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Research article

Development of trauma symptoms following adversity in childhood: The moderating role of protective factors

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ABSTRACT

Background: Although the buffering effect of protective factors on children's outcomes following exposure to adverse childhood experiences has been well documented, research gaps remain as to whether this buffering effect differs based on the type of adversity experienced (i.e., maltreatment versus household dysfunction).

Objective: To examine whether protective factors moderate the association between cumulative adversity, as well as adversity subtypes (i.e., maltreatment and household dysfunction) and child trauma-related distress in a clinical sample referred for treatment following exposure to adversity.

Participants and setting: One-hundred and seventy-six children (aged 3–18) referred to a child abuse treatment clinic and whose files were opened between January 2016 and June 2017 were included.

Methods: Data were collected, extracted, and coded from clinical files using a standardized data extraction protocol. Protective factors included: using individual coping strategies, peer support, individual social skills, caregiver physical caregiving, caregiver psychological caregiving, and educational involvement.

Results: Cumulative childhood adversity ($b = .16, p = .04$) positively predicted child trauma-related distress. The link between exposure to cumulative adversity and child trauma-related distress varied as a function of protective factors: there was a positive association between adversity and child trauma-related distress for children who had low levels of protective factors, but not for those with high levels of protective factors ($b = -.056, p = < .001$). Similar findings were observed when data was stratified by maltreatment and household dysfunction.

Conclusions: Bolstering children's protective factors prior to, and during child abuse treatment, may reduce trauma-related distress following exposure to adversity.

1. Introduction

Childhood adversity, including maltreatment (physical, sexual, emotional abuse and neglect) and household dysfunction (witnessing domestic violence, parental incarceration, mental illness, substance use, or divorce) is a leading public health concern, with 45 % of children experiencing some form of adversity in childhood (Sacks, Murphey, & Moore, 2014). It is well established that

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children who are exposed to Adverse Childhood Experiences (ACEs) are at increased risk for experiencing trauma-related distress symptoms, such as intrusive thoughts, guilt, shame, sadness, and anger, that may precipitate a cascade of negative sequelae including psychopathology, school and social difficulties, substance use, poor long-term health, and later perpetuation of maltreatment (Afifi & Macmillan, 2011; Cicchetti & Toth, 2016; MacMillan & Munn, 2001; Madigan et al., 2019). Consequently, exposure to adversity in childhood is one of the most costly public health expenditures with an estimated lifetime cost of 124 billion US dollars (Fang, Brown, Florence, & Mercy, 2012). Thus, identification and treatment of trauma related-distress in children who have been exposed to adversity is paramount for reducing the potential long-term impact of these negative experiences.

1.1. Variability in symptoms following ACEs

Despite the long-term consequences that are often associated with ACEs (Shonkoff et al., 2012), children are differentially impacted by these experiences (McLaughlin & Sheridan, 2016). Several factors likely contribute to the observed variability in symptom presentation, including the type, severity and duration of adversity experienced, as well as the developmental period during which the adversity occurred (Jaffee & Maikovich-Fong, 2011). Although the buffering effect of protective factors on children's outcomes following exposure to cumulative ACEs has been well documented (Afifi & Macmillan, 2011), whether this buffering effect differs based on the type of adversity experienced (e.g., maltreatment versus household dysfunction) is unknown. Thus, the goal of the current study was to examine whether protective factors moderate the association between adversity subtypes and child trauma-related distress symptoms following exposure to ACEs.

1.2. Protective factors in children exposed to ACEs

A robust literature has identified the protective factors that lead to positive adaptation following exposure to adverse experiences in children and youth (Afifi & Macmillan, 2011; Gartland et al., 2019; Heller, Larrieu, D'Imperio, & Boris, 1999; Luthar, Crossman, & Small, 2015; Masten & Barnes, 2018; Werner, 2013). Protective factors refer to effects that modify or improve an individual's response to an adverse experience that would typically lead to a poor outcome (Rutter, 1985). Drawing on the ecological-transactional model of developmental psychopathology, these protective factors can exist at multiple levels of the child's ecology, including the individual child level (e.g., positive coping skills), the family level (e.g., supportive relationships with caregivers), and the broader community level (e.g., connection to cultural activities or groups) (Cicchetti & Toth, 2016). In childhood psychopathology, ecological models provide the underpinnings for understanding the influence of protective factors on children's adaptation (Masten, 2006). A recent systematic review used an ecological model to examine the individual, family, and community-level protective factors that lead to positive adaptation in children following exposure to adversity (Gartland et al., 2019). Generally, individual characteristics that lead to positive outcomes in the face of adversity include higher intelligence, better self-regulation skills, an internal locus of control, high self-esteem, and adequate prosocial skills (Brown, Barbarin, & Scott, 2013; Jaffee, Caspi, Moffitt, Polo-Tomas, & Taylor, 2007; Yoon, 2018). With regards to family protective factors, family support and parental warmth were identified as contributing to adaptive outcomes (Downie, Hay, Horner, Whichman, & Hislop, 2010; Graham-Bermann, Gruber, Howell, & Girz, 2009). Broader social support, positive relationships with teachers and peers, and high friendship quality were also identified as protective factors (Borman & Overman, 2004; Luthar et al., 2015). Finally, high social cohesion within a neighborhood, perceived community support, and spirituality are community protective factors that have been associated with resilience (Jaffee et al., 2007). Taken together, adaptive outcomes following exposure to childhood adversity are complex and multi-determined, highlighting the need to identify the role of protective factors in mitigating poor outcomes.

1.3. The moderating role of protective factors

Although the buffering effect of resilience on child outcomes following adverse experiences has been well established, gaps in the current literature remain. First, to date, studies examining resilience in children exposed to ACEs have focused on general psychopathology outcomes such as internalizing and externalizing problems rather than on distress symptoms that occur following a trauma. Symptoms associated with a diagnosis of Post-Traumatic Stress Disorder including intrusive thoughts, negative affectivity and cognition, and changes in physiological reactivity (American Psychiatric Association, 2013), have been largely understudied. While identifying emotional and behavioral difficulties in children who have experienced trauma are important outcomes to consider, research that specifically identifies the role of protective factors in mitigating the risk for trauma-related distress symptoms in particular could provide valuable assessment and intervention guidance to clinicians. Second, many studies investigating the role of protective factors on childhood adversity have operationalized childhood adversity broadly using cumulative indices and have not investigated potential differences across subtypes of adversity (Afifi & Macmillan, 2011). Previous work using exploratory factor analysis has found support for two main factors of childhood adversity: child maltreatment and household dysfunction (Mersky, Janczewski, & Topitzes, 2017), while other studies have found support for a three factors model including physical/emotional abuse, sexual abuse, and household dysfunction (Ford et al., 2014). Although poly-victimization is common in the child maltreatment population (Finkelhor, Ormrod, & Turner, 2007), understanding the moderating role of protective factors across child maltreatment (e.g., physical, sexual, and emotional abuse) and household dysfunction (e.g., parent mental illness, parent substance abuse) subtypes would provide guidance on targeted intervention strategies for children exposed to different forms of adversity. Lastly, there is a pressing need to examine the buffering effect of protective factors on the development of trauma-related distress symptoms within clinical samples, such as children who are referred to trauma services following exposure to adversity. Unlike general population

samples, children referred to child abuse services have typically been exposed to multiple forms of pervasive adversity, often referred to as complex trauma (Grasso, Greene, & Ford, 2013; Grasso, Dierkhising, Branson, Ford, & Lee, 2016). Specifically, children referred to a child abuse service are at serious risk of psychopathology, school and social difficulties, as well as developing substance use issues (Cicchetti & Toth, 2016; MacMillan & Munn, 2001). Given the unique service needs of these children, the current study sought to examine the buffering effect of protective factors within a child maltreatment sample.

1.4. Current study and hypotheses

Retrospective file review is a valuable research design for utilizing rich, accessible, and existing data with high relevance to clinical practice (Gearing, Mian, Barber, & Ickowicz, 2006). Accordingly, in the current study, we utilized retrospective file review methodology in a sample of children referred to a Child Abuse Service to address the following aims: 1) investigate whether cumulative adversity, as well as the two adversity subtypes (maltreatment versus household dysfunction), predicted the development of trauma-related distress in children and 2) examine whether cumulative protective factors across multiple levels of the ecology (i.e., individual, family, and community) would differentially moderate the association between childhood adversity and trauma-related distress symptoms. Based on previous research demonstrating that children with higher exposure to adversity have higher PTSD symptoms and behaviour problems (Grasso et al., 2016), we hypothesized that having more experiences of cumulative adversity, maltreatment, and household dysfunction would be related to more trauma-related distress symptoms in children. However, we also hypothesized that the association between cumulative adversity and both adversity subtypes would be moderated by an interaction between adversity and protective factors: children exposed to higher levels of adversity would have lower trauma-related distress symptoms when exposed to high levels of protective factors as compared to low levels of protective factors.

2. Method

2.1. Participants

Data from the current study were obtained via retrospective case-file review of children, ages 3–18 ($n = 176$), referred to the Child Abuse Service, Alberta Health Services, within the Calgary and Area Child Advocacy Centre between January 2016 to June 2017. Inclusion criteria for the study were: children's files had to be activated after a designated date of January 2016 and no longer receiving active treatment. The case file review was conducted from March 2017 to October 2018. Descriptive statistics are reported in Table 1. Ethics approval was obtained from the institutional review board and a waiver of consent for retrospective file review was obtained.

The Child Abuse Service is an outpatient specialty clinic that uses evidence-based practices to assess and treat the most complex and severe child maltreatment cases in a large urban center. All the clinicians within the Child Abuse Service are registered psychologists or social workers with a minimum of a Master's degree. Clinicians within the child abuse service follow standardized assessment and treatment processes. For example, for assessments, information on the child's current functioning, family functioning, and response to the adversity exposure is collected. A tailored treatment approach using evidence-based treatment protocols (e.g., trauma-focused cognitive behavior therapy) is implemented for each client.

In the Child Abuse Service, a standardized intake protocol is initiated over the phone with the referral source. The intake form documents demographic factors and purpose of referral, as well as the types of adversity experienced, and current trauma-related distress symptoms. Protective factors are collected during the assessment phase and documented by clinicians in an extended assessment report written prior to the child commencing treatment. Data for this study is considered to be cross-sectional as the child trauma-related distress symptoms and adversity subtypes were collected at the intake interview, or during the assessment phase, prior to commencing treatment.

2.2. Procedure

Following guidelines for retrospective file review developed by Gearing et al. (2006), a standardized data extraction protocol was developed. This protocol was subsequently piloted on 10 files and refined as needed. Research assistants were trained by the first author and were blind to study hypotheses in order to decrease reviewer bias (Vassar & Holzmann, 2013). The first author reviewed the first 5 extractions for each coder. Coders were considered adequately trained when the data extraction protocol was deemed to be well understood and no data extraction discrepancies emerged on training files. Two research assistants were trained to become familiar with the health record and their extraction was monitored over the course of the study. Each file was reviewed by a primary data extraction coder. Extracted data included demographic information, as well as information about maltreatment history, presenting symptoms at the time of referral, and protective factors. This information was extracted from a standard intake record form, clinician reports, case notes, and any medical documents included in the case files. Research assistants used a data extraction reference manual that listed each variable and its operationalization in order to increase consistency across coders. Consistent with recommendations from behavioural research studies, (Hruschka et al., 2004), 20 % of case files were coded independently by a second coder for inter-rater reliability purposes (see below). Discrepancies were resolved by consensus and the lead author was consulted as needed.

Table 1
Study Characteristics.

	N (%)	Mean (SD)	Range
Child age		10.45 (3.57)	3.75–17.67
Child sex (male)	58 (33 %)		
Financial difficulty reported	26 (14.8 %)		
Living situation			
Biological parent	137 (77.8 %)		
Foster parents	20 (11.4 %)		
Adoptive parents	3 (1.7 %)		
Legal guardians	3 (1.7 %)		
Missing	13 (7.4 %)		
Maltreatment Exposure	167 (94.9 %)	1.98 (1.26)	0-5
Physical abuse	60 (34.1 %)		
Sexual abuse	118 (67 %)		
Emotional abuse	64 (36.4 %)		
Physical neglect	60 (34.1 %)		
Emotional neglect	47 (26.7 %)		
Household Dysfunction	153 (86.9 %)	2.38 (1.51)	0-5
Divorce	124 (70.5 %)		
Domestic violence	94 (53.4 %)		
Parent substance abuse	46 (43.2 %)		
Parent mental illness	92 (52.3 %)		
Parent incarceration	32 (18.2 %)		
Cumulative Adversity		4.35 (2.41)	0-10
Cumulative Trauma-Related Distress		5.03 (2.32)	0-11
Physical aggression	89 (50.6 %)		
Oppositional behaviour	87 (49.4 %)		
Sexual acting out	59 (33.5 %)		
Anxiety/fearfulness	140 (79.5 %)		
Nightmares/sleep disturbance	106 (60.2 %)		
Weight/appetite	62 (35.2 %)		
Preoccupied with abuse	83 (47.2 %)		
Guilt/shame	89 (50.6 %)		
Sad/withdrawn	96 (54.5 %)		
Self-harm/suicide	59 (33.5 %)		
Substance abuse	16 (9.1 %)		
Protective Factors Ratio		.82 (.25)	0-1
Individual/personal skills ^a	128 (72.7 %)		
Missing	17 (9.7 %)		
Individual peer support ^a	92 (52.3 %)		
Missing	61 (34.7 %)		
Individual social skills ^a	114 (64.8 %)		
Missing	26 (14.8 %)		
Physical caregiving ^a	142 (80.7 %)		
Missing	17 (9.7 %)		
Psychological caregiving ^a	151 (85.8 %)		
Missing	11 (6.3 %)		
Context spiritual ^a	26 (14.8 %)		
Missing	146 (83.0 %)		
Context education ^a	102 (58.0 %)		
Missing	44 (25.0 %)		
Context cultural ^a	12 (6.8 %)		
Missing	163 (92.6 %)		

^a Where the resilience variable was present and scored as 1.

2.3. Measures

2.3.1. Demographic information

Information was gathered from the Child Abuse Service intake form, which includes information on child age, child gender, abuse type experienced, and family composition.

2.3.2. Childhood adversity

A cumulative list of risk factors that are associated with poor child outcomes were extracted from the child's file. These abuse types are reported by the referral source during the initial telephone intake, which is typically reported by the parent (58.5 %), child and family services (16.5 %), or another service provider (16.5 %). In the current study, we retrospectively assessed for current or past exposure to the following risk factors in childhood: emotional abuse, physical abuse, sexual abuse, emotional neglect, physical neglect, parental separation or divorce, exposure to domestic violence, parent/caregiver substance misuse, parent/caregiver mental

illness or attempted suicide, as well as parental/caregiver incarceration. Each adversity was coded as “0” when not present in the child’s history or file and “1” when present. Reliability among the two coders for the total adversity score was excellent (ICC = .81).

For analyses, a cumulative adversity score was calculated by summing the score across all 10 adversity subtypes (range from 0 to 10). Based on previous research, two adversity subtypes were also created: child maltreatment (physical abuse, sexual abuse, emotional abuse, emotional neglect, and physical neglect) and household dysfunction (divorce, parent mental illness, parent substance abuse issues, domestic violence, and parent incarceration) (Mersky et al., 2017). These subtypes each had scores that ranged from 0 to 5. There was no missing data for the measurement of childhood adversity.

2.3.3. Cumulative trauma-related distress

A list of 11 presenting distress symptoms related to trauma were reported by the child’s referral source during the intake process. These items were based on the criteria identified in the Diagnostic and Statistical Manual for the diagnosis of post-traumatic stress disorder (PTSD) (American Psychiatric Association, 2013). Supplementary Table 1 delineates how the 11 trauma-related symptoms map on to the general criteria for PTSD in the DSM-5. There were trauma-related symptoms for each of the diagnostic criteria, except for criteria C (avoidance of stimuli related to the trauma). The 11 distress symptoms selected are commonly found in children who are exposed to adversity (Wherry & Dunlop, 2018). The 11 trauma-related symptoms were selected and coded as either “0” when not occurring at the time of referral or “1” when present and were summed to create a cumulative score. The 11 trauma-related symptoms included: physical aggression, oppositional behavior, acting out in a sexual manner, symptoms of anxiety or fearfulness, presence of nightmares or sleep disturbance, changes in weight or appetite, preoccupation with or can’t stop thinking about the abuse or adverse event, feelings of guilt or shame related to the abuse, persistently sad or withdrawn behavior, thoughts or attempts of self-harm or suicide, and substance use. Cronbach’s alpha for items included in the cumulative score was .61, considered to be an acceptable level of internal consistency for this exploratory research (Streiner, 2003). Reliability among two independent coders for the total trauma symptoms score was excellent (ICC = .90). There was one participant with missing data.

2.3.4. Protective factors

Child protective factors were evaluated using an adaptation of the Child and Youth Resilience Measure (CYRM-28; Ungar & Liebenberg, 2011). The CYRM includes 28-items within eight overall subscales pertaining to the individual child (i.e., personal skills, peer support, and social skills), caregiver (i.e., physical and psychological caregiving), and context variables (i.e., spiritual, educational, and cultural support) (Liebenberg, Ungar, & Vijver, 2012). The 8 overall subscales measured by the CYRM-28 were evaluated in the current study (See Supplementary Table 2). Each of the eight protective factors were given a score ranging from 0 to 1 where 0 indicated not present and 1 indicated present. The CYRM-28 has been identified as a valid instrument for assessing components of the resilience process and shows strong psychometric properties (Ungar & Liebenberg, 2011). Internal consistency in the current study was acceptable with a Cronbach’s alpha of .66.

The research assistants used information available in the files to score all protective factors, but the majority of this information was typically found in the child’s assessment report. Due to a low prevalence of spiritual and cultural support variables, these items were excluded from the overall total. Thus, scores ranged from 0 to 6. A ratio score was subsequently created whereby the sum of all total items answered was divided by the total number of variables extracted, leading to a ratio score between 0 and 1. The mean protective factors ratio among children was .82 ($SD = .25$). Reliability among independent coders for the total protective factors score was considered adequate (ICC = .69). Missing data are reported in Table 1.

2.4. Statistical analyses

Descriptive statistics and correlations among variables were examined in SPSS 25.0. Confirmatory factor analysis and path analysis were conducted in MPlus 8.0, which allows for the inclusion of multiple variables and the testing of more complex models (Streiner, 2005), and also accounts for missing data using full information maximum likelihood. All 176 participants were included in analyses based on the missing at random assumption (Graham, 2009). The ML estimator was used, which is robust to non-normality (Yuan & Bentler, 2000).

2.4.1. Confirmatory factor analysis (CFA)

Given that Mersky et al. (2017) had previously conducted an exploratory factor analysis identifying two main categories of adversity, maltreatment and household dysfunction, a confirmatory factor analysis was conducted in MPlus to establish the same factor structure prior to model testing (Supplementary Table 3).

2.4.2. Main analyses

Two path models were performed. The first examined whether protective factors moderated the link between cumulative adversity and trauma-related distress. The second model broke down cumulative adversity into two subtypes based on the CFA (maltreatment and household dysfunction) and simultaneously tested whether protective factors moderated the association between the two adversity subtypes and child trauma-related distress. Due to the high co-occurrence of maltreatment and household dysfunction in the current sample (83 % of children experienced both), the correlation between household dysfunction and maltreatment was included in this larger model. We specified all hypothesized variables in both models given the power of structural equation path models to capture simultaneous relationships among variables. Results are presented with two covariates, child sex and child age, which have been established as predictors of child trauma-related distress (Darves-Bornoz, Choquet, Ledoux, Gasquet, & Manfredi,

Table 2
Point-Biserial and Pearson Correlations Among Variables.

	1	2	3	4	5	6	7
1. Child Age	1						
2. Child Sex	-.05	1					
3. Maltreatment	.18*	.08	1				
4. Household dysfunction	.14	.08	.51**	1			
5. Cumulative Adversity	.18*	.09	.84**	.89**	1		
6. Protective factors	-.05	-.17*	-.30**	-.30**	-.34**	1	
7. Trauma-related distress	.21**	-.04	.22**	.21**	.25**	-.26**	1

* $p < .05$.

** $p < .01$.

1998; Green et al., 1991). Both models were also just identified and thus had perfect fit. All models were first estimated and the interaction terms were subsequently added.

2.4.3. Simple slopes analyses

To help interpret the significant interaction terms, we performed simple slope analyses using the PROCESS macro in SPSS (Hayes, 2017). We plotted and tested the strength of the association between adversity and child trauma symptoms for children with high (1 SD above the mean) and low (1 SD below the mean) levels of protective factors (Dawson, 2014). All continuous variables were centered to minimize collinearity and the interaction term was computed using the centered variables prior to analyses.

2.4.4. Additional analyses

To test the robustness of our findings, we also examined whether protective factors moderated the association between child maltreatment and household dysfunction in separate models. This allowed us to test whether our findings were substantiated when the variables were examined separately (See Supplementary Tables 4 and 5).

3. Results

3.1. Descriptive statistics

Correlations in Table 2 revealed that child age was positively associated with child maltreatment ($r = .18, p = .02$), cumulative adversity ($r = .18, p = .02$), as well as cumulative trauma-related distress ($r = .21, p = .006$). Child sex was negatively associated with child protective factors whereby boys had lower protective factor scores than girls ($r = -.17, p = .03$). Experiences of child maltreatment and household dysfunction were strongly positively associated ($r = .51, p < .001$). Child protective factors were negatively associated with child maltreatment ($r = -.30, < .001$), child household dysfunction ($r = -.30, < .001$), cumulative childhood adversity ($r = -.34, < .001$), and child trauma-related distress ($r = -.26, p = .001$). Child trauma-related distress and exposure to cumulative childhood adversity ($r = .25, p = .001$), maltreatment ($r = .22, p = .003$) and household dysfunction ($r = .21, p = .005$) were positively associated.

On average, children had 4.35 ACEs with 62 % of children having four or more ACEs. This is considerably higher than population-based samples where approximately 12 % of individuals have more than four ACEs (Felitti et al., 1998). This is likely due to the clinical nature of the sample who were referred for treatment due to exposure to childhood adversity.

3.2. Confirmatory factor analysis

Examination of the fit statistics suggested adequate fit of the two-factor model (RMSEA = .05, CFI = .97, TLI = .96). The weighted root mean square residual was also less than 1.0 indicating adequate fit. A moderate correlation of .44 was found between the two factors (maltreatment and household dysfunction). Models estimates for the CFA can be found in Supplementary Table 3. Interestingly, the estimate for sexual abuse was negative, which differs from results previously found by Mersky et al. (2017). It is plausible that this is due to a selection bias based on referral, whereby children referred for sexual abuse or assault may have been less likely to experience other forms of adversity. In line with previous research demonstrating that the accumulation of adverse childhood experiences is associated with poor mental health outcomes in children (Kerker et al., 2015), sexual abuse was included in the cumulative score for child maltreatment in subsequent analyses.

3.3. Main analyses

3.3.1. Cumulative adversity

Results from the path analysis examining the effect of cumulative adversity on child trauma-related distress can be found in Table 3. Child age positively predicted child trauma-related distress ($b = .16, p = .02$), whereby children who were older had higher cumulative scores. After accounting for covariates (child age and gender), cumulative adversity positively predicted child trauma-

Table 3
Path Analysis Examining the Role of Cumulative Adversity in Predicting Child Trauma-Related Distress.

Child trauma-related distress						
	β	SE	Z	p-value	R ²	p-value
Covariates						
Child Age	.16*	.07	2.30	.02		
Child Sex	-.07	.07	-0.98	.33		
Predictors						
Cumulative Adversity	.16*	.08	2.06	.04		
Protective factors	-.20*	.08	-2.70	.01	.13	.01
Interaction						
Cumulative Adversity*Protective factors	-.56**	.15	-3.78	< .001	.19	< .001

Note. R-square change between the model with and without the interaction term is .06.

related distress ($b = .16, p = .04$). Protective factors negatively predicted child trauma-related distress ($b = -.20, p = .01$) and significantly moderated the association between cumulative adversity and child trauma-related distress ($b = -.56, p < .001$). Simple slope analyses to probe the interaction between cumulative adversity and protective factors 1 SD above and below the mean revealed that the slope of high protective factors is not significant ($b = -.49, t = -1.50, p = .14$), while slope of low protective factors is significant ($b = .79, t = 2.37, p = .02$). See Fig. 1.

3.3.2. Adversity subtypes

Results from the path analysis examining the two adversity subtypes in one model can be found in Table 4. Examining covariates, child age positively predicted child trauma-related distress ($b = .16, p = .02$), whereby children who were older had higher scores. When all predictors were included together in one model, protective factors negatively predicted child trauma-related distress ($b = -.21, p = .007$), but the main effects of the two maltreatment subtypes were not significant. However, both interaction terms for the moderating role of protective factors on the association between maltreatment ($b = -.34, p = .03$) and household dysfunction ($b = -.52, p = .03$) were significant (see Fig. 2).

To probe the nature of the significant interaction, we tested the simple slopes for both interaction terms separately. For the association between maltreatment and child trauma-related distress (See Supplementary Fig. 1), simple slopes analyses were not significant at high ($b = -.12, t = -.20, p = .84$) or low levels ($b = .58, t = 1.04, p = .30$) of protective factors. For household dysfunction, simple slopes analyses suggested that at low levels of protective factors, having high levels of household dysfunction predicted higher trauma-related distress ($b = 1.14, t = 2.43, p = .02$); however, high levels of protective factors did not ($b = -.78, t = -1.66, p = .10$) (See Supplementary Fig. 2).

4. Discussion

Exposure to adversity in childhood is common and is associated with long-term emotional, behavioral, and health difficulties across the lifespan (Cicchetti & Toth, 2016; MacMillan & Munn, 2001). Trauma-related distress has been identified as a mechanism by which exposure to adversity leads to the development of psychopathology in children, making them a critical target for assessment and intervention (Milot, Ethier, St-Laurent, & Provost, 2010). Recent research has demonstrated that exposure to different types of childhood adversity, such as maltreatment or household dysfunction, may have differential effects on the development of poor outcomes in children and adolescents (Mersky et al., 2017), and that protective factors may interrupt these diverse pathways. In the

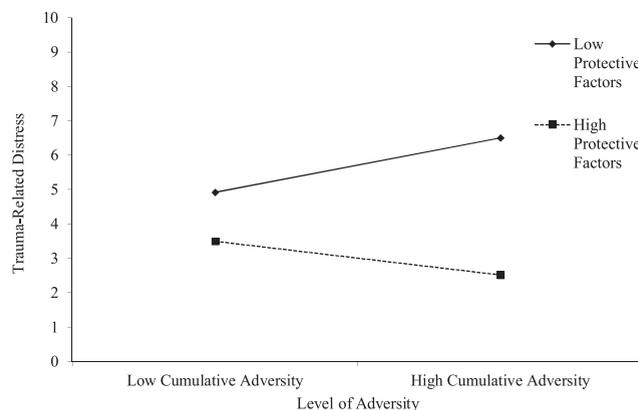


Fig. 1. Cumulative trauma-related distress as a function of protective factors and cumulative adversity. Regression lines for relations between cumulative adversity and total trauma-related distress as moderated by protective factors (1 SD above and below the mean; 2-way interaction).

Table 4
Path Analysis Examining the Role of Maltreatment and Household Dysfunction in Predicting Child Trauma-Related Distress.

Child trauma-related distress						
	β	SE	Z	p-value	R ²	p-value
Covariates						
Child Age	.16*	.07	2.29	.02		
Child Sex	-.07	.07	-.98	.33		
Predictors						
Household dysfunction	.09	.08	1.06	.31		
Maltreatment	.09	.08	1.08	.28		
Protective factors	-.20**	.08	-2.69	.007	.13	.007
Interaction						
Maltreatment*Protective factors	-.34*	.15	-2.20	.03	.18	.001
Household Dysfunction*Protective factors	-.52*	.24	-2.20	.03		

Note. R-square change between the model with and without the interaction term is .05.

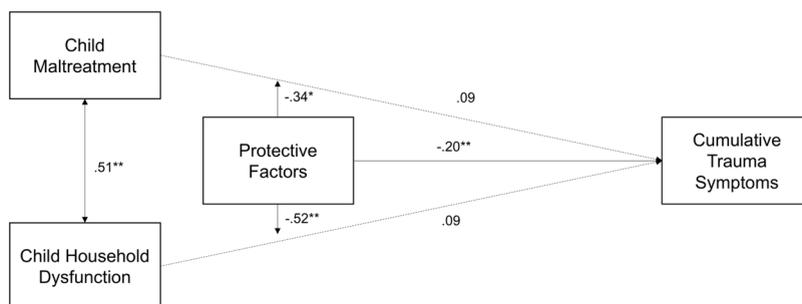


Fig. 2. Path model of child exposure to maltreatment and household dysfunction predicting presenting trauma symptoms moderated by child protective factors controlling for child age and sex. Standardized estimates are reported above. Solid lines represent significant paths and dotted lines represent non-significant paths. *p < .05, **p < .01.

current study, we explicitly investigated this hypothesis, by first examining whether cumulative protective factors buffered the risk of cumulative adversity on child-trauma related distress and subsequently investigating whether this effect was found for two adversity subtypes in a child maltreatment sample.

Three key findings emerged from this study. First, correlational analyses revealed that exposure to cumulative adversity and both adversity subtypes (maltreatment and household dysfunction) were positively associated with the development of child trauma-related distress. Second, children who were exposed to higher levels of adversity had fewer protective factors. Finally, protective factors moderated the association between adversity and child trauma-related distress regardless of subtype. Findings from the current study have implications for the assessment of protective factors and the development of intervention strategies that capitalize on strengths at the individual, parent, and community level.

4.1. Types of adversity and child trauma-related distress

Extensive research over the last two decades has demonstrated a robust association between exposure to cumulative adversity and child trauma-related distress symptoms (Alisic et al., 2014; McLaughlin et al., 2013). However, considerably less work has examined the differential association of adversity subtypes on the development of these symptoms, especially in samples of children referred for treatment following adversity experiences. Recent research in the general population has pointed to the importance of moving beyond cumulative measures of adversity in order to understand how adversity subtypes may influence the development of psychopathology in children (McLaughlin & Sheridan, 2016). Correlational analyses from the current study demonstrate that maltreatment and household dysfunction were both associated with the development of child trauma-related distress, suggesting that gathering broad information on different forms of adversity, including exposure to abuse and disruptions within the family context, are important for a comprehensive assessment of the impact of trauma. Although the main effects of child maltreatment and household dysfunction were not significant in the larger path model, they were marginally significant when tested independently, suggesting that shared variance may have contributed to the lack of statistical significance in the broader model. Ultimately, our findings suggest that cumulative adversity may be the most robust predictor of trauma-related distress in this population.

4.2. Child ACEs and protective factors

Although early exposure to mild stressors has been posited as a means to inoculate children against stress and may help them to develop resilient coping responses, exposure to uncontrollable adversity can be detrimental to development (Benjet, Borges, &

Medina-Mora, 2010; Southwick & Charney, 2012). Furthermore, experiences of adversity tend to accumulate rather than occur as isolated incidents (Jacobs, Agho, Stevens, & Raphael, 2012), and poly-victimization in childhood is often predictive of trauma-related symptoms, maladaptive behavior, and psychosocial difficulties (Finkelhor et al., 2007; Shonkoff et al., 2012; Turner, Vanderminden, Finkelhor, & Hamby, 2019). In the current study, not only was there a strong positive association between exposure to child maltreatment and household dysfunction, but children exposed to greater levels of both adversity subtypes tended to have fewer protective factors. This finding speaks to experiences of complex trauma whereby multiple traumatizing events result in limited protective factors due to a breakdown of supports at multiple levels including the individual (e.g., executive functions), family (e.g., supportive caregiver), and community level (e.g., strong relationships with neighbors or community members) (Cook et al., 2005). Protective factors may also be fewer in children with greater adversity due to the erosion of environmental (e.g., psychological caregiving) and physiological systems (e.g., HPA axis functioning). In short, while a typical developmental course allows children the opportunity to invest their energy in developing personal competencies and positive relationships, children exposed to multiple adversities are focused on survival. Considering the consequences of cumulative adversity, comprehensive assessments that identify children with complex trauma could be useful in case formulation.

In the current study, there was insufficient information in the patient files on spiritual and cultural protective factors to include them in the analyses. The absences of information related to spiritual and cultural supports speaks to the under-emphasis of these two domains across children's mental health and child welfare settings. Yet, resilience in the face of adversity is less of an individual construct and has more to do with the quality of the environment that the individual is in (Luthar et al., 2015; Ungar, 2013). In addition to supportive family relationships, identifying protective factors outside of the individual child and the family unit may maximize the potential for positive adaptation. An emphasis on the protective effect of the broader social ecology is needed in future research.

4.3. The buffering effect of protective factors

The biopsychosocial model of risk and resilience proposes mechanisms by which exposure to adversity in childhood leads to the development of trauma symptoms and psychopathology (McLaughlin & Lambert, 2017). This model also purports that protective factors such as a supportive caregiver, individual sensitivity to positive cues, and better emotion regulation skills, may buffer or disrupt the association between exposure to adversity and the development of negative sequelae. In the current study we found that cumulative protective factors, including those at the individual, family, and community level, moderated the association between cumulative adversity and trauma-related distress. These findings are in line with results from a meta-analysis demonstrating that children with protective factors, such as supportive caregivers, are less likely to develop psychopathology following trauma exposure than those without support (Trickey, Siddaway, Meiser-Stedman, Serpell, & Field, 2012). Thus, the identification and promotion of protective factors in children who have been exposed to adversity are critical intervention targets.

Interestingly, when we examined whether the moderating effect of protective factors was present for two adversity subtypes (maltreatment and household dysfunction), we found the moderating effect of protective factors was present for both subtypes. However, simple slopes analyses were only significant for household dysfunction. This finding suggests that protective factors play an important role in diminishing the impact of adversity, particularly for household dysfunction. Children who have caregivers who are emotionally available and may help to scaffold the development of positive coping and emotion regulation strategies may have better outcomes (McLaughlin & Lambert, 2017; Riley & Masten, 2005). Positive relationships with adults outside the family unit, including teachers, coaches, or community members, also have the potential to help decrease distress following experiences of adversity (Masten, Herbers, Cutuli, & Laforvor, 2008). Future research examining the longitudinal impact of protective factors are needed.

4.4. Study limitations

There are limitations to the current study. First, a cross-sectional, retrospective, file review methodology of a clinical sample was used. Although the nature of the file review methodology makes results highly clinically informative, the availability of data are limited to the information provided within patient files. For example, trauma-related distress symptoms were reported by the referral source as opposed to administering a validated questionnaire to participants. Protective factors were also only captured if they were reported during the clinical assessment phase and were not explicitly asked about using a validated questionnaire. Future work will need to replicate the current findings using parent and child reported questionnaires. Moreover, due to the file review nature of the data, the temporal sequences of the variables collected in the current study are also a limitation. Furthermore, the measures used to operationalize adversity and protective factors were not exhaustive and excluded factors that are often associated with the development of trauma symptoms. For example, previous research has demonstrated that community violence, discrimination, or peer victimization negatively impact children's outcomes (Finkelhor, Shattuck, Turner, & Hamby, 2015), while neighborhood cohesion, neighbor support, and neighborhood safety are associated with positive outcomes in the face of adversity. Furthermore, severity and duration of adversity are two important factors that may influence the development of trauma symptoms that were not examined in the current study. Future research may benefit from measuring adversity and protective factors more broadly as well as from investigating whether the duration and severity of adversity play a role in trauma symptoms. Finally, there are confounding factors related to the information that was available in the clinical files including the level of clinician training, services available and accessed, and the nature of the referrals (i.e., 67 % of children were exposed to sexual abuse). Therefore, the results of this study may be most relevant to child maltreatment samples.

4.5. Conclusion

Our findings suggest that both child maltreatment and household dysfunction are linked to the development of trauma-related distress in a sample of children referred to a child abuse treatment clinic, pointing to the importance of gathering an understanding of diverse types of adversity experiences at the time of referral. Although maltreatment experiences, such as abuse and neglect, typically precipitate child welfare involvement, family dysfunction also plays an important role in children's distress symptoms. Our results also indicate that children with higher levels of protective factors experience less adversity and lower levels of trauma-related distress following exposure to adversity. From a public health perspective, protective factors such as building emotional regulation skills in children, fostering positive parenting behaviors, and developing supportive schools and neighborhoods, may prevent the development of severe trauma symptoms following adversity. Finally, our findings provide preliminary evidence that individual, family, and community level protective factors mitigate the association between experiences of adversity and the development of trauma-related distress. Interventions that address modifiable protective factors, such as improving parenting, supporting parent mental health, and fostering positive appraisal styles in children (Traub & Boynton-Jarrett, 2017), have the potential to ameliorate child and family functioning.

Declaration of Competing Interest

No conflict of interest to declare.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.chiabu.2020.104375>.

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