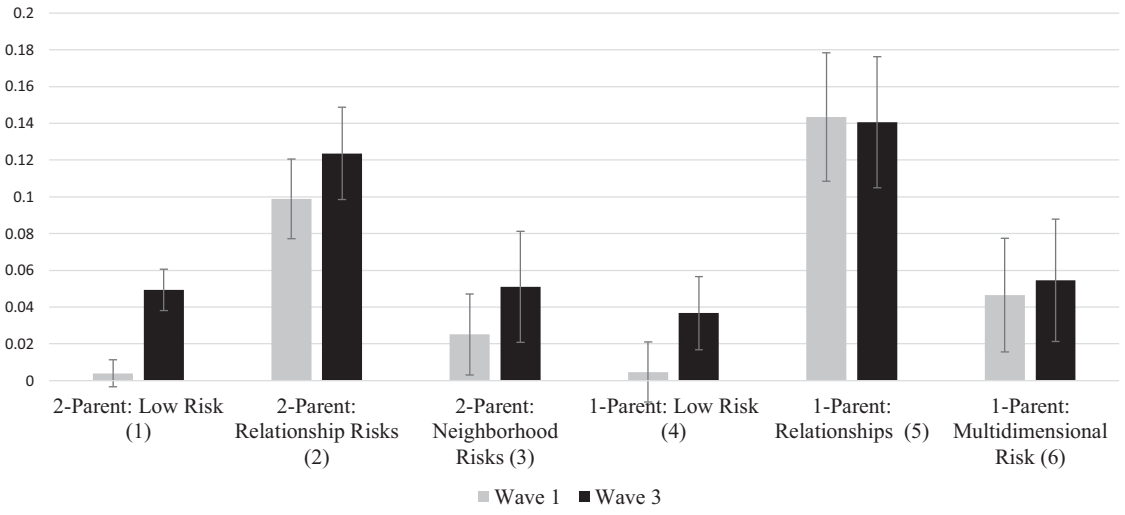

Figure 2. Proportion of Participants Reporting Illicit Substance Use in the Past Month.
Adolescent $N = 6{,}649$.
Note. Whiskers denote 95% confidence intervals; class number included in parentheses.
Wave 1: 1 < 2***, 5***, 6*; 2 < 5*; 3 < 2**, 5***; 4 < 2*, 5*; 6 < 2*, 5**
Wave 3: 1 < 2***, 5***; 3 < 2**, 5**; 4 < 2***, 5***; 6 < 2**, 5**
***$p < .001$. **$p < .01$. *$p < .05$.

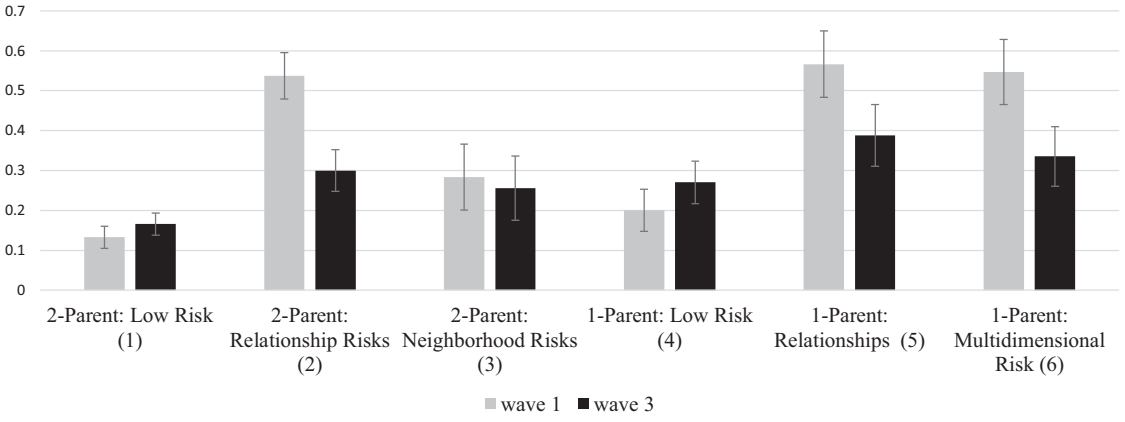

Figure 3. Proportion of Participants Demonstrating Depressive Symptomology on CES-D (a Score of 7 or Higher on the CES-D Was Conceptualized as Demonstrating Depressive Symptomology).
Adolescent $N = 6{,}649$.
Note. Whiskers denote 95% confidence intervals; class number included in parentheses. CES-D = Center for Epidemiologic Studies Depression Scale.
Wave 1: 1 < 2***, 3***, 4*, 5***, 6***; 3 < 2***, 5***, 6***; 4 < 2***, 5***, 6***
Wave 3: 1 < 2***, 3*, 4***, 5***, 6***; 3 < 5*; 4 < 5*
***$p < .001$. **$p < .01$. *$p < .05$.

Single Parent: Relationship Risks, 57%; and Single Parent: Multidimensional Risk, 55%; significantly higher than all other classes). The Two Parent: Low Risk (13%) and Single Parent: Low Risk (20%) classes had the lowest rates of depression and adolescents from these classes were significantly less likely to meet the CES-D cutoff for depression than nearly every other latent class (all significant differences reported in Figure 3).

At W3, rates of depression declined across four of the six profiles, but the differences across classes remained relatively the same. Once again, rates of depression were highest in the Two Parent: Relationship Risks (30%), Single Parent: Relationship Risks (39%), and Single Parent: Multidimensional Risk (34%) classes (all significantly higher than other classes; Figure 3). Again, young adults from the Two Parent: Low Risk class had the lowest rates of depression (17%) which was significantly lower than all other classes.

Discussion

This study provides an overarching view of the patterns of risk and protective factors experienced by adolescents with the six unique latent classes demonstrating the diversity of contexts adolescents grow up in. As expected, some classes displayed multiple risk

factors across domains (i.e., Two Parent: Relationship Risks, Single Parent: Relationship Risks, Single Parent: Multidimensional Risk), while some had little risk with protective factors in multiple domains (Two Parent: Low Risk and Single Parent: Low Risk). Additionally, one class (i.e., Two Parent: Neighborhood Risk) primarily experienced risk only at the neighborhood level.

Proximal Risk and Negative Outcomes

Utilizing LCA with the BCH approach allowed us to examine how unique patterns of risk and protection in adolescence predicted heavy episodic drinking, illicit substance use, and depression during adolescence and young adulthood. While there is evidence that risk factors at proximal levels (e.g., family and peer) and distal levels (e.g., neighborhood) are associated with adolescent and young adult heavy episodic drinking, illicit substance use, and depression, our latent classes provided the opportunity to explore if proximal or distal risks appear to be more relevant for adolescent development. Our results suggest that proximal, social factors are more impactful for heavy episodic drinking and substance use as the two classes demonstrating the highest rates of adolescent and young adult heavy episodic drinking and illicit substance use were the Two Parent: Relationship Risks and Single Parent: Relationship Risks classes. These classes where unique in that they were the only subgroups where adolescents were not likely to have a highly warm or involved parent, felt teachers did not care, and had close friends using substances. While the Single Parent: Multidimensional Risk class was similar in that these adolescents did not feel like their parents were warm and involved or their teachers cared, they did have better adolescent and young adult heavy episodic drinking and substance use outcomes. This is somewhat surprising especially given that adolescents from this class also likely experienced risk at the neighborhood level. However, most adolescents from the Single Parent: Multidimensional Risk class did not have a close friend using substances. This is meaningful as there is a bevy of research to suggest that associating with substance using peers in adolescence is a key risk factor for both adolescent and young adult alcohol, substance use, and depression (Cairns et al., 2014; Leung et al., 2014; Stone et al., 2012). Adolescents often adopt similar behaviors to their peers and vice versa (Hawkins & Weis, 1985). As such, it is likely that adolescents from both of the Relationship Risks classes and their peers were reinforcing each other's drinking and substance use behaviors.

The Two Parent: Relationship Risks, Single Parent: Relationship Risks, and the Single Parent: Multidimensional Risk classes had the highest rates of adolescent depression, a trend that was largely carried into young adulthood. Again, the accumulation of proximal social risk factors appears to be having both immediate and downstream consequences. Warmth, involvement, and perceptions of caring all promote secure attachments (Scott et al., 2011), which in turn protects against depression (Lee & Hankin, 2009). Adolescence is often a time of transition, where adolescents experience changes in their relationships with parents and peers (Oberle et al., 2011), making it a key developmental period to understand attachment. Secure attachments can be formed within different systems through multiple mechanisms including within the family (Wang et al., 2014) and the school (Groh et al., 2014). Our findings suggest that adolescents from these classes may not have had strong positive relationships with the adults in their lives and this accumulation of risk at proximal, social levels played a role in their mental health as young adults. Additionally, because alcohol, substance use, and depression often co-occur, it is possible that this increased risk for heavy episodic drinking and substance use for the classes marked by poor relationships also increased the risk of depression in adolescence and young adulthood, or alternatively, this increased depression led participants to seek out unhealthy coping mechanisms (i.e., heavy episodic drinking and illicit substance use) and pushed them to find substance using peers (Cairns et al., 2014). However, it is also important to note that while participants from the Single Parent: Multidimensional Risk class did have higher rates of depression than the lower risk classes (i.e., Two Parent: Low Risk, Single Parent: Low Risk, Two Parent: Neighborhood Risks), their rates of illicit substance use were comparable. This would indicate that while depression may increase the risk for illicit substance use, it does not guarantee it and instead there are multiple pathways of risk to substance use and depression (Colder et al., 2013).

Our results also suggest that protective factors in one domain can offset risk in another. For example, adolescents from the Two Parent: Neighborhood Risk class were likely to be living in impoverished areas where drugs were a concern, presumably increasing their risk for multiple negative outcomes. However, these adolescents reported protective factors at the school level and were likely to have at least one highly warm and involved parent. Young adults from this class had outcomes relatively comparable to both the Two Parent: Low Risk and Single Parent: Low Risk classes. This indicates that it might be possible to offset neighborhood risk by bolstering protective factors in other domains (e.g., within families or within school settings) and further suggests the utility of both family (e.g., Strengthening Families Program; Kumpfer et al., 1996) and school-based intervention efforts (Greenberg et al., 2003).

Implications of Family Structure

The three single-parent latent classes were very similar to the three 2-parent latent classes in terms of risk and protective factors (i.e., there were single and two-parent classes characterized by no risk factors, relationships risks, and neighborhood risks). The fact that the single-parent classes had comparable outcomes to their corresponding two-parent classes suggests that it is not having a single parent that increases the risk of poor outcomes but is instead the factors that are more likely to accompany single parenthood (e.g., more adolescent–parent conflict, more socioeconomic stress, and less parental monitoring). This is consistent with the Family Stress Model and empirical work that has found factors like socioeconomic status (SES), social support and stress, peer approval of substance use, attachment, and parent–adolescent communication patterns to underlie associations between family structure and adolescent heavy episodic drinking, substance use, and depression (Barrett & Turner, 2005, 2006; Crawford & Novak, 2008; Levin & Currie, 2010). This is further reinforced by the Single Parent: Low Risk class generally having lower incidences of heavy episodic drinking, illicit substance use, and depression. Additionally, while the social development model (Catalano & Hawkins, 1996; Hawkins & Weis, 1985) and theories of social exclusion (e.g., Leary, 1990) might suggest that adolescents from single-parent families experience more risk factors in other proximal domains (e.g., affiliation with substance using peers) as a result of strained family relationships and less parental modeling, our results did not bear this out. Roughly 54% of participants in the Two Parent classes

fell into the Low Risk class with protective factors across domains. This percentage was similar within the Single Parent classes, as about 47% of participants from Single Parent classes were in the Low Risk class. While it is possible that this could be in part due to a small degree of misclassification to the probabilistic nature or LCA, our results do further suggest that living in a single parent family is not an insurmountable challenge, not only in terms of drinking, substance use, and depression outcomes, but in terms of the accumulation of additional proximal risk factors too.

Ultimately, our results indicate that parenting is more about quality than quantity. Single parenthood can present challenges for both the parent and adolescent, but positive results in the Single Parent: Low Risk class indicate adolescents and their parents can overcome these challenges. As such, it is important to ensure that single parents receive the support they need to ensure they are able to remain involved and parent their adolescents with warmth.

Appropriately Timed Prevention

Examining heavy episodic drinking, illicit substance use, and depression in adolescence and young adulthood provided us with a better idea of when differences across profiles emerged. For illicit substance use and depression, these patterns were largely consistent across time points. However, while rates of illicit substance use in the Two-Parent Relationship Risks and Single-Parent Relationship Risks remained relatively stable, adolescents from other classes (i.e., Two Parent: Low Risk and Single Parent: Low Risk) reported higher rates of illicit substance use in young adulthood. These increases for the low-risk classes were even more dramatic in terms of heavy episodic drinking (Two Parent: Low Risk W1: 4%, W3: 34%; Single Parent: Low Risk W1: 4%, W3: 27%). In fact, young adults from the Two Parent: Low Risk had the third highest rates of heavy episodic drinking and did not differ significantly from young adults from the Single Parent: Relationship Risks class. These increases in heavy episodic drinking and illicit substance use in the two lowest risk classes may stem from these classes having significantly higher percentages of young adults attending college (64% of Two Parent: Low Risk; 46% of Single Parent: Low Risk) as college students engage in heavy episodic drinking more frequently than their noncollege-enrolled peers (White & Jackson, 2005) and the transition to college is seen as a risky period for experimentation with illicit substances (Skidmore et al., 2016). When college attendance was included as a covariate in the regression models, latent class membership remained a significant predictor of heavy episodic drinking and illicit substance use ($p < .001$), but there were fewer significant differences between classes. This suggests a portion of the variance between classes was attributable to college attendance, but latent class was a significant predictor of heavy episodic drinking and illicit substance use above and beyond college attendance. For the young adults from the Two Parent: Low Risk and Single Parent: Low risk latent classes, it is possible that an accumulation of protective factors and an absence of risk factors in adolescence led to an increased likelihood of college attendance, which led to more dramatic increases in rates of heavy episodic drinking and illicit substance use.

Another explanation for the higher rates of heavy episodic drinking in the Two Parent: Low Risk class specifically comes from the higher SES of these families as this class had the lowest probability of experiencing poverty. Previous research has found young adults from more affluent families are at a greater risk for heavy episodic drinking due to greater parental acceptance of alcohol and infrequently enforced consequences (Patrick et al., 2012). Additionally, it is possible that individuals from these low-risk classes may have encountered unique, unmeasured risks (e.g., inconsistent consequences) that resulted in higher heavy episodic drinking rates in young adulthood. Ultimately, these results articulate the importance of appropriately timed interventions. While interventions in early-to-mid adolescence may be crucial for preventing heavy episodic drinking, illicit substance use, and depression in some classes (e.g., classes marked by poor relationships and a lack of attachment), it is important to recognize that prevention efforts still may be needed for those in lower risk classes, particularly around key transition points (e.g., college attendance).

Limitations and Future Directions

Although the longitudinal nature of our study is a strength, we do not know factors that preceded the LCA indicators. For example, membership in the Two Parent: Relationship Risks and Single Parent: Relationship Risks subgroups were associated with multiple negative outcomes, but we do not know why these individuals felt a lack of connection to teachers and school and associated with substance using peers. It is possible these adolescents were demonstrating behaviors that strained their family and school relationships (e.g., using substances) before data were collected at W1. Similarly, it is important to note that while all indicators in the study have been linked to adolescent and young adult heavy episodic drinking, substance use, and depression, we cannot assume the directionality of the associations. For example, a lack of parental involvement increases the risk for adolescent substance use, but adolescents who use substances have also been shown to withdraw from their families and disclose less about their activities, limiting their parents' opportunities for involvement (Coley et al., 2008). Adding additional time points in future studies to model patterns of risk and protection along with the emergence of heavy episodic drinking, substance use, and depression across adolescence may provide a better picture of the directionality of these associations.

While we attempted to capture the contexts influencing adolescent development by including risk and protective factors from multiple domains of influence, we did not include potentially meaningful factors at the individual level. Future research could build on our findings by including individual-level factors into an LCA model along with variables at proximal and distal levels. This could be valuable as individual traits that promote resilience (e.g., self-efficacy; Fergus & Zimmerman, 2005) in the face of other risks could be identified. Additionally, we only examined how patterns of risk and protection were associated with three outcomes. Future research could expand on our findings to include additional outcomes relevant for adolescent and young adult wellbeing (e.g., academic achievement, marijuana use). Finally, it is important to remember data came from one cohort of participants. Caution should be taken when considering the generalizability of the study to additional groups of adolescents.

Conclusion

Some adolescents experience an accumulation or absence of risk, while others experience risk factors in specific domains and protective factors in others. For adolescent and young adult heavy episodic drinking, substance use, and depression, it appears that

an accumulation of risk in social relationships carries more weight than risk in more distal areas (i.e., in the neighborhood). Ultimately, our results further indicate that adolescent development is complex and is shaped by multiple events and relationships that carry implications for well-being. Examining these multiple factors together is an important step to better understand and facilitate healthy development as well as inform effective prevention efforts.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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ijbd

International Journal of Behavioral Development
2021, Vol. 45(4) 368–377

DOI: 10.1177/01650254211005560
journals.sagepub.com/home/jbd
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Validation of motor, cognitive, language, and socio-emotional subscales using the Caregiver Reported Early Development Instruments: An application of multidimensional item factor analysis

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Abstract

The Caregiver Reported Early Development Instruments (CREDI) are assessments tools for measuring the development of children under age three in global contexts. The present study describes the construction and psychometric properties of the motor, cognitive, language, and socio-emotional subscales from the CREDI's long form. Multidimensional item factor analysis was employed, allowing indicators of child development to simultaneously load onto multiple factors representing distinct developmental domains. A total of 14,113 caregiver reports representing 17 low-, middle-, and high-income countries were analyzed. Criterion-related validity of the constructed subscales was tested in a subset of participants using data from previously established instruments, anthropometric data, and a measure of child stimulation. We also report internal-consistency reliability and test–retest reliability statistics. Results from our analysis suggest that the CREDI subscales display adequate reliability for population-level measurement, as well as evidence of validity.

Keywords

Early childhood development, validity and reliability, population-level measurement, low- and middle-income countries, multidimensional item factor analysis

A growing body of research shows that early childhood is a sensitive period of brain and skill development and has the largest individual and social returns to investments relative to other periods of human development (Grantham-McGregor et al., 2007; Heckman, 2006; Lu et al., 2016; Moffitt et al., 2011; Nores & Barnet, 2010; Peet et al., 2015). Reflecting this promise, the past several decades has seen a surge in global interest in promoting early childhood development (ECD), particularly during the first one thousand days of life (Black et al., 2017). A broad range of ECD intervention approaches (e.g., home visiting programs, early childhood care and education services, nutritional supports) have been developed to meet the needs of children living in diverse settings around the world and are increasingly being prioritized by governments and nongovernmental organizations for large-scale implementation (Richter et al., 2017). At a policy level, the United Nations' (2015) recently ratified Sustainable Development Goals (SDGs) that specifically focus on ECD under Target 4.2. In fact, Target 4.2 under the SDGs represents the first major global policy initiative to specifically focus on ECD.

Central to the success of ECD intervention and policy efforts is access to reliable, valid, and practically feasible methods for measuring young children's outcomes. In particular, experts have highlighted the need for global instruments that can be used to capture multiple domains of development (e.g., motor skills, language skills, etc.) in large, culturally diverse samples (Richter et al., 2019). Such approaches are critical for a multitude of purposes, ranging from improving basic understanding of developmental processes globally to evaluating the impact of programs and policies on child outcomes to monitoring progress toward global policy targets.

The large-scale implementation of existing measures of motor, cognitive, language, and socio-emotional development in children younger than 3 years of age is likely not feasible in international contexts. Existing ECD instruments include the *Denver Developmental Screening Test* (Frankenburg & Dodds, 1967), the *Bayley Scales of Infant and Toddler Development* (BSID-III; Bayley, 2006), and the *Ages & Stages Questionnaire* (Squires & Bricker, 2009). These instruments provide information about ECD with enough precision to screen individual children for developmental disabilities or delays. However, these instruments were primarily constructed for U.S. populations and, with some exceptions (e.g., Kerstjens et al., 2009), there is limited evidence on their validity in international contexts (Peña, 2007). Furthermore, the costs and

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resources associated with purchase and implementation make these instruments difficult to implement in large samples, particularly in resource-limited low- and- middle-income countries (LMICs).

In recent years, a number of instruments have been developed to address the need for cross-culturally comparable ECD measures. For example, Save the Children's *International Development and Early Learning Assessment* has shown evidence for validity and easy implementation in international contexts, but it is intended to measure learning and development for children 3.5- to 6.5-years-old (Halpin et al., 2019; Wolf et al., 2017). Similarly, the Inter-American Development Bank's Regional Project on Child Development (PRIDI), a direct assessment tool, seeks to measure 2- to- 4-year-olds' motor, cognitive, language, and socio-emotional development using a brief set of indicators that are considered to be valid in culturally diverse contexts. A final example is the *INTERGROWTH-21st Project Neurodevelopment Package* (INTER-NDA), which was calibrated and tested in eight multiethnic sites across five continents but only targets 22- to 26-month-old children (Fernandes et al., 2014). Given the particularly high plasticity of development during the first 3 years of life (Walker et al., 2011), there is an urgent need for scalable, internationally validated instruments to monitor child development in this specific developmental period.

In response to the limitations of existing ECD measures, we developed the Caregiver Reported Early Development Instruments (CREDI; McCoy et al., 2016, 2018). The CREDI is a simple, caregiver-reported measure developed for large-scale assessment of ECD for children between the ages of zero and three years. The CREDI exists in both a short form and a long form. The short form aims to provide policymakers and NGOs with a single score of overall ECD, and these scores have demonstrated validity evidence in 17 low-, middle-, and high-income countries (McCoy et al., 2018). In contrast, the purpose of the long form is to provide finer-grain information regarding children's development across multiple domains, including (a) motor skills (including fine and gross motor skills), (b) cognitive skills (including executive functioning, reasoning, problem solving, and pre-academic knowledge), (c) language skills (including expressive and receptive language skills), and (d) socio-emotional skills (including emotional and behavioral self-regulation, emotion knowledge, and social competence). A thorough discussion of the instrument's construction (i.e., item construction, data collection procedures, etc.) as well as the psychometrics of the short form is provided by [*citation redacted*].

The aim of the present study is to report the validity evidence for the CREDI long form's motor, cognitive, language, and socio-emotional subscale scores obtained from $N = 14{,}113$ caregiver reports in a multicultural, multinational sample. In assessing the evidence, we followed the recommendations set forth by the *Standards for Educational and Psychological Testing* (henceforth, *Standards*; American Educational Research Association [AERA], American Psychological Association [APA], & National Council on Measurement in Education [NCME], 2014) to evaluate whether subscale scores obtained from the CREDI long form support inferences about the developmental status of children under 3 years of age. Complementing existing evidence regarding the CREDI's test content and cognitive testing provided in McCoy et al. (2018), this study provides evidence of the long form's (1) *Construct validity* and the internal structure of the CREDI long form, including the extent to which observed item response patterns are predicted by theory; (2) *Criterion validity* and the degree to which relations between the CREDI subscale scores and other variables match what would be expected by theory; (3) *Reliability* in that the subscale scores drawn from the CREDI long form are sufficiently precise for the intended purpose of the instrument (i.e., population measurement of young children's developmental status in multiple developmental domains); (4) *Fairness* in that scores do not result in biased conclusions about the developmental status. To provide this evidence, we begin by comparing a variety of potential model specifications, including several multidimensional models that allow CREDI items to load onto multiple subscales simultaneously. We argue that such a multidimensional approach is more conceptually valid for capturing ECD during infancy and toddlerhood, when children's observable behaviors often reflect multiple underlying skills or capacities (e.g., pointing as reflecting both expressive communication and motor skills).

Measures and Methods

Participants

We collected data from a sample of 14,113 primary caregivers of children aged 0–35 months old from 21 sites across 17 high- and LMICs.[1] The mean age of children was 20.3 months ($SD = 9.41$). Approximately half of the children were male (50.2%). Geographically, 53.2% of respondents were from Africa (Ghana, Tanzania, and Zambia), 20.68% from Asia (Bangladesh, Cambodia, India, Jordan, Laos, Nepal, Pakistan, and the Philippines), 21.0% from Latin America (Brazil, Chile, Colombia, and Guatemala), and 6.4% from the United States (see Table 1 for details about the sample). The CREDI was translated (and back-translated) from English to local languages in all sites. Within each site, surveys were administered to children participating in local research projects. Although samples were predominantly convenience-based, several sites (e.g., Brazil, Nepal, Cambodia) included samples that were representative of subnational units (e.g., districts or zones).

The study was reviewed by each site's Institutional Review Board, and all data collection was conducted in accordance with local ethical standards. All caregivers gave informed consent.

CREDI

In administering the CREDI, we asked caregivers to report whether their child can or does exhibit a range of milestones, skills, and behaviors compiled to measure motor, cognitive, language, and socio-emotional development for children under 36 months of age. We developed and refined the wording of the items refined using a multiphase process that has been documented previously (see *citation redacted*). Overall, we field-tested 149 items. Caregivers responded to up to 103 dichotomous items that were identified as appropriate given the child's age. Caregivers could answer all CREDI items with a "yes," "no," or "I don't know" response. We treated all "I don't know" responses as missing values in the analysis.

Of the 149 items tested, we excluded 39 from further analysis as these items: (1) showed >10% "don't know" responses, (2) were understood by fewer than 80% of caregivers on cognitive interviews, (3) showed poor agreement levels (unadjusted for chance agreement) of Cohen's $\kappa < .40$ for the caregivers selected to respond to the same questions 7–10 days later, or (4) were identified as primarily measuring mental health and did not demonstrate a

Table 1. CREDI Sample Description.

Country	Full sample size (total number of children assessed)	Analytic sample size (children under 36 months)	Country estimated stunting prevalence (%)	Country estimated average daily income per capita in USD
Bangladesh	280	280	39	8.6
Brazil	2,359	2,212	7	39.8
Cambodia	493	410	40	9.0
Chile	244	244	2	60.8
Colombia	378	314	13	35.6
Ghana	3,000	1,709	19	10.8
Guatemala	205	197	47	19.9
India	200	200	38	15.7
Jordan	317	278	8	28.1
Laos	46	43	44	14.6
Lebanon	426	384	17	35.9
Nepal	363	363	37	6.3
Pakistan	250	241	45	12.9
Philippines	720	719	30	19.0
Tanzania	3,715	3,610	34	6.9
USA	1,021	899	2	144.4
Zambia	2,012	2,010	40	9.9
Total/average	16,029	14,113	27	28.1
Min	46	43	2	6.3
Max	3,715	3,610	47	144.4

Note. Income per person and day computed by dividing purchasing-power-parity adjusted per capita income in each country by 365 days. Stunting data refer to children under age 5 and was retrieved from http://data.unicef.org/topic/nutrition/malnutrition/.

monotonic relationship with age. Further details on the item-screening process are provided in McCoy et al. (2018). Consequently, we analyzed responses to a total of 110 items in this study.

Construct Validity

Consistent with the recommendations from the *Standards*, we gathered construct validity evidence by demonstrating that there is a theoretical basis for explaining item response patterns (i.e., the internal structure). In developing ECD instruments, exploratory factor analysis (EFA) is often used as a starting point for evaluating the internal structure of the items, including ascertaining the dimensionality of the instrument and assessing internal structure using factor loadings (e.g., Fernandes et al., 2014; Ghandour et al., 2019). In contrast, in educational assessment and the item response theory literature, test developers often employ confirmatory approaches (e.g., confirmatory factor analysis [CFA]) in which the loading structure of items to constructs is pre-specified according to a panel of experts (Liu & Kang, 2019). Both approaches—EFA and CFA—have advantages and disadvantages. On the one hand, with CFA, there is no guarantee that the theoretical loading structure specified by a panel of experts best explains item responses. On the other hand, traditional EFA models make strong distributional (i.e., normality of the underlying factors) and parametric (i.e. linearity) assumptions that likely do not hold perfectly in real-world data; consequently, solutions from EFA that differ from theoretical expectations may be reflective of the sensitivity of the parameter estimates to assumption violations when modeling the data, as opposed to an accurate indication of the true underlying structure of the instrument. Indeed, although a traditional EFA was conducted (contact first author for details), the EFA solution was determined to be inconsistent with theory because all but 6 items (2 motor items and 4 socio-emotional items) loaded onto two factors and these two factors had no clear theoretical delineation to theorized ECD constructs.

Table 2. Model Fit Across Fitted IFA Models.

Model	Factors	Parameters	LL	AIC	BIC
A.1	4	321	−232549.06	465740.11	468160.25
A.2	4	332	−231261.88	463187.76	465690.83
A.3	4	339	−230549.24	461776.48	464332.32
B	4	313	−231602.39	463830.78	466190.60
C	3	309	−232068.34	464754.67	467084.33
D	1	239	−238102.63	476683.26	478485.16

Note. $N = 14{,}113$. All models fit to the same $J = 108$ items.

Our approach for testing the internal structure of the CREDI long form utilized a hybrid between CFA and EFA. Consistent with CFA, we fit multidimensional item factor analysis (IFA) models to the data using a theoretically grounded factor loading structure developed by a team of 16 external expert advisors. However, we also use disagreements among the panel of experts to specify alternative models and evaluate the corresponding fit. Thus, our hybrid approach attempted to strike a balance between identifying a factor loading specification that maximizes model-data consistency (i.e., the goal of EFA) while ensuring that we remain tied to theory (i.e., the goal of CFA).

To begin this process, our panel of expert advisors analyzed each item and voted for all ECD domains that the item was hypothesized to measure (i.e., motor, cognitive, language, and/or socio-emotional; see Online Supplemental Appendix Table 2 for a fully tally of all expert votes). These experts included developmental psychologists and pediatricians representing a range of countries. Items with potential implications for multiple areas of development could be flagged as representing more than one

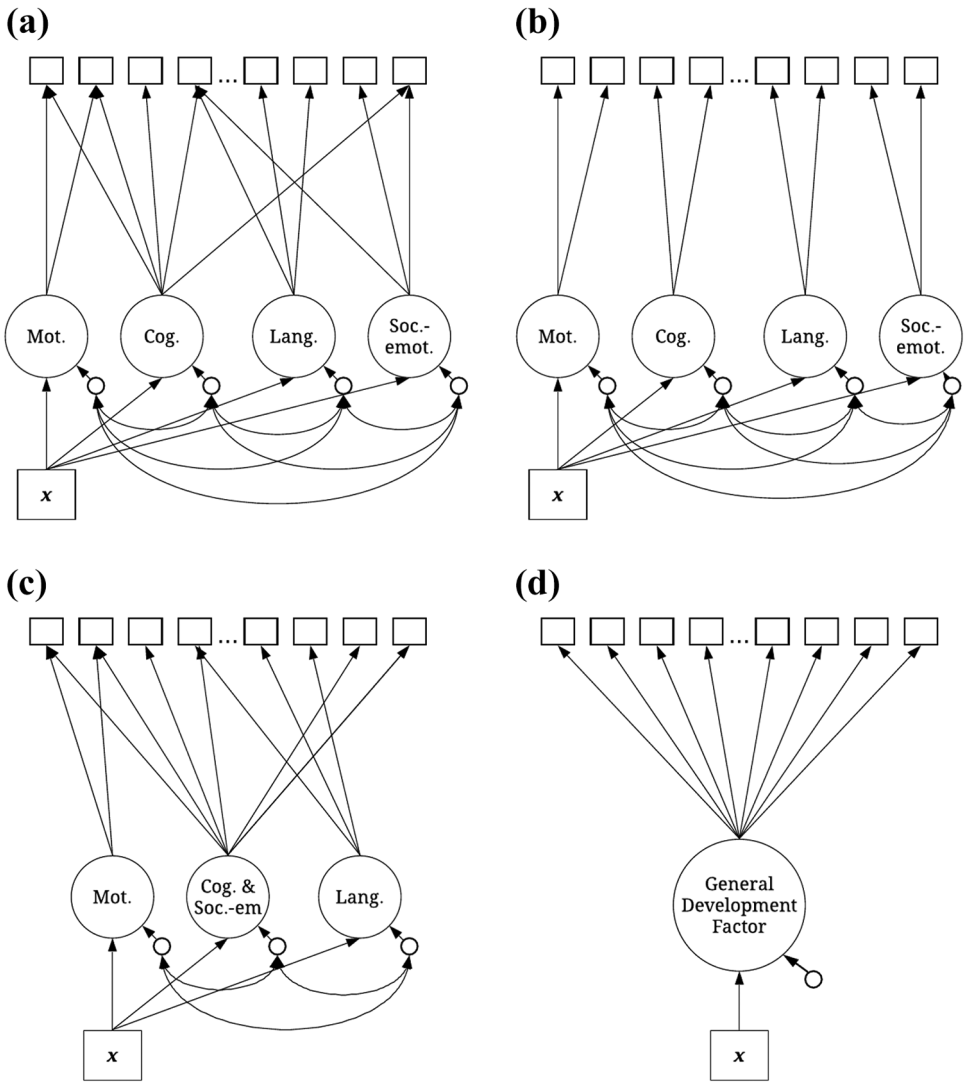

Figure 1. (a) Four-Factor IFA Model That Specifies Cross-Loadings; (b) Four-Factor IFA Model Without Cross-loadings; (c) Three-Factor IFA Model with the Factor Representing Cognitive and Socio-Emotional Skills Combined and with Cross-Loadings specified; (d) Single-Factor IFA Model.
Note. The predictor of each latent variable, ***x***, represents three covariates: A linear, a quadratic, and a cubic term for age, as well as site fixed effects.

domain of development so as to allow for cross-loadings. In other words, unlike what has been done in traditional ECD instruments that provide subscores (c.f. Bayley, 2006; Fernandes et al., 2014; Squires & Bricker, 2009), we specify cross-loadings and do not require that items are assigned to one and only one ECD domain. We hypothesized that specifying the presence of cross-loadings would better reflect the internal structure of the data because any given item may indicate children's development across several domains. This is especially likely in the first 3 years of development when children's observable behaviors often reflect multiple different skills and capacities. For example, most traditional measures of ECD claim infants' use of gestures (e.g., pointing, grabbing) as a "pure" representation of their language abilities, whereas it is likely that these behaviors also reflect skills in motor development (Bowman et al., 2018).

We tested three alternative loading specifications by varying the minimum number of expert votes required to freely estimate a loading across the factors (i.e., domains). These four-factor IFA models are visualized in Figure 1. In the first model (Model A.1), loadings were freely estimated if at least eight (of the 16) experts agreed that the item loaded on a domain. The second model (Model A.2) and third model (Model A.3) reduced the required number of votes to free a loading to six and four, respectively. We did not test less restrictive specifications, as freeing loadings with fewer than four votes led to convergence issues.

In all models, we relaxed the (unconditional) multidimensional normality assumption traditional in multidimensional IFA models because such an assumption is likely untenable. For example, we did not think it would be plausible to assume that motor subscale scores for all children aged 0–35 months would follow a symmetric distribution as would be implied by the traditional normality assumption. In other words, a symmetric assumption would imply that motor scores followed linear age gradients, whereas we expect nonlinear gradients with the fastest rate of change occurring early in development and then tapering with age. The result of a tapered age gradient would be a left-skewed marginal distribution of motor scores.

To accommodate nonlinear age gradients, all four factors were modeled with a linear, quadratic, and cubic function of age as

covariates. In this way, subscale scores were assumed to be multivariate normally distributed for children of the same age, even if the marginal distribution is not normally distributed. Intercepts were fixed to zero and residual variances were fixed to one for model identification. In addition, we included site fixed effects (with the sample from Jordan as the reference group) to account for planned missingness, as not all items were administered in all sites. (Items exhibited an average missingness rate of 50.3% and ranged from 14.6% to 76.9% across sites.) We employed maximum likelihood estimation, which assumes that data are missing at random conditional on the observed responses, age, and between site differences in factor scores. Analyses were conducted in Mplus Version 8.3 (Muthén & Muthén, 2017).

To minimize overfitting and maximize model-data consistency, we next pruned Models A.1–A.3, fitted using the loading specifications. In theory, after reverse-coding items (as appropriate), all items should be positively correlated with the specified developmental domain, implying that all loading estimates should result in positive values. In fitting the models, however, we encountered overfitting behaviors where negative loading estimates on one domain often accompanied unreasonably strong positive loading estimates on another domain. For a small subset of items, this undesirable compensating behavior was so severe when fitting Model A.3 that it led to convergence problems. We considered the instability induced by this compensation as an indication of overfitting to our sample because theory would suggest that all factor loadings in the population would be positive. Overfitting implies that the model is overly complex and does not optimize predictive fit to out-of-sample data compared to a more parsimonious model (c.f., Hastie et al., 2009). Thus, a current focus in measurement and structural equation modeling is developing methods to minimize overfit by reducing model complexity to improve the generalizability of inferences (e.g., Jacobucci et al., 2016). Our approach to reduce model complexity was to specify linear inequality constraints that required loading estimates to take on nonnegative values only. Loadings with estimates at the boundary of the constraint (i.e., equal to zero) were removed from consideration. We subsequently fit a model without specifying any constraints and removed any nonsignificant loadings to arrive at our final solution.

Next, we conducted likelihood ratio tests and compared information criteria for the three pruned models (Models A.1–A.3) to select a final model. After selecting the best fitting model, we assessed whether cross-loadings could be ignored by fitting a new four-factor IFA model (Model B diagrammed in Panel B of Figure 1) in which we assigned items to the factor corresponding to the most positive standardized loading from the final model best fitting model in Models A.1–A.3.

We evaluated the dimensionality of the data by assessing model fit of the best fitting of the IFA model with four factors (i.e., Model A or Model B, which include separate factors for motor, cognitive, language, and socio-emotional skills) compared to IFA models with fewer dimensions (Model C and Model D). In fitting Model A and Model B, we consistently found strong, positive residual correlations between the factors representing cognitive and socio-emotional skills (approximately $r = .80$). Consequently, we tested a model that combined these factors (Model C) compared to a four-factor solution. Next, we tested whether a four-factor solution fits better than a unidimensional model (Model D) specified with a single factor representing one general ECD construct. If the data support a model specified with four factors, then we would expect that the best fitting four-factor solution (Model A or Model B) would fit better than the three-factor solution (Model C) and the unidimensional model (Model D).

Criterion-Related Validity

Following the recommendations of the *Standards*, we assessed the criterion-related validity evidence by evaluating whether the relations of subscores with other measures and known correlates of children's development are consistent with theory. We studied the correlations between CREDI scores with anthropometric data and household stimulation measures because these variables have been shown to predict children's development (Sudfeld et al., 2015; Walker et al., 2011). Additionally, associations between the CREDI subscores and scores from concurrent ECD measures obtained from a subsample of participants were also studied to investigate convergent and discriminant relations. Local collaborators within the data collection sites selected concurrent measures based on children's age and cultural appropriateness and included (1) the ASQ Social-Emotional (ASQ: SE; Squires et al., 2002) collected from 234 Chilean children, (2) the BSID-III, collected from 1,036 Tanzanian children, (3) the INTER-NDA, collected from 921 Zambian children, (4) the MacArthur-Bates CDI collected from 180 Chilean children, and (5) the PRIDI, collected from 598 Brazilian children from 2 to 3 years old. Online Supplemental Appendix Table 1 presents a brief description of each instrument. In analyzing convergent and discriminant validity, we calculated partial correlations using polynomial regression to control for the strong confounding effect of age; we also controlled for between-site differences in scores by specifying fixed effects in the regression model.

We collected anthropometric and household stimulation data for 8,925 children in seven countries. HAZ scores (height-for-age or length-for-age *z*-scores for children less than 24 months) were calculated using the WHO child growth standards (Onis, 2006). Child stimulation was measured following UNICEF guidelines (2014), totaling the number of adult–child activities as reported by the main caregiver, including reading, telling stories, singing songs, taking outside the child, playing, and naming, counting, or drawing objects.

Reliability

We tested two forms of reliability in this study. First, we examined the stability of scores (i.e., test–retest reliability) using data collected from 575 caregivers in Guatemala, Jordan, and Lebanon, who completed the CREDI twice over a 7- to 10-day administration period. We calculated interclass correlation coefficients (ICCs) to measure the stability of scaled scores. We fit a one-way random effects analysis of variance to estimate the intraclass coefficient 1, or ICC(1). We chose the one-way random effects model over two-way alternatives because the one-way model measures the absolute agreement between scores across the two points in time by estimating the correlation between time points (McGraw & Wong, 1996).

Second, we analyzed internal-consistency reliability by studying pairwise tetrachoric correlations and by calculating Cronbach's α values. We relied on Cronbach's α statistics rather than coefficient omega statistics because the latter assumes unidimensionality (see Bandalos, 2018, p. 395) which is not amenable to the multidimensional measurement approach we adopted in this study. Specifically, for each domain, we evaluated separate Cronbach's α values for children aged 0–11 months, 12–23 months, and 24–35 months. We note that reporting a single α value across all

ages is not appropriate because item responses are so highly correlated with age. Consequently, a single value would suggest greater precision of the instrument than warranted when an important goal of the instrument is to discriminate among children of the same age.

Fairness

We investigated measurement noninvariance by studying whether there is evidence of test-level bias in scores across (a) high, (b) middle-high, and (c) low country income groups, as indicated by differential test functioning. We used only data from the fourth and last round of pilot testing, when the administration of the CREDI most resembled its current form. Thus, the total sample size for assessing invariance was $N = 6{,}545$ caregivers.

In the present study, we conducted pairwise tests comparing differential test functioning across each income group, separately by domain (i.e., motor, cognition, etc.). We used the simulation procedure advanced by Chalmers' et al. (2016) to form a sampling distribution for the unsigned differential test functioning (uDTF) statistic to conduct significance testing. The uDTF is interpreted as the average absolute difference in predicted total scores given children's position on the scale for a particular domain (e.g., motor, cognition, etc.), where we used the maximum-a-posteriori factor scores to approximate a child's position on the scale. As an absolute difference, the uDTF is a conservative statistic and represents an upper bound in measuring differential test functioning. If the estimated uDTF statistic is statistically significant, such evidence suggests that abilities differentially predict item response patterns and may indicate possible test-level bias. Relying on Stark et al.'s (2004) proposed Cohen's *d*, we analyzed the substantive size of the uDTF to ascertain whether evidence of bias is practically important,

$$d = \frac{\widehat{\text{uDTF}}}{s_x}, \tag{1}$$

where $\widehat{\text{uDTF}}$ is the estimate for the unsigned differential test functioning statistic and s_X is the standard deviation of observed total scores. The Online Supplemental Material contains technical details on our testing procedure for evaluating differential test functioning.

Results

Construct Validity

Of the 110 initial CREDI items, 108 items exhibited positive loadings on at least one domain across the three initial loading specifications discussed in the Measures and Methods section and outlined in Panel A of Figure 1 (Models A.1–A.3). The two items that did not exhibit a positive loading under any of the considered specifications included (1) "Does the child often cry for no reason (e.g., when he/she is not hungry or tired)?" (reverse coded), and (2) "Does the child cry or whine when he/she is made to wait for something he/she wants (e.g., toy or food)?" (reverse coded). These items were subsequently removed when fitting pruned versions of Model A.1–A.3. Likelihood ratio tests suggested that the more stringent eight-vote threshold (Model A.1) and six-vote threshold (Model A.2) for specifying cross-loadings resulted in a decrement in model fit relative to the less strict four-vote model (Model A.1 vs. Model A.3: $\chi^2(18) = 3{,}999.64$, $p < .001$; Model A.2 vs. Model A.3: $\chi^2(7) = 1{,}425.28$, $p < .001$).

Relative to Model A.3, likelihood ratio tests also identified a significant decrement in model fit if cross-loadings were not specified (Model B vs. Model A.3: $\chi^2(26) = 2{,}106.30$, $p < .001$), if a three-factor solution was employed by combining the factors representing cognitive and socio-emotional skills (Model C vs. Model A.3: $\chi^2(81) = 16{,}388.35$, $p < .001$), or if a unidimensional model (Model D) was utilized (Model D vs. Model A.3: $\chi^2(100) = 15{,}106.78$, $p < .001$). Combined with the fact that Model A.3 also minimized both the Akaike information criteria (AIC) and the Bayesian information criteria (BIC) across all fitted models (see Table 2), the data therefore suggest a four-factor model with cross-loadings maximizes model-data consistency. Thus, we selected Model A.3 as the final model for the CREDI long form. Observed loading patterns are reported in Table 3, and Online Supplemental Appendix Table 2 reports standardized factor loading estimates for this final model (Model A.3); unstandardized factor loadings and threshold estimates are provided in Online Supplemental Table 1).

The correlations among the residuals of the motor, cognitive, language, and socio-emotional factors from the final model (Model A.3) suggest that the factors themselves displayed adequate discrimination to justify a four-factor solution. Except for the residual between the factors representing cognitive and socio-emotional skill ($r = .81$ $p < .001$), these values ranged from $r = .49$ ($p < .001$) between language and socio-emotional skills to $r = .67$ ($p < .001$) between motor and cognitive skills. Children's scores on one factor most often explained less than half the variance in scores on a separate factor, holding age constant and controlling for mean differences in scores between sites.

Criterion-Related Validity

For each of the four ECD domains, we found evidence of criterion-related validity. The partial correlation between HAZ and CREDI subscores ranged from $r = .16$ ($p < .001$) to $r = .20$ ($p < .001$). These partial correlations were similar to or larger than those observed between HAZ and scores from concurrent ECD instruments in this sample. Similarly, CREDI subscale scores were positively associated with child stimulation, with partial correlations ranging from $r = .21$ ($p < .001$) to $r = .25$ ($p < .001$). As observed with HAZ, CREDI subscale scores were more positively correlated with stimulation than scores from the previously established ECD measures (although we recognize that this may be in part a function of same-reporter bias). Finally, CREDI subscale scores were positively associated with the PRIDI scores (a composite measure of overall development) in Brazil, and partial correlations ranged from $r = .37$ ($p < .001$) to $r = .47$ ($p < .001$).

We also found that convergent and discriminant relations between CREDI motor and languages subscales with subscores from alternative ECD measures generally matched that expected by theory. Partial correlations with CREDI motor scores were strongest for gross motor scores from the BSID-III ($r = .26$, $p < .001$) and from the INTER-NDA ($r = .50$, $p < .001$) but were also positively associated with fine motor skills (BSID-III: $r = .22$, $p < .001$; INTER-NDA: $r = .18$, $p < .001$). Partial correlations with language, cognitive, and socio-emotional scores from these alternative measures ranged from $r = .12$ ($p < .001$) to $r = .24$ ($p < .001$) for the BSID-III scores and from $r = .16$ ($p < .001$) to $r = .34$ ($p < .001$) for the INTER-NDA scores.

Table 3. Observed Loading Patterns From the Best-Fitting Model (Model A.3).

	Motor	Cognitive	Language	Soc.-emo.	# Items
1	✓	—	—	—	35
2	✓	✓	—	—	5
3	—	✓	—	—	10
4	—	✓	✓	—	13
5	—	✓	—	✓	4
6	—	—	✓	—	22
7	—	—	✓	✓	4
8	—	—	—	✓	15
Total	40	32	39	23	

Note. ✓ indicates positive and significant loading estimate.

CREDI language scores displayed similar convergent and discriminant validity evidence. Language scores exhibited strong, positive partial correlations with the MacArthur–Bates CDI ($r = .60$, $p < .001$), with expressive language scores from the BSID-III ($r = .26$, $p < .001$), and with expressive language scores from the INTER-NDA ($r = .42$, $p < .001$). In contrast, scores from other ECD domains were less positively correlated with CREDI language scores and were found to range from $r = .12$ ($p < .001$) with BSID-III's socio-emotional scores to $r = .40$ ($p < .001$) with INTER-NDA's gross motor skills. CREDI language scores also exhibited positive partial correlations with receptive language measures (BSID-III: $r = .14$, $p < .001$; INTER-NDA: $r = .20$, $p < .001$). In summary, the CREDI language subscale displayed evidence of both convergent validity and discriminant validity, especially as it relates to expressive language subscales from alternative instruments.

Moreover, positive partial correlations with concurrent cognitive and socio-emotional subscales provided evidence for convergent validity; however, there was less evidence for discriminant validity. As expected, CREDI cognitive and socio-emotional scores exhibited positive partial correlations with equivalent subscales from the BSID-III (cognitive: $r = .17$, $p < .001$; socio-emotional: $r = .13$, $p < .001$), the INTER-NDA (cognitive: $r = .25$, $p < .001$), and the ASQ: SE (socio-emotional: $r = .31$, $p < .001$). However, CREDI cognitive scores exhibited even more positive partial correlations with concurrent expressive language scores (BSID-III: $r = .25$, $p < .001$; INTER-NDA: $r = .36$, $p < .001$). Likewise, for children of the same age, CREDI socio-emotional scores were more positively correlated with language scores from the BSID-III (receptive: $r = .15$, $p < .001$; expressive: $r = .24$, $p < .001$), while ASQ: SE scores were most positively correlated with CREDI cognitive scores ($r = .33$, $p < .001$). In summary, although we found evidence that CREDI cognitive and socio-emotional scores were positively correlated with measures from alternative instruments, we did not find that these scores were most correlated with concurrent cognitive and socio-emotional measures. We provide a possible explanation for this in our Discussion. Online Supplemental Appendix Table 3 contains a table of partial correlations all measures.

Reliability

Moderate-to-strong correlations between scores provided evidence of test–retest reliability. The ICC(1) model ranged between .70 and .81 across the domains (Motor: ICC(1) = .81, 95% CI [.76, .85]; Cognitive: ICC(1) = .79, 95% CI [.74, .83]; Language: ICC(1) = .70, 95% CI [.63, .76]; Socio-emotional: ICC(1) = .78, 95% CI [.73, .83]). These ICC(1) values indicate moderate levels of stability over time for language scores and good levels of stability for the other domains (Koo & Li, 2016).

Table 4. Cronbach's α Values Observed Across Age Groups and ECD Domain.

Age (months)	Motor	Cognitive	Language	Socio-emotional
0–11	0.94	0.88	0.86	0.70
12–23	0.85	0.85	0.92	0.70
24–35	0.74	0.80	0.90	0.64

Strong pairwise tetrachoric correlations and acceptable Cronbach's α values provide evidence of internal-consistency reliability within each of the four domains. Tetrachoric correlations were all positive and averaged around .80 within each domain (Motor: $M = .78$, $SD = .12$; Cognitive: $M = .80$, $SD = .12$; Language: $M = .78$, $SD = .12$; Socio-emotional: $M = .81$, $SD = .14$).

We also found that the Cronbach's α values ranged between .64 and .94 across the four domains and three age-groups (see Table 4). Internal consistency was slightly lower for the socio-emotional subscale relative to the other ECD domains, which is perhaps not surprising given the diversity of socio-emotional skills included (e.g., emotion knowledge, self-regulation, social competence, etc.).

Fairness

For the motor, language, and socio-emotional domains, we found evidence of statistically significant, but substantively small levels of differential test functioning when comparing scores across country income groups (Table 5). uDTF effect sizes in the motor, language, and socio-emotional domains ranged from $d = 0.04$ (Language, high- vs. middle-high income groups: Est. = 0.33, $p = .206$) to $d = 0.09$ (Socio-emotional, high- vs. middle-high income groups: Est. = 0.39, $p < .001$). These effect sizes are universally accepted as small in substantive size (c.f., Cohen, 1988). The small levels of observed differential test functioning indicate that the statistically significant findings of differential test functioning are artifacts of the large sample size ($N = 6{,}545$), but likely do not suggest that test-level bias threatens the validity of inferences regarding children's development when comparing across country income groups.

Notably, cognitive scores demonstrated the strongest uDTF effect sizes, with the uDTF strongest between middle-high versus low-income countries and taking on a value of $d = 0.18$ (Est. = 1.06, $p < .001$). Although such a values arguably classifies the differential test functioning as moderate rather than small, we note that the uDTF statistic is a conservative statistic and likely overestimates the amount of differential functioning that would change conclusions when comparing scores across income groups.

Discussion

In this article, we have used a large ($N = 14{,}113$), multicountry and multicultural sample to assess the validity evidence for the motor, language, cognitive, and socio-emotional subscales for the long form of the CREDI. We found sufficient evidence to justify a four-factor solution, as well as acceptable internal-consistency

Table 5. Unsigned Differential Test Functioning (uDTF) by Country Income Group Comparison Across ECD Domains.

	High vs. low income			High- vs. middle-high income			Middle-high vs. low income		
	Est.	*d*	*p*	Est.	*d*	*p*	Est.	*d*	*p*
Motor	0.42	0.06	<.001	0.48	0.07	<.001	0.36	0.05	<.001
Cognition	0.62	0.11	<.001	0.48	0.08	<.001	1.06	0.18	<.001
Language	0.44	0.05	<.001	0.33	0.04	.206	0.51	0.06	.736
Socio-emotional	0.28	0.07	<.001	0.36	0.09	<.001	0.26	0.07	<.001

reliability and test–retest reliability. We also found evidence of concurrent validity, although the adjusted CREDI cognitive and socio-emotional scores were more strongly correlated with concurrent scores representing nonequivalent domains than concurrent scores representing the same domain. Regarding the cognitive domain, CREDI scores were more strongly correlated with concurrent expressive language scores than they were with concurrent cognition scores. Although it may seem that the factor representing cognition is more accurately a measure for a language construct, we believe this explanation is unlikely. If adjusted CREDI cognitive scores represented a language construct, then we would expect an unusually strong residual correlation between the cognitive and language domains from Model A.3. Although there was a moderate-to-strong residual correlation between the cognitive and language factors ($r = .62$, $p < .001$), this association was weaker than the corresponding residual correlation between the cognitive and motor factors ($r = .67$, $p < .001$).

An alternative explanation is perhaps that concurrent measures of cognitive and expressive language development in young children (e.g., the BSID-III, INTER-NDA) have not allowed for items to load on multiple domains. As a result, these measures may be confounding cognitive and language development in ways that inflate their expressive language subscales relative to the CREDI cognitive subscale. Conceptually, indicators of expressive language (in the CREDI and in the concurrent measures) often tap into children's latent cognitive abilities through asking children to describe complex constructs or explain (i.e., make sense of) situations. In fact, of the 44 items that loaded on the factors representing cognition or language, greater than one third (15 items) loaded on both factors simultaneously. Moving forward, additional work is needed to better understand the relations between these complex constructs and to identify more precise ways to operationalize them in distinct ways.

The weak discriminant validity evidence for CREDI's socio-emotional subscale is unsurprising. Socio-emotional development is an extremely broad construct encompassing a highly diverse set of skills ranging from getting along with others (social competence) to inhibiting impulsive behavior (self-regulation) to identifying and responding to emotions (emotion knowledge; Jones et al., 2016). Accordingly, it is no surprise that the socio-emotional measures from the BSID-III, ASQ: SE, and CREDI all focus on different facets of socio-emotional development, complicating comparisons of these scales. The BSID-III and ASQ: SE tend to emphasize adaptive behaviors (e.g., sleep, behavior during mealtimes), whereas the CREDI does not emphasize these behaviors. Further research extricating and incorporating the distinct constructs that comprise socio-emotional development will be needed.

The evidence suggesting unsubstantial levels of differential test functioning in the motor, language, and socio-emotional domains is encouraging as it is suggestive that item-level measurement invariance is likely not acting systemically in one direction so as to bias conclusions when comparing mean differences in scores across country income groups. However, researchers using the CREDI scores proceed cautiously in comparing scores across populations for several reasons. The present study only evaluated evidence of measurement invariance across country income groups. Therefore, we cannot establish whether measurement noninvariance would invalidate conclusions if comparing populations defined by some other set criteria; future research should examine whether there is evidence of differential test functioning across alternatively defined populations. Meanwhile, we encourage users of the CREDI to acknowledge that conclusions may be dependent on the assumption of especially important, given the finding that the size of the uDTF for cognitive scores arguably does designate it as substantively small. It is difficult to project the implications of this finding in practice because we remain unaware of guidance in the literature for when the substantive size of the uDTF designates it as concerning and jeopardizes the validity of conclusions. Future methodological research should focus on providing such guidance.

Although our findings suggest favorable evidence for construct validity of the subscales, we have developed using CREDI's long form, potential users should consider several limitations. Our culturally and linguistically diverse sample was obtained by convenience and not necessarily representative of any stringently defined global population. Thus, next steps include defining a target population, then obtaining representative samples from this target.

More evidence is also needed to firmly establish criterion-related validity. Longitudinal data would provide predictive validity evidence using distal outcomes, including school readiness, academic performance, and later mental health and emotional well-being. Given that we found differential test functioning for the motor domain, researchers should be cautious when comparing mean differences in motor scores across countries. Future work should focus on identifying the sources of this differential functioning and investigate item-level measurement noninvariance. Lastly, the CREDI subscales measure aspects of ECD that are shared across cultures, but they are not designed to meaningfully capture important phenomena measured by culturally specific instruments. Moving forward, we strongly recommend that researchers pair the CREDI with direct assessments that can target culturally specific processes while mitigating bias (e.g., social desirability) associated with caregiver report.

We also found that items frequently measured multiple domains simultaneously and that specifying cross-loadings resulted in improved model-data consistency. To assist in scoring in the presence of cross-loadings, we provide users with a web-based scoring application. Users can access all resources at the CREDI website: https://sites.sph.harvard.edu/credi/. Cross-loadings are consistent with developmental theory in that children's observable behavior often requires the recruitment of skills from multiple domains,

especially early in life. Yet, to our knowledge, existing ECD instruments ignore item-level multidimensionality, as items are typically assigned to a single developmental domain during the calculation of subscores. Our findings indicate that such practices may result in a misspecified measurement model. Future research should examine whether conclusions about children's development are sensitive to such misspecification, as would by hypothesized by previous simulation studies (c.f., Curran, 1994).

In conclusion, we have shown that scores from the CREDI long form demonstrate evidence of construct and criterion-related validity and are sufficiently precise for population measurement purposes. The CREDI long form is designed to be globally relevant and applicable across cultures. As a self-report measure, the CREDI long form is efficient to implement and can be used in public policies to monitor child development and to assess interventions, with the goal of improving outcomes of children around the world. Toward this end, recent research suggests that the simple act of interviewing caregivers in measuring their children's development may itself help caregivers become more aware of and attentive to their children's milestone attainment and behaviors (Altafim et al., 2020).

Authors' note

CREDI Field Team comprised of (in alphabetical order) Elisa Altafim, Alexandra Brentani, Andreana Castellanos, Alexandra Chen, Anne Marie Chomat, Wafaie Fawzi, Cristina Gutierrez de Piñeres, Jena Hamadani, Natalia Henao, Pamela Jervis, Codie Kane, Jeffrey Measelle, Patricia Medrano, Lauren Pisani, Muneera Rasheed, Peter C. Rockers, Jonathan Seiden, Christopher R. Sudfeld, Fahmida Tofail, Christine Wong, Dorianne Wright, and Aisha K. Yousafzai.

Acknowledgments

The authors would like to acknowledge the intellectual contributions of the CREDI Advisory Panel members and our data collection partners. The authors thank the thousands of children and caregivers who participated in this research. Finally, that authors are also grateful to Katherine Masyn for her insights and suggestions and for generously sharing her computational resources so that the authors could make progress in a timely manner.

Author contributions

Marcus Waldman conceptualized the validity study, designed the methodological approach, conducted the psychometric analysis, wrote the initial draft, and approved the final manuscript. Dana Charles McCoy assisted in the design of the study, conducted preliminary statistical analysis, developed the data collection instruments, reviewed and revised drafts, and approved the final manuscript. The CREDI Field Team assisted in the development of data collection instruments, conducted all data collection, reviewed and revised drafts, and approved the final manuscript. Günther Fink assisted in the design of the study, conducted preliminary statistical analysis, developed portions of the data collection instruments, led the study sampling, reviewed and revised drafts, and approved the final manuscript. Jonathan Seiden and Jorge Cuartas assisted with the statistical analysis, reviewed and revised drafts, and approved the final manuscript.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The authors would like to acknowledge funding and support provided by the Saving Brains Program from Grand Challenges Canada (Grant Number 0073-03).

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Supplemental Material

Supplemental material for this article is available online.

Note

1. This figure differs from the analytic sample size in McCoy et al. (2018) because we did not require that at least 75% of the items were observed (not missing) to remain included in the sample.

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