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ORIGINAL ARTICLE

Children's Prosocial Resilience in the Face of Adversity: the Role of Narrative Coherence

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Abstract

Childhood adversity undermines children's positive adaptation, including engagement in prosocial behaviors that benefit others. However, children's capacity to make meaning of challenging experiences in a balanced and organized manner (i.e., narrative coherence) may contribute to better-than-expected psychosocial outcomes in the context of adversity. This multi-informant longitudinal study tested whether children's narrative coherence at age 6 predicted better-than-expected prosocial outcomes at age 8 in the wake of early childhood adversity exposure from birth to age 4 (i.e., prosocial resilience) in a sample of 250 children (50% female sex assigned at birth, 46% Latine). Using a standardized residual approach, children's narrative coherence predicted better-than-expected prosocial outcomes relative to the overarching negative effect of early childhood adversity on prosocial behavior in middle childhood. This study suggests that children's ability to process difficult life events in a way that is balanced, accurate, and open to modification contributes to their prosocial resilience in the wake of early adversity.

Keywords Adversity · Narrative coherence · Prosocial behavior · Resilience

Over the past several decades, researchers have shown increased interest in the diversity of adaptive responses to experiences of adversity. Although evidence suggests that adversity undermines the development of prosocial behavior (i.e., behavior intended to benefit others; e.g., Kaufman & Cicchetti, 1989; Koenig et al., 2004), less is known about why these behavioral effects are more or less pronounced across children. Moreover, recent theoretical investigations point to the potentially promotive impact of adversity on prosocial behavior (Staub & Vollhardt, 2008; Vollhardt, 2009), as supported by empirical evidence showing that the impact of adversity on prosocial behavior is not uniformly negative (e.g., Qin et al., 2016; Taylor & Hanna, 2018). That said, only a handful of studies have sought to understand why some children exhibit better-than-expected prosocial outcomes in the wake of early childhood exposure to adversity (e.g., Greenberg et al., 2018; Qin et al., 2016).

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Narrative Meaning-Making in the Wake of Adversity

The manner in which children make meaning of their difficult life experiences may contribute to differential expressions of prosocial resilience following adversity (Frankl, 1985). Narrative coherence refers to children's ability to construct storylines about difficult life events that are meaningful to both themselves and their listener(s), in a way that is balanced, accurate, and flexible (i.e., open to modification; Hesse, 2008; Hudson & Shapiro, 1991). Coherent narratives are logical and consistent, address and resolve the core emotional conflict of the situation, and consider both positive and negative aspects of interpersonal relationships. These narrative features reflect and are engendered by the narrator's willingness and ability to think and talk through difficult life events without becoming overwhelmed (Oppenheim, 2006; Sher-Censor et al., 2013). Narrative coherence may be especially important for adversity-exposed children because the capacity to talk meaningfully about one's experiences enables children to share difficult feelings with others in ways that support the co-regulation of emotions that may be too overwhelming for a child to manage alone (Macaulay & Angus, 2019). For this reason, narratives have

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become a key component of therapeutic interventions aimed at mitigating the effects of trauma and adversity (J. A. Cohen et al., 2011; Knutsen & Jensen, 2019).

Narrative meaning making not only allows children to understand their own experiences, but also supports their emotion understanding and capacity to empathize with others (Berzenski & Yates, 2017), which, in turn, engenders prosocial behavior (Laible et al., 2004; Spinrad & Gal, 2018). Children who show a capacity for narrative coherence may be more likely to approach and assist those in distress because they are confident that the negative emotions of themselves and others will not become overwhelming (Oppenheim et al., 1997). Likewise, the capacity for flexibility that is integral to the modifiability and updating of coherent narratives may equip children with confidence that their actions can alter another's negative experiences. Indeed, Berzenski and Yates (2017) found that narrative coherence predicts gains in children's emotion knowledge across time, and experimental evidence demonstrates that increases in emotion knowledge accompany increases in prosocial behavior (Ornaghi et al., 2017). Importantly, resilience may manifest in a variety of ways (Masten & Obradović, 2006), such that some individuals may report positive psychological changes following adverse experiences (e.g., spiritual growth; Ogletree & Blieszner, 2022), others may demonstrate positive behaviors (e.g., prosocial behavior; Bell et al., 2013), and still others may avoid psychological or behavioral problems in the wake of adversity (e.g., depression, conduct problems; Poole et al., 2017; Supplee et al., 2007). Although several studies have examined the role of narrative coherence in psychological resilience (Richardson & Yates, 2014; Toth et al., 2000), the current study is among the first to examine the role of narrative coherence in behavioral resilience.

Adversity and Prosocial Behavior

Historically, researchers have focused on the negative consequences of adverse life experiences, documenting deleterious effects of adversity on psychological (Afifi et al., 2011), cognitive (Quach et al., 2017), physical (Kalmakis & Chandler, 2015), and behavioral (Kerig & Becker, 2015) adjustment. As compared to abundant research on expressions of negative adjustment in the wake of adversity, fewer studies have examined if and how adverse life events may undermine expressions of competence (Masten, 2015). Consistent with this pattern, studies examining the behavioral consequences of adversity have focused on the presence of behavior problems, such as aggression (Beck & Shaw, 2005; Criss et al., 2002) and impulsivity (Lovallo, 2013), rather than on the absence of positive behaviors, such as prosocial behavior. In recent years, however, researchers have considered opportunities for growth in the midst of adversity (Calhoun & Tedeschi, 2006). Staub and Vollhardt (2008) provide a theoretical framework (i.e., Altruism Born of Suffering) for understanding positive behavioral change following adverse life experiences. They suggest that difficult life experiences may sensitize and motivate individuals to act with compassion on behalf of others and posit that individual differences in executive functioning and emotion regulation may inspire actions to help others following adverse life events. The current study builds on this theoretical model by considering meaning-making as another construct undergirding prosocial behavior following adversity.

Although a handful of studies suggest that some types of adversity, particularly natural disasters, can promote prosocial behavior (Alanzi et al., 2023; Qin et al., 2016; Rodriguez et al., 2006), most theory and research suggests that adverse life experiences undermine prosocial development and its correlates. Emotion knowledge (Spinrad & Gal, 2018), self-regulation (Coulombe et al., 2019), and empathy (Paulus et al., 2020) all support children's prosocial behavioral expressions, yet all are threatened by adverse life experiences (Milojevich et al., 2021; Music, 2011; Quas et al., 2017). Children may cope with traumatic events by numbing or restricting their subjective experience of emotion (Frewen & Lanius, 2006; Kerig et al., 2012). This pattern may persist even after the stressor has resolved (Weems et al., 2003) in ways that constrain emergent capacities for emotion recognition and engagement, which are required to execute prosocial behaviors (Coulombe et al., 2019; Spinrad & Gal, 2018; Xu et al., 2012). Given that nearly two-thirds of children worldwide have experienced at least one adverse life event (Carlson et al., 2020), understanding the behavioral implications of adversity in childhood is crucial. However, mixed evidence on this topic to date highlights the importance of identifying and understanding predictors of individual differences in the association between adversity and children's behavioral resilience (e.g., prosocial behavior).

The Current Study

Although a wealth of evidence documents the deleterious impact of adversity on adaptation broadly (for a review, see Anda et al., 2006), and on prosocial behavior specifically (e.g., Kaufman & Cicchetti, 1989; Music, 2011), recent efforts to understand the full spectrum of responses to adversity point to potential promotive effects of adversity on prosocial development (Vollhardt, 2009), at least in some cases. Adopting a strength-based approach, this study sought to (a) examine the association between early life adversity and children's prosocial behavior and (b) assess the role of children's narrative coherence as a potential predictor of individual differences in children's prosocial behavior in the wake of adversity. Despite some

mixed evidence regarding adverse life events and prosocial behavior (Alanzi et al., 2023; Qin et al., 2016; Rodriguez et al., 2006), most prior theory and research suggest that adverse life experiences undermine positive development (Milojevich et al., 2021; Music, 2011; Quas et al., 2017). Thus, we hypothesized that early life adversity exposure from birth to age 4 would predict lower levels of prosocial behavior at age 8 beyond prior levels. That said, we also hypothesized that children's capacities to form coherent narratives about emotionally charged interpersonal events would contribute to better-than-expected prosocial outcomes (i.e., resilience) in the wake of early life adversity.

The current analyses held empirically supported covariates constant, including child sex assigned at birth, child ethnicity, family socioeconomic status (SES), child IQ, and prior prosocial behavior. Although actual gender differences in prosocial behavior may be weak (Xiao et al., 2019), girls are frequently rated by informants as more prosocial than boys (for a review, see Hastings et al., 2007). Likewise, although empirical investigations on differences in prosocial responding between Latine and non-Latine children are limited, traditional Latine values, such as *respeto* and *familism*, emphasize and encourage Latine children's expression of prosocial behavior (for a review, see Carlo et al., 2014). Evidence regarding family SES and prosocial behavior is mixed, with some studies finding positive relations between SES and prosocial behavior (Benenson et al., 2007), but others showing higher rates of prosocial behavior among children from low SES families (Piff et al., 2010). Finally, IQ is a relevant predictor of both narrative coherence (Grey & Yates, 2014) and prosocial behavior (Han et al., 2012).

The current investigation expands our understanding of resilience and child development in several ways. First, we focus on individual differences in positive behavioral expressions (i.e., prosocial actions to benefit others), rather than on negative behavioral expressions, such as antisocial or delinquent behaviors, which have dominated extant research. Second, we consider narrative coherence as a potential predictor of individual differences in prosocial outcomes following experiences of adversity in early childhood. Finally, we draw on multiple informants and methods from an ongoing longitudinal study of child development to support our understanding of prosocial resilience across the crucial transition to formal schooling while controlling for prior levels of prosocial behavior and other relevant covariates (i.e., child sex assigned at birth, ethnicity, SES, IQ). We focus on the transition to formal schooling given the special and cascading significance of childhood prosocial behavior for later adaptation. For example, prior research demonstrates that prosocial children are more likely to build positive relationships with teachers that, in turn, promote children's academic achievement and mental health (Coulombe & Yates, 2018).

Method

Participants

Participants were drawn from an ongoing longitudinal study of development among 250 child–caregiver dyads. Caregivers and children completed assessments when the children were 4 ($N = 250$, $M_{age} = 4.085$ years, $SD = 0.249$), 6 ($N = 215$, $M_{age} = 6.106$ years, $SD = 0.21$), and 8 years old ($N = 215$, $M_{age} = 8.123$ years, $SD = 0.230$). Teachers provided reports on children's prosocial behavior in the classroom following the assessments at ages 6 ($N = 158$; 63.2%) and 8 ($N = 142$; 58.6%). Across assessments, 223 (89.2%) families completed two or more visits. Children were diverse with regard to sex assigned at birth (50% females, 50% males) and ethnicity-race (46% Latine, 24.4% multiethnic-racial, 18% Black, 11.2% white, 0.4% Asian), and were representative of the southern California community from which they were drawn (U.S. Census Bureau, 2008). Caregivers were biological mothers (91.4%), foster and adoptive mothers (3.6%), and grandmothers or other kin (5.0%).

Procedures

Caregivers were recruited to participate in a longitudinal study of children's early learning and development via flyers placed in community childcare centers. Exclusionary criteria included children diagnosed with developmental disabilities or delays ($n = 3$), children who were unable to understand English ($n = 4$), and children who were outside the recruitment age of 45–54 months (not tracked). At ages 4, 6, and 8, dyads completed comprehensive laboratory assessments which included both questionnaires and observational tasks. Caregivers were compensated at a rate of $25 per hour of assessment, and children received a small gift for their participation after each visit. Informed consent was obtained from the child's legal guardian and verbal assent was collected from each child beginning at age 8. A minimum of 1 month following each assessment, a packet of questionnaires was mailed to the child's primary school teacher. Teachers were compensated with a $20 gift card upon return of the questionnaires. All procedures were approved by the human research review board of the participating university.

Measures

Early Life Adversity

At age 4, parents reported on children's lifetime exposure to biological (e.g., premature delivery, asthma), environmental (e.g., residential mobility, crowding), and relational (e.g., parental loss, maltreatment) adverse life events during

a semi-structured face-to-face interview. Ten biological adversities were evaluated in a health interview that covered prenatal factors (e.g., prenatal substance exposure), delivery (e.g., birth complications), and child health during infancy and early childhood. Nine environmental adversities were evaluated based on caregiver reports of household income, housing experiences (e.g., homelessness), neighborhood crime, and sociodemographic neighborhood risk indicators (e.g., vacant homes; U.S. Census Bureau, 2008). Fourteen relational adversities (e.g., parental incarceration, maltreatment) were assessed via caregiver reports on the Early Trauma Inventory (Bremner et al., 2000).

Two trained coders who were naïve to all other information about the family coded the presence and severity of each adverse life event from 0 (*no exposure*), to 1 (*mild exposure*), to 2 (*moderate exposure*), to 3 (*severe exposure*) based on established guidelines (see Bridgewater et al., 2023 for a full description of the adversity coding). Coder discrepancies were resolved through consensus meetings and reliabilities were evaluated based on average/consensus score intraclass correlations (ICC). Severity ratings were standardized and composited within biological (ICC = 0.953), environmental (ICC = 0.883), and relational (ICC = 0.927) subtypes, then combined across domains to yield an overall index of the severity of the child's lifetime adversity exposure from birth to age 4 with higher scores representing more severe adversity exposure.

Prosocial Behavior

Children's primary school teacher evaluated their prosocial behavior following the laboratory assessments at ages 6 and 8 using the 5-item prosocial subscale of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997). Teachers reported how true each statement was for the target child (e.g., *this child shares readily with other children, for example toys, treats, pencils*; $\alpha_{age\ 6} = 0.896$, $\alpha_{age\ 8} = 0.913$) on a scale from 1 (*never true*) to 5 (*always true*), where higher scores indicated more prosocial behavior. The SDQ is a well-validated measure of prosocial behavior that demonstrates strong reliability and validity for children from the preschool years (Croft et al., 2015) through adolescence (Van Roy et al., 2008) and in children of varying genders (Mieloo et al., 2012) and ethnic-racial backgrounds (Mieloo et al., 2014).

Narrative Coherence

During the age 6 assessment, children completed the MacArthur Story Stem Battery (Emde et al., 2003) wherein they were asked to finish a series of story stems about parental discipline, child injury, parental conflict, parental separation, parental reunion, and parental comfort using a "family" of toy bunny rabbits from the Calico Critters doll collection. Examiners initiated each story using standardized props, and then directed the child to "show and tell me what happens next." Coders were trained to reliability by Dr. Jenny Macfie who co-authored the Narrative Coding Manual (Robinson et al., 1996) and were naïve to all other information about the family. Each story stem was rated on a 0–10 continuum that captured the organizational characteristics of the narrative with regard to its fluency, the extent to which the child engaged the problem in the story, and the child's resolution of the problem. Following prior research on narrative coherence (e.g., Oppenheim, 2006; Schechter et al., 2007; Sher-Censor & Yates, 2015), we dichotomized story-specific scores to capture the ordinal nature of the coherence scale, such that the difference between scores of 3 and 4 is not comparable to that between 4 and 5. This approach emphasizes the distinction between coherent narratives (i.e., logical, balanced, flexible) and incoherent narratives (i.e., illogical, unresolved), rather than individual differences within the coherent range (i.e., ratings of 5–10) versus the incoherent range (i.e., scores of 0–4), while retaining variability as dichotomized scores were composited across the five narratives (ICC = 0.870).

Family Socioeconomic Status

At age 4, family socioeconomic status (SES) was measured using the Hollingshead (1975) four-factor index of social status. Caregivers reported on the educational and occupational status of the child's primary caregiver(s). Education was scored on a scale of 1 (*less than seventh grade*) to 7 (*graduate or professional training*). Occupation was scored on a scale of 1 (*farm laborers and unskilled service workers*) to 9 (*executives and major professionals*). To calculate family SES, education scores were multiplied by three and occupation scores were multiplied by five. Scores were summed within caregiver and averaged across caregivers (when applicable) to yield an overall score of family SES ($M = 32.13$, $SD = 12.14$; i.e., semi-skilled employment, such as a salesclerk).

Child IQ

At age 4, children completed the Wechsler Preschool and Primary Scales of Intelligence-III (WPPSI; Wechsler, 1989). Verbal IQ was indexed using the expressive vocabulary subtest for children who were 48 months or older and the receptive vocabulary subtest for children who were younger than 48 months ($M = 96.93$, $SD = 15.30$). Performance IQ was assessed using the block design subtest ($M = 92.97$; $SD = 17.65$). Verbal IQ and Performance IQ scores were averaged to yield an abbreviated measure of Full-Scale IQ (Sattler, 2008).

Data Preparation and Analytic Plan

All analyses were performed using the lavaan package (Rosseel, 2012) in Rstudio (Allaire, 2012). Families who completed two or more assessments ($n = 223$) did not differ from families who completed only a single assessment ($n = 27$) on any study constructs. Thirty-nine (15.6%) children were missing data on narrative coherence because they did not complete the age 6 assessment ($n = 35$) or they completed a partial visit ($n = 4$). Thirty-five (14.0%) children were missing prosocial data at age 6 because they did not complete the age 6 assessment. An additional 57 (22.8%) children were missing teacher reports of prosocial behavior at age 6 because the teacher did not return the questionnaire packet ($n = 43$), the caregiver refused school contact ($n = 2$), the child was homeschooled ($n = 1$), we received only partial school data ($n = 10$), or we were unable to locate the teacher ($n = 1$). Thirty-six (14.4%) children were missing prosocial data at age 8 because they did not complete the age 8 assessment. An additional 72 (28.8%) children were missing prosocial data because the teacher did not return the questionnaire packet ($n = 53$), the child was homeschooled ($n = 1$), we received only partial school data ($n = 3$), or we were unable to locate the teacher ($n = 15$). These rates of missingness on teacher-reported survey data are consistent with prior investigations (Izzo et al., 1999; Youngstrom et al., 2003).

Missing data were handled using Full-Information Maximum Likelihood (FIML), which incorporates information from all observed variables for a given case to estimate parameters and standard errors in a single simultaneous step (Graham, 2009). In contrast to imputation methods, which "fill in" missing values, estimation techniques like FIML produce parameter estimates and standard errors rather than "completed" data files. FIML is well equipped for addressing even large amounts of missing data (> 50%) with minimal bias (Enders & Bandalos, 2001; Newsom, 2018). Indeed, a recent study using simulated data to compare parameter estimates provided by FIML, multiple imputation, and complete data found that both FIML and multiple imputation return nearly identical results to those found using complete data (Lee & Shi, 2021). Still, given the relatively large proportion of missing data, a sensitivity analysis evaluated the proposed model using the 94 participants with complete data at all waves.

Regression analyses were conducted using a standardized residual approach to evaluate children's deviations from expected prosocial outcomes relative to their adversity exposure in early childhood. Prosocial resilience was conceptualized as better-than-expected levels of prosocial behavior relative to early adversity exposure (i.e., the difference between children's *actual* prosocial behavior scores and the scores that were *predicted* by their level of adversity exposure). To quantify this difference, we regressed teacher reports of prosocial behavior at age 8 on prior reports of early adversity from birth to age 4 such that positive standardized residuals reflected better-than-expected prosocial outcomes relative to early adversity exposure (i.e., prosocial resilience) and negative standardized residuals reflected poorer-than-expected prosocial outcomes (i.e., prosocial vulnerability) relative to early adversity exposure. The contribution of narrative coherence to prosocial resilience was evaluated by regressing the standardized residuals on narrative coherence while holding child sex assigned at birth (i.e., female = 1), ethnicity (i.e., Latine = 1), family SES, child IQ, and prior prosocial behavior constant. Given the potential for biased estimates associated with residualized regression models (Freckleton, 2002), a second sensitivity analysis evaluated the proposed model within a traditional regression framework.

Results

Descriptive and Bivariate Analyses

Descriptive statistics and bivariate correlations for study variables are reported in Table 1. A multivariate analysis of variance evaluated differences in study variables as a function of child sex assigned at birth and ethnicity-race. There were no significant main effects of child sex (Wilks' $\lambda = 0.878$, $p = 0.079$) or child ethnicity-race (Wilks' $\lambda = 0.887$, $p = 0.107$), nor was there a significant child sex*ethnicity-race interaction (Wilks' $\lambda = 0.963$, $p = 0.775$).

At the bivariate level, family SES was negatively associated with early childhood adversity exposure and positively associated with prosocial behavior at age 6. Child IQ was positively associated with both prosocial behavior and narrative coherence at age 6. Adversity exposure was negatively associated with prosocial behavior at both ages 6 and 8. Prosocial behavior showed significant stability from ages 6 to 8, despite changing teacher informants. Narrative coherence was positively associated with prosocial behavior at age 8.

Regression Analyses

First, a regression of prosocial behavior at age 8 on early childhood adversity exposure while controlling for child sex assigned at birth (i.e., Female = 1), ethnicity (i.e., Latine = 1), SES, IQ, and prior prosocial behavior at age 6 showed that children with higher levels of adversity in early childhood were less prosocial in middle childhood ($\beta = -0.251$, $SE = 0.218$, $z = -2.967$, $p = 0.003$). Second, to assess better-than-expected prosocial outcomes relative to early adversity exposure, we regressed the standardized residuals produced from a regression of prosocial behavior on early adversity exposure on narrative coherence in the absence of controls.

Table 1 Descriptive statistics and bivariate relations among study variables

Study variable	*M* (*SD*)	1	2	3	4	5	6
1. Family SES (age 4)	32.130 (12.136)	–	–	–	–	–	–
2. Child IQ (age 4)	95.174 (13.466)	.256**	–	–	–	–	–
3. Early Life Adversity (age 4)	0.003 (0.311)	−.218**	−.120	–	–	–	–
4. Prosocial Behavior (age 6)	3.624 (0.904)	.208**	.202*	−.370**	–	–	–
5. Narrative Coherence (age 6)	5.658 (1.361)	−.055	.173*	−.069	.128	–	–
6. Prosocial Behavior (age 8)	3.846 (0.725)	.111	.149	−.251**	.408**	.240**	–
7. Prosocial Resilience (standardized residual)	0 (1)	.074	.147	.000	.357**	.223**	.968**

*$p < .05$, **$p < .001$

Figure 1 depicts a residuals-versus-predictor plot showing adequate and consistent variability in standardized residuals of the association between adversity and prosocial behavior across values of narrative coherence (i.e., heteroscedasticity). Finally, as shown in Table 2, a regression of these standardized residuals on children's narrative coherence at age 6 and relevant covariates showed that narrative coherence predicted better-than-expected prosocial outcomes in middle childhood given their degree of early adversity exposure (i.e., prosocial resilience; $B = 0.156$, $SE = 0.078$, $z = 1.996$, $p = 0.046$).

Sensitivity Analyses

An initial sensitivity analysis evaluated the proposed model using only the 94 cases with complete data and fully replicated the obtained finding that narrative coherence predicted prosocial resilience ($B = 0.155$, $SE = 0.071$, $z = 2.157$, $p = 0.031$). A second sensitivity analysis using all 250 cases in a traditional regression framework to evaluate the unique contribution of children's narrative coherence to prosocial behavior at age 8 beyond early life adversity and relevant covariates also replicated the findings using a standardized residual approach ($B = 0.087$, $SE = 0.042$, $z = -2.072$, $p = 0.038$).

Discussion

The current study offered a novel investigation of the role of narrative coherence in prosocial resilience across childhood. Using a standardized residual approach, the findings confirmed our hypothesis that child narrative coherence at age 6 predicts better-than-expected prosocial outcomes (i.e., prosocial resilience) at age 8 relative to early life adversity exposure (ages 0–4) over and above the impact of prior prosocial behavior at age 6 and empirically supported covariates. These findings add to previous research demonstrating deleterious impacts of adversity on child behavior (Criss

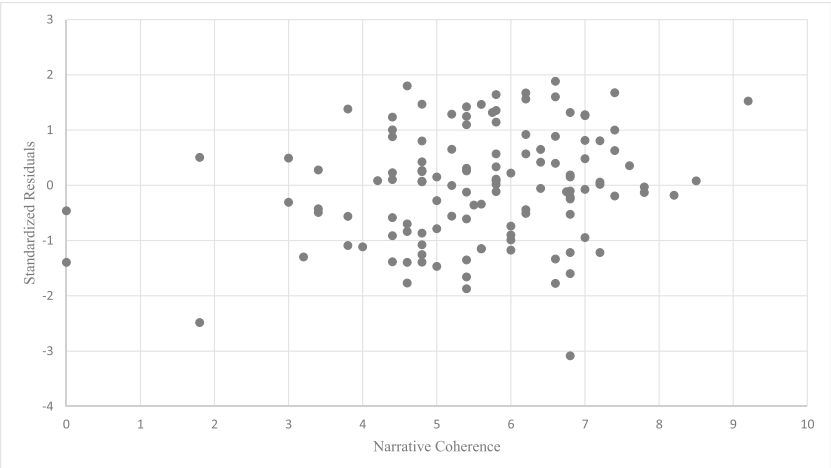

Fig. 1 Residual versus predictor plot. *Note.* Positive standardized residuals reflected better-than-expected prosocial outcomes relative to early adversity exposure (i.e., prosocial resilience) and negative standardized residuals reflected poorer-than-expected prosocial outcomes (i.e., prosocial vulnerability) relative to early adversity exposure. The regression line demonstrates an even distribution of data points around a residual value of 0, suggesting there are no unusual or outlying data points in the dataset (i.e., heteroscedasticity)

Table 2 Regression of prosocial resilience on child narrative coherence

Predictor	*B*	Bootstrapped SE	*z*	*p*	95% CI bias corrected	
					LLCI	ULCI
Child sex (female = 1)	0.254	0.173	1.466	0.143	−0.049	0.304
Child ethnicity (Latine = 1)	−0.130	0.177	−0.737	0.461	−0.234	0.103
Family socioeconomic status	0.005	0.007	0.214	0.830	−0.409	0.525
Child IQ	−0.008	0.007	−1.176	0.240	−0.585	0.383
Prior prosocial behavior (age 6)	0.375	0.092	4.065	< 0.001	0.175	0.499
Narrative coherence (age 6)	0.115	0.092	1.992	0.046	0.003	0.309
$R^2 = 0.192, f^2 = .238$						

et al., 2002; Lovallo, 2013) and highlight the importance of understanding factors that may enhance positive social behaviors in the wake of difficult life experiences.

This investigation expands our understanding of resilience processes in several ways. First, although theoretical models of resilience highlight the importance of experiences in early childhood (e.g., Masten & Gewirtz, 2006), empirical investigations of resilience largely focus on outcomes in adulthood (for a systematic review, see Aburn et al., 2016). Studying resilience processes *within* childhood can illuminate important protective factors to inform timely intervention practices. Furthermore, understanding individual differences in resilience processes may inform targeted intervention practices aimed at those most at risk. Second, most studies of resilience focus on preventing negative outcomes (for meta-analyses, see Darling Rasmussen et al., 2019; Lee et al., 2013) as opposed to promoting positive outcomes. Given the positive impact of prosocial behavior on mental health outcomes and psychological well-being in childhood (Coulombe & Yates, 2018, 2022), supporting children's behavioral resilience can promote their psychological resilience. Finally, although adversity was negatively associated with later prosocial behavior in the current sample, the overarching literature on this topic remains mixed with some studies suggesting promotive effects of adversity on prosocial outcomes (Lim & DeSteno, 2016; Staub & Vollhardt, 2008). Even within the current sample, some children with very high adversity exposure nevertheless demonstrated some of the highest levels of prosocial behavior. Thus, demonstrating that children's narrative coherence (i.e., meaning-making) predicts individual differences in prosocial behavior following early life adversity represents an important advance in our understanding of whether, when, and for whom adversity may undermine prosocial development.

Narrative coherence may promote prosocial resilience because a capacity to understand and make meaning of one's own experiences can engender both emotion knowledge and empathy for others who are struggling (Berzenski & Yates, 2017). Indeed, emotion knowledge and empathy are critical components of prosocial development generally (Ornaghi et al., 2017; Shaver et al., 2016), and enhanced empathy may be a particularly powerful motivator of prosocial behavior in contexts of prior or concomitant adversity (Staub & Vollhardt, 2008). In addition, because children with a capacity for narrative coherence may be more likely and better able to share their difficult experiences with social partners who can offer support (Oppenheim et al., 1997), they may carry their own experiences of seeking and receiving support forward to guide prosocial actions in the context of future opportunities to mitigate others' suffering.

Strengths and Limitations

This study features several strengths that magnify the importance of our findings. For example, data were drawn from a rich, multi-informant, multi-method longitudinal study of child development, which allowed for the use of varied informants for each variable and limited the impact of common method bias. We drew on parent reports of children's adversity exposure, independent coding of children's narrative coherence using a well-validated and standardized laboratory story-telling task, and teacher reports of children's prosocial behavior. Furthermore, our use of a standardized residual approach allowed us to assess individual differences in prosocial *resilience* (i.e., better-than-expected outcomes relative to early adversity exposure), while our inclusion of sensitivity analyses further supported the obtained findings with respect to both missing data concerns and potential biases associated with residualized regression models.

That said, several limitations qualify our findings. First, teachers reported on children's prosocial behavior in the school setting. Teachers are important informants on child behavior because they observe children interacting with peers in situations that may offer opportunities for children to behave prosocially (e.g., sharing toys or pencils, helping others with assignments). Moreover, parent and teacher reports of child behavior often demonstrate low correlations alongside low measurement invariance, which suggests that teachers offer a unique perspective on child behavior that is

not captured by parent reports (Konold et al., 2004). That said, teachers only see children in a limited setting (i.e., in the classroom) as compared to parents who observe children across a variety of settings (e.g., home, playground, grocery store). Future studies will benefit from integrating information about children's prosocial behaviors across multiple informants to obtain a more comprehensive picture of child behavior across settings.

Second, although teachers offered a unique perspective on child prosocial behavior, a large proportion of participants in this sample were missing teacher-reported prosocial data. The obtained rates of teacher responses in this study are comparable to prior studies (Izzo et al., 1999; Youngstrom et al., 2003), yet the obtained rate of missingness represents an important limitation in the present study. Although FIML is well equipped to handle large amounts of missing data (Enders & Bandalos, 2001; Newsom, 2018), it remains possible that the high rates of missing data introduced statistical bias that could not be avoided. Importantly, a follow-up sensitivity analysis showed that all findings replicated within the subsample of participants who completed all measures at all waves.

Third, although all children in the current study were fluent in English as part of the original inclusion criteria, a large proportion of children (36%) were exposed to more than one language at home. Although multilingual children may have a comparable or broader overall vocabulary relative to their monolingual peers, they may have known fewer words in the testing language relative to the primary language used at home (Byalistok et al., 2010). Notwithstanding the possibility that our English-language paradigm underestimated bilingual children's narrative coherence scores, a post hoc *t*-test did not reveal significant differences in age 6 narrative coherence scores between children from multilingual homes ($n = 77$) versus monolingual homes ($n = 128$) in this study ($t_{203} = 0.705$, $p = 0.482$). Furthermore, although the current sample was diverse with regard to gender, ethnicity-race, and linguistic experience, questions remain about the generalizability of the current findings to children outside the USA.

Fourth, although the use of a standardized residual approach to quantifying better-than-expected outcomes remains a dominant statistical technique in resilience research (Cohen et al., 2021; Newsome et al., 2016; Thakur & Cohen, 2022), researchers have raised concerns about bias introduced by this approach (Freckleton, 2002). In this study, these concerns were mitigated by the relatively modest collinearity among the independent variables examined here ($rs = 0.055$–0.256) and the second sensitivity analysis showing a full replication of the study findings using a traditional multiple regression approach. Given that traditional regression approaches cannot capture the *better-than-expected* outcomes that typify resilience, this investigation highlights the need for resilience scientists to adopt multiple statistical approaches to understand resilience fully while highlighting the need for statistical innovations that can capture *resilience* in development with limited bias.

Fifth, although our measure of early life adversity was robust and comprehensive, questions remain about whether certain types of adversity are more or less relevant for narrative coherence and prosocial development. Importantly, the three types of adversity examined in the current study (i.e., environmental, relational, biological) are all likely relevant for prosocial development. For example, evidence suggests that resource scarcity, which would be captured by environmental adversity in the current study, can undermine prosocial behavior (Wu et al., 2020). Likewise, ample evidence points to the deleterious impact of child maltreatment (a type of relational adversity examined in the current study) on prosocial development (Koenig et al., 2004). Previous evidence also supports the negative impact of biological adversities, such as perinatal injury, on prosocial behavior (Beck & Shaw, 2005). In the current analysis, collinearity concerns precluded our consideration of all adversity types simultaneously, but future studies should examine the relative impact of specific adverse experiences on prosocial resilience.

Finally, as noted above, the current sample revealed significant variability in children's prosocial responses to adverse life experiences. Although a qualitative analysis of individual cases falls beyond the scope of this study, this variability points to the need for qualitative and case-based methodologies to elucidate additional processes that may undergird such variability. For example, children with access to alternate protective caregivers (e.g., extended kin, teachers) are more likely to demonstrate resilience than those without (Masten et al., 1990). Likewise, ongoing research is needed to consider these patterns over longer periods of development, given known "tend and befriend" responses to trauma (Taylor, 2006, 2012) that may support behavioral resilience (i.e., prosocial behavior) in the short-term while compromising competence in the longer term.

Implications for Future Research and Practice

The current study adds to the existing body of literature documenting the deleterious impact of adversity on prosocial behavior (Kaufman & Cicchetti, 1989; Koenig et al., 2004) while identifying narrative coherence as a significant predictor of better-than-expected prosocial outcomes relative to early adversity exposure across childhood. This study underscores the importance of identifying predictors of individual differences in resilience, which can be

harnessed to inform strength-based interventions. Indeed, given the cumulative nature of development (Sroufe, 2009) and the marked plasticity of early development in particular (Bjorklund & Ellis, 2014), childhood interventions may be especially effective for mitigating the negative consequences of adversity exposure (Ramey & Ramey, 1998).

Emphasis on children's capacity to make meaning of their difficult experiences as a way to promote resilience is a cornerstone of trauma-focused cognitive behavioral therapy (TF-CBT; Westerman et al., 2017). However, research has largely focused on the symptom reduction effects of TF-CBT, rather than on whether and how narrative mechanisms may engender positive outcomes (de Arellano et al., 2014; Deblinger et al., 2011). The current study suggests that relatively greater capacities to make meaning of difficult experiences in a way that is balanced, reflective, logical, and comprehensive may not only reduce symptoms of psychopathology, but may also confer important strengths, such as prosocial behavior (Dunlop et al., 2015).

Ongoing research is needed to identify factors that can promote narrative coherence in the wake of adversity. For example, evidence suggests that children's temperament (i.e., emotionality and sociability) can affect the quantity and quality of their interactions with parents, which, in turn, predict their narrative abilities (Noel et al., 2008). Given the contribution of narrative coherence to behavioral resilience in this study, as well as to psychological resilience in prior studies with foster youth (Richardson & Yates, 2014), future work aimed at understanding predictors and mechanisms promoting narrative coherence represents an exciting avenue for enhancing children's positive adaptation to challenging life experiences. Strength-based examinations such as the current study offer an important reminder that we must focus not only on symptom reduction or mitigation, but also on the development of positive behaviors that may engender future adaptation.

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Declarations

Conflict of Interest The authors declare no competing interests.

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