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Childhood Adversity and Associated Psychosocial Function in Adolescents with Complex Trauma

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Abstract

Background: Childhood adversity is linked to a number of adult health and psychosocial outcomes; however, it is not clear how to best assess and model childhood adversity reported by adolescents with known maltreatment exposure.

Objective: This study sought to identify an empirically-supported measurement model of childhood adversity for adolescents in child protective custody and associations among childhood adversity and adolescent outcomes.

Methods: Self-report survey data assessed childhood adversity and adolescent outcomes, including psychological wellbeing, quality of life, and substance use, in 151 adolescents ages 16 to 22 in protective custody with a documented maltreatment history.

Results: Findings suggest that, among youth with complex trauma histories, it is important to distinguish among risk related to unexpected tragedy (e.g., natural disaster, parental divorce), family instability (e.g., parental substance abuse or mental health concerns), and family violence (e.g., physical or sexual abuse). Family violence was associated with poorer psychological

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Ethical approval. All procedures performed in this study, which involved human participants, were in accordance with the ethical standards of Cincinnati Children's Hospital Medical Center (CCHMC) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The institutional review board at CCHMC approved this study.

Informed consent: For youth under 18 years of age, informed consent to participate in this study was obtained from the legal custodian (Child Protective Services) and all youth provided informed assent to participate. All youth 18 years of age and older provided informed consent to participate in this study.

wellbeing and quality of life, while family instability was associated with cigarette and marijuana use.

Conclusions: Among adolescents with complex trauma histories, childhood adversity assessments reflect multiple domains of adversity, each of which are differentially related to adolescent risks. Properly assessing childhood adversity in adolescents with complex trauma histories may help target interventions for specific risks (e.g., substance use) based on which types of childhood adversity youth have been exposed to.

Keywords

child maltreatment; adolescence; adverse childhood experiences; foster care

More than three decades of research has highlighted the long-term negative consequences of childhood adversity (e.g., Felitti et al., 1998) and maltreatment (e.g., Currie & Spatz Widom, 2010; Gilbert et al., 2009) on psychosocial functioning (e.g., Hillis et al., 2004; Kaplow & Widom, 2007), risk behaviors (e.g., Anda et al., 1999; Dube et al., 2006; Leslie et al., 2010), and health (e.g., Dube, Felitti, Dong, Giles, & Anda, 2003; Jee & Simms, 2006). The opportunity to effectively identify individuals whose childhood history of adversity or trauma may elevate risk for negative adult outcomes, many of which are challenging to address, has been promising (Chapman, Dube, & Anda, 2007; Dube et al., 2001; Felitti et al., 1998). The ease of identifying and calculating childhood adversity and risk has allowed for a rapid increase in research in this area, with benefit to the field. This approach is most prominently represented by the Adverse Childhood Experiences (ACEs) Study, in which researchers identified different experiences adults could have had as children (e.g., abuse, neglect, and household challenges, such as domestic violence and parental divorce). The number of negative exposures was significantly and positively associated with negative outcomes in adulthood, including chronic disease, mental illness, violence, health risk behaviors, mental illness, and chronic health conditions such as heart disease (Felitti et al., 1998). Similarly, developmental delays and disorders, behavior problems, and obesity have also been observed among children with elevated ACE scores (Burke, Hellman, Scott, Weems, & Carrion, 2011). Adverse and traumatic experiences do not happen infrequently; two-thirds of children have experienced at least one adverse event (Burke et al., 2011), and around 13% of children have been exposed to multiple traumas (Burke et al., 2011; Kisiel et al., 2013). Further, research from Costello and colleagues illustrated that vulnerability to adverse experiences is higher when children are exposed to poverty, family psychopathology, or other family relationship problems (Costello, Erkanli, Fairbank, & Angold, 2002). In sum, adverse or traumatic experiences occur frequently in childhood, are measurable, and are not randomly dispersed; instead, some children are more vulnerable to exposure to traumatic events and environments than others. This likely places particular sub-populations of children at greater risk for poor health and psychosocial outcomes in adulthood.

The opportunity to identify childhood trauma in a relatively easy and reliable manner (e.g., Bifulco, Bernazzani, Moran, & Jacobs, 2005; Keeshin, Strawn, Out, Granger, & Putnam, 2014) has gained traction and inspired recent movements to develop trauma-informed communities and practices, which typically involve training for key stakeholders in the

community, positive parenting classes, and changing school and child protection practices (Huckshorn & LeBel, 2013; Ko et al., 2008). Legislative action to promote the use of assessments of adversity and support trauma-informed care has occurred in 18 states in the United States (Maul, 2017), demonstrating the importance of this work in shaping the political narrative responding to childhood adversity and risk, with the long-term goal of improving life-long health and wellbeing. However, there are several challenges to this approach of assessing childhood adversity that make its application difficult with specific sub-populations of youth; of specific interest for this paper, adolescents with complex trauma histories, defined as exposure to multiple traumatic events, including maltreatment (The National Child Traumatic Stress Network, 2018). First, this summative approach treats maltreatment (i.e., physical, emotional, and sexual abuse, neglect) and other risk factors or life stressors equivalently, without any additional assessment of whether the child perceived the stressor to be traumatic. For example, a child whose parents divorced amicably would receive one point for that divorce, as would a child whose parents' divorce was riddled with conflict, the child who was sexually abused once by a stranger, or the child who was sexually abused repeatedly by a trusted caregiver. However, young people, and particularly those who are exposed to complex traumas, may not identify all negative life events as traumatic. This is well-illustrated by the findings of Taylor and Weems (2009), where young people were asked to report their traumatic experiences. Children and adolescents reported events such as witnessing violence, separation and loss from family, and motor vehicle accidents as traumatic events, with high reliability, but failed to identify several events included in more traditional assessments of traumatic events (e.g., ACEs, DSM criteria for post-traumatic stress disorder [PTSD]) as traumas.

A second concern in applying ACEs measures and summing responses from youth with complex trauma is that there is no opportunity to distinguish among multiple mechanisms (e.g., abuse, poverty, disrupted attachment) that may not all contribute to the same outcomes. For example, studies have demonstrated that some adverse experiences (e.g., maltreatment) elevate risk for psychopathology (e.g., Widom, 1999) while this is not the case for all adversity (e.g., life stressors; Breslau, Davis, Andreski, & Peterson, 1991). A cumulative assessment of adversity does not distinguish among differing mechanisms; rather, all children with elevated scores would receive similar interventions regardless of the source of their score. This may be effective for initial screening (e.g., children with low scores assumed to not need services in the absence of other symptoms, children with high scores provided with services regardless of symptoms), and as a means of providing cursory evidence of the long-term impacts of child adversity, particularly at a population level. However, without delineation, ACEs and other cumulative trauma exposure scores do not inform specific interventions or assist with understanding the heterogeneity of outcomes experienced within specific subgroups of children (e.g., maltreated youth). For example, Kisiel et al. (2013) reported that, in a study of all youth in custody in the state of Illinois, a combination of violent/interpersonal trauma exposure and non-violent/attachment-based trauma exposure elevated risk for PTSD, behavior problems, and relational concerns. In the absence of classifying traumatic exposures in this fashion, it may be difficult to know how to proceed with referrals for therapy and treatment. Specifically, Kisiel and colleagues speculate that this could explain why youth with complex trauma have a higher number of

behavioral diagnoses other than PTSD and receive more psychiatric medication. Thus, while ACEs and other cumulative models of adversity may be a beneficial assessment in many settings (e.g., Anda et al., 1999; Dube et al., 2001; Dube, Anda, Felitti, Edwards, & Croft, 2002; Dube, Felitti, Dong, Chapman, et al., 2003; Felitti et al., 1998), it is unclear whether a single construct of adversity has utility for youth with known complex trauma.

Understanding how to reliably assess and interpret adverse experiences in youth with complex trauma exposures is important because of the known health risks for this population. A robust literature has demonstrated, for example, that child maltreatment and entry into protective custody (e.g., foster care) are associated with increased acute and chronic health concerns and substance use (Aarons et al., 2008; Leslie et al., 2010; Leslie et al., 2000; Lewis, Beckwith, Fortin, & Goldberg, 2011; Minnis, Everett, Pelosi, Dunn, & Knapp, 2006; Oswald, Heil, & Goldbeck, 2010). These negative outcomes are compounded for maltreated children who remain in protective custody until emancipation (i.e., age out; Courtney, Terao, & Bost, 2004). Emancipation occurs when adolescents leave protective custody, generally between ages 18 and 21, without a permanency arrangement (e.g., guardianship, adoption, reunification). Studies have demonstrated that young people emancipating from protective custody experience significantly higher rates of substance abuse, mental health concerns, and poorer quality of life when compared to their same-aged peers never in protective custody (Dworsky, Ahrens, & Courtney, 2013; Dworsky & Courtney, 2009a; Dworsky & Courtney, 2009b; Dworsky & Courtney, 2010; Fowler, Toro, & Miles, 2011; Kushel, Yen, Gee, & Courtney, 2007). Several mechanisms likely contribute to the increased risk for poor outcomes observed for young people who emancipate from protective custody. First, young people who emancipate, like all youth in protective custody, are exposed to complex trauma prior to entry into protective custody. These young people also frequently experience instability in placement (i.e., more placement changes), and placement in congregate care settings (e.g., group homes, residential care), which are both associated with increased mental health problems and substance use, among other concerns (Gramkowski et al., 2009; Havlicek, Garcia, & Smith, 2013; Keller, Cusick, & Courtney, 2007). In preparation for emancipation, these young people often enter independent living programs where they are placed in apartments by themselves to facilitate gains in life skills and experiences with household and financial management before emancipation. While this is intended to benefit young people, studies have demonstrated variability in service delivery, resulting in increased risks to psychosocial wellbeing and quality of life (Lee & Ballew, 2018; Thompson, Wojciak, & Cooley, 2018). Whether the negative outcomes observed for young people emancipating from child welfare are due to their involvement with protective custody or their history of traumatic experiences and family background (Bellamy, 2008; Taussig & Clyman, 2011; Taussig, Clyman, & Landsverk, 2001), it remains clear that these adolescents represent some of the most vulnerable young people in the United States (Osgood, Foster, & Courtney, 2010).

Current measurement approaches assessing ACEs for adolescents approaching emancipation from protective custody are likely to result in the majority of youth receiving an elevated score classifying them as at risk. This is in part due to the known complex traumas experienced by children in protective custody, including both violent and non-violent exposures (Kisiel et al., 2013). Complex trauma exposures, including abuse, neglect, and

family vulnerability, have been demonstrated to increase behavioral and psychological problems, PTSD, and service utilization when children enter protective custody (Greeson et al., 2011; Kisiel, Fehrenbach, Small, & Lyons, 2009). Frequently, elevated ACEs are used to indicate a need for intervention due to increased risk. However, when resources are limited, as is the case in child welfare, stratifying the population to identify those at greatest risk is critical. In order to accomplish this, a measurement approach for adversity that is validated in a child protection sample is needed. This is particularly important given that children in protective custody are all expected to report high rates of childhood adversity, and the measurement structure of ACEs may be different when multiple ACEs are endorsed. As examples, Scott et al. (2014) and Felitti and Anda (2010) have identified two alternate three-factor structures for the ACEs measure, aligning with abuse, household dysfunction, and neglect (Felitti & Anda, 2010) or mixed (Scott et al., 2013) adversity exposures. Importantly, Scott and colleagues identified that children who reported exposures to items labeled “abuse” also consistently reported more than one ACE, while 44% of youth reporting “neglect” or “mixed” exposures (i.e., one or no parents, neglect) did not have exposure to other ACEs. Of note, separation from one or both parents (one adverse experience) is inherent among children in protective custody, and co-occurs with other forms of maltreatment that resulted in their entry into custody. Therefore it is unclear whether previously-identified three-factor measurement models apply to this unique population. A more nuanced approach to assessing traumatic events in the population of young people preparing to emancipate between 18 and 21 is critical for aiding caseworkers and clinicians as they provide targeted services to young people.

The current study draws on a survey of childhood adversity reported by young people ages 16–20 who have spent at least 12 months in protective custody, along with child welfare data describing their primary reason for entry into protective custody, age of entry into custody, length of stay, and number of placement changes while in custody. These young people were likely to emancipate from child welfare, and were therefore at greatest risk for poor psychosocial and health outcomes (Courtney et al., 2010). Using child welfare data and the reports of young people themselves, this study compared several measurement models of childhood adversity to maximize predictive utility for three common outcomes experienced by young people emancipating from protective custody: decreased psychological wellbeing, substance use, and poorer quality of life. It was hypothesized that childhood adversity in this population would be best modeled as multiple constructs reflecting different types of experiences rather than a single construct, consistent with prior research (e.g., Felitti & Anda, 2010; C. L. Kisiel et al., 2013; Scott et al., 2014). Further, we hypothesized that childhood adversity due to family violence (i.e., physical, sexual, or emotional abuse, neglect) would be consistently associated with poor outcomes, while other types of childhood adversity would not.

Method

Participants

This secondary analysis is based on a longitudinal study of 151 young people ages 16–22 (Mean age = 17.63, SD = 1.40) in the custody of child welfare in a single urban county in

Ohio. Participants were primarily African American (70%) or White (23%), with slightly more women (54%) participating than men. Young people were eligible to participate in the parent study if they 1) were between the ages of 16 and 22, 2) had been in protective custody for 12 or more months, 3) spoke English, 4) had the cognitive capacity to provide consent (ages 18 and older) or assent (ages 16 and 17) to participate, and 5) resided within a 1 hour driving distance of the children's hospital where the study took place. Child welfare provided the primary reason participants were removed from their families of origin and placed into protective custody, which included neglect (59%), child behavior problems (18%), physical abuse (14%), and sexual abuse (5%). Participants entered protective custody between the ages of 3 and 17 ($M = 14.3$, $SD = 2.90$) and had between 1 and 25 different placements during that time ($M = 6.10$, $SD = 4.60$). At the time participants were enrolled in the study, they resided in certified non-relative foster homes (41%), independent living (34%), group homes (13%), and with kinship care providers (7%).

Procedures

A list of 436 eligible youth was created by Jobs and Family Services (i.e., the child welfare system) in the county where the study took place using information from the Statewide Automated Child Welfare Information System (SACWIS). Study staff screened the medical records of potentially eligible youth to eliminate youth who did not meet eligibility criteria. Study staff contacted the caseworkers and guardians ad litem (GALs) of potentially eligible youth via email to notify them of the study and provide an opportunity for them to opt-out of youth participating. For youth whose caseworkers or GALs did not opt-out, youth were contacted through a mailed letter notifying them of their eligibility and providing an opportunity to opt out of contact with the study team. The majority ($n = 365$) of youth were considered potentially eligible after chart review and contact with caseworkers and GAL. Youth who did not choose to opt-out were then contacted by phone or in person while receiving medical care at the children's hospital where the study took place and invited to participate.

More than half ($n = 204$) of youth were successfully contacted, and 154 provided initial verbal consent (if aged 18 years or older) or assent (if aged 16 or 17 years) to participate. Once verbal consent/assent was provided, study staff met participants in their homes or at public locations such as community centers, libraries, or restaurants. Participants ($N = 151$) provided documented informed consent/assent and completed surveys at those visits. Three participants who provided verbal consent/assent were lost to enrollment due to changes in placement ($n = 2$) and incarceration ($n = 1$). Participants were compensated for their time with \$15 for their first visit and \$20 for each of the following visits loaded onto a ClinCard, which operates similarly to a pre-paid Mastercard.

This study was approved and monitored by the Institutional Review Board at Cincinnati Children's Hospital Medical Center. The authors report no conflicts of interest, including those which may come in the form of grants, employment by, consultancy for, shared ownership in, or any close relationship with an organization whose interests, financial or otherwise, may be affected by the publication of the paper. The parent study was funded by

the CareSource Foundation, a foundation associated with a Medicaid managed-care plan that provides health care services to Ohio residents.

Measures

The primary predictor variable in this study is child adversity, derived from the Childhood Trust Events Survey (CTES), a 26-item questionnaire that asks participants yes or no questions such as, “Has someone in your home ever been physically violent toward you, such as whipping, kicking, or hitting hard enough to leave marks?” (Boat, Baker, & Abrahamson, 1996). Consistent with other cumulative measures of adverse childhood experiences, the CTES is traditionally scored by summing the number of yes responses, providing a count of adverse events from childhood.

The primary outcome variables for this study, quality of life, psychological wellbeing, and substance use, were assessed via self-report. Quality of life (QoL) was assessed using the Center for Disease Control Health-Related Quality of Life measure, a 14-item survey that asks participants to evaluate their health over the last 30 days by asking questions like, “During the past 30 days, for about how many days have you felt you did not get enough rest or sleep?” (CDC, 2011). Responses across items were summed to create a single measure (Cronbach’s $\alpha = .78$). Psychological adjustment was assessed using 24 items that were adapted from previous studies (Harris, 2009; Manificat et al., 2003). Participants identified how often in the last seven days certain indicators of negative psychological adjustment (e.g., “You thought your life had been a failure”), positive psychological adjustment (e.g., “You enjoyed life”), and peer and adult support (e.g., “You felt that your friends understand you”) were present. The scale included four options, “Never or rarely”, “Sometimes”, “A lot of the time”, and “Most or all of the time”. Responses were recoded and summed such that higher scores indicated worse psychological adjustment (Cronbach’s $\alpha = .90$). Finally, substance use was assessed using items adapted from Johnston and colleagues (1991) to capture tobacco, alcohol, marijuana, and illicit substance use in the last 30 days.

Demographic characteristics were based on child welfare records and self-report. The county child welfare division provided study staff with the child’s age of entry into custody in years, lifetime number of months in custody, and lifetime number of placements. These variables were included as potential covariates. Demographic characteristics provided by participants and used in subsequent analyses included age in years, gender (male = 1, female = 2), and minority status (White non-Hispanic = 1, Minority = 2).

Statistical Analysis

The parent study from which these data are derived sought to understand changes in healthcare use as adolescents emancipated from protective custody; power analyses indicated that a sample size of 200 would be sufficient to detect that change as significant. After 18 months of recruitment ($n = 150$) data were examined and a larger increase in healthcare use was identified. As a result recruitment ended at $N = 151$.

The analysis plan for this study was as follows: First, a confirmatory factor analysis (CFA) was conducted to examine whether the covariance among all the item responses was accounted for by a single underlying dimension. To determine whether the CTES was

actually comprised of several underlying dimensions (i.e., multidimensional), we qualitatively categorized each of the 26 items into separate hypothetical dimensions based on the item content – for example, item #1, “bad accident” was categorized as “risk for unexpected tragedy” whereas item #5 “had parent swear at you” was categorized as “family violence.” Items such as “family member was depressed” and “someone in home abusing drugs or alcohol” may put youth at higher risk for maltreatment, they do not necessarily indicate the presence of maltreatment. Thus, we coined this dimension as “family instability.” A second confirmatory factor analysis (CFA) was then conducted on our exploratory 3-factor model to examine whether the covariance among all the item responses was better explained by this 3-factor model rather than a unidimensional model. To determine if summed scores (observed) of childhood adversity were adequate approximations of individuals’ estimated latent scores on the CTES, we constrained the factor loadings to be equal (i.e., equal discrimination, via the Rasch item response model; Bezruczko, 2005; Rasch, 1960; Wright, 1977). If this model is a good fit, we can be more confident that the raw sum scores are sufficient estimates of each of the domains. This was essential to test given that the CTES will likely be scored via sum scores, whether unidimensional or multidimensional. Goodness of fit for all models was based on empirically-supported indices (Hu & Bentler, 1998): RMSEA values <0.05, and comparative fit index (CFI) and Tucker-Lewis Index (TLI) values >0.95. All analyses were conducted with Mplus version 8 (Muthen & Muthen, 1998–2017) and its weighted least squares with mean and variance adjustment estimator and accounted for the binary nature of the item responses. Missing data were handled via maximum likelihood estimation. Finally, path analysis models in Mplus were conducted to evaluate the impact each of the predictors on each of our outcomes.

Results

Descriptives

Descriptive statistics are provided in Table 1. Adolescents endorsed an average of 10 out of 26 items on the CTES; measures of quality of life and psychosocial functioning also indicated poor functioning on average. Approximately one third of youth were using substances.

Measurement Models

We first tested a CFA model where all 26 items are explained by a single factor of “adverse experiences”. The model fit was close to acceptable (RMSEA = 0.05, TLI = 0.87, CFI = 0.88), but some of the items had non-significant factor loadings. We then tested our exploratory, alternative 3-factor model using a CFA with the 26 items to see if it was an improved fit over the unidimensional model. This model was a good fit to the data, RMSEA = .04, TLI = .92, CFI = .93. Factor loadings were all high and significant on their respective factors except for item #21: “Have you ever been badly hurt by an animal, such as attacked by a dog?” did not strongly load onto the hypothesized “risk for unexpected tragedy” factor and was thus dropped from further analysis. The revised 3-factor model on the remaining 25 items was a good fit to the data, RMSEA = .04, TLI = .93, CFI = .93. The factor loadings for all 25 items were all high and significant on their respective factors (see Table 2).

Correlations among the factors were moderate to high (see Table 3), further indicating that the three maltreatment dimensions of risk for unexpected tragedy, family instability, and family violence, while related, are distinct. Finally, we estimated a Rasch measurement model where all of the factor loadings were constrained to be equivalent within each of the 3 subscales because that would provide evidence that summed scores on each of the three subscales would adequately approximate an individuals' estimated latent score on the three-factor CTES. This model had comparable fit to the original 3-factor model, RMSEA = .05, TLI = .90, CFI = .90. The equivalent loadings within each factor/scale are listed in Table 2. Thus, based on our review of item content and our factor analyses, we propose that the CTES be revised to include only 25 items and be scored to reflect these three distinct dimensions.

Path Analysis Models

We used the observed sum scores for risk for unexpected tragedy, family instability, and family violence as predictors of each outcome (quality of life, psychological well-being, and substance use) in three separate models. Coefficient estimates (see Table 4) indicated that family violence was significantly associated with poorer QoL and psychological wellbeing, while family instability significantly predicted increased cigarette and marijuana use, but not alcohol or illicit drug use. Risk for unexpected tragedy was not associated with any outcome. Demographic and child welfare characteristics were not significantly associated with any outcomes.

Discussion

The purpose of this study was to examine measurement models of childhood adversity in adolescents with complex trauma, and to estimate associations among types of childhood adversity and indicators of adolescent wellbeing. Results suggest that a measurement model that distinguished among subtypes of childhood adversity fit adolescent-reported data better than approaches treating adverse events as unidimensional. Further, measurement models where factor loadings were constrained to be equivalent, mirroring the approach taken to sum items across subscales, did not substantially impact fit, indicating that it is sufficient to use sum scores of these subscales with this population.

In addition to examining measurement, this study found that subtypes of adverse events (i.e., risk for unexpected tragedy, family instability, and family violence) were differentially associated with indicators of adolescent wellbeing (i.e., quality of life, psychosocial wellbeing, substance use). Specifically, an increase in the number of family violence exposures was associated with poorer quality of life and psychosocial wellbeing, while family instability was associated with increased cigarette and marijuana use. An increase in risk for unexpected tragedy was not associated with any indicators of adolescent wellbeing. This provides further evidence of the importance of distinguishing among subtypes of childhood adversity, as the subscales are associated with unique risk outcomes.

Our findings that the measurement model for CTES best fit with a three-factor rather than a single-factor model structure is consistent with research demonstrating that experiencing abuse is distinct from experiencing other sorts of early life stressors (Lawson et al., 2017).

Importantly, this was detected in a sample of adolescents in child welfare protective custody; it may be the case that in samples where maltreatment is less prevalent, both measurement structure and associations with indicators of wellbeing would differ from what was found here. For example, more items on the family violence subscale may have been endorsed by this sample than would have occurred with a community sample of adolescents. Consistent with this interpretation, the average score on CTES was 10.6, 6 times higher than reports from the general population (Pretty, D O'Leary, Cairney, & Wade, 2013). Further, while unexpected tragedy, instability, and violence can have detrimental impact on child and adolescent outcomes, research has previously suggested that the familial context within which these events occur (e.g., warm parents vs. hostile or absent parents) shape how children respond (Silvern, 1994). In this sample of adolescents in protective custody, a determination that parental support is missing has already been made, resulting in the child's entry into protective custody. It is possible that for this sample, findings reflect the impact of childhood adversity in the absence of parental support; this may not be the case in associations of childhood adversity with outcomes for youth still residing with their parents.

These results indicated significant associations between family violence and two indicators of adolescent wellbeing among youth in protective custody: quality of life and psychological wellbeing. Specifically, as family violence exposures increased, adolescents reported significantly more days with mental and physical health challenges and more difficulties with depression, anxiety, and social support. Poor quality of life was quite high in this sample, with roughly one-third of youth reporting challenges with daily life across multiple domains of daily functioning. The average rates described here are higher than those observed in the general population (Zahran et al., 2005). Given the known poor health and psychosocial outcomes for young adults after they leave protective custody, including challenges with employment, education, housing instability, and mental health, assessing family violence-related childhood adversity in a meaningful and impactful way may aid in getting youth most at risk connected to services to curtail these negative outcomes (Ahrens, Garrison, & Courtney, 2014; Courtney et al., 2011).

The results of these models also indicated that family instability was associated with adolescent cigarette and marijuana use, while family violence and risk for unexpected tragedy were not. This is consistent with previous studies linking family mental health concerns, parental substance use, and other aspects of instability to adolescent substance use (Mears & Siennick, 2016; Mersky, Topitzes, & Reynolds, 2013; Moran, Vuchinich, & Hall, 2004; Sitnick, Shaw, & Hyde, 2014). The differential association of substance use by type of childhood adversity is important, as it provides further evidence of the value of distinguishing among subtypes of childhood adversity in order to improve intervention and service delivery. In this case, childhood adversity due to family instability may indicate a need for substance use prevention, while this may not be necessary if childhood adversity results from risk for unexpected tragedy or family violence. Of note, family instability was related to cigarette and marijuana use, but not to alcohol use or illicit substance use. Future research may identify mechanisms that explain these differential relations.

Limitations

The findings from this study should be interpreted within the context of several limitations. First, these data are cross-sectional. Longitudinal research examining patterns in the link between maltreatment and wellbeing are warranted, particularly given that among abused adolescents risk for re-victimization is high (Maker, Kemmelmeier, & Peterson, 2001). Secondly, this study included only adolescents in child welfare custody; while studies have previously suggested that adolescents in protective custody are at greatest risk for poor adult outcomes (Courtney et al., 2011), it is not clear whether the patterns found here would generalize to other populations. Additionally, this study used the CTES rather than a more common measure of ACEs (Felitti et al., 1998); findings should be replicated to ensure conclusions are similar when a traditional ACEs measure is used, and could consider also replicating with an objective child welfare record. Finally, the sample size for this study is relatively small and geographically limited. While our findings indicate a strong signal for effect, larger scale studies to confirm multidimensional aspect of the CTES are needed, with studies designed to take contemporary measurement methods into account.

Conclusion

Despite these limitations, this study makes an important contribution to the literature examining measurement approaches in child maltreatment. Specifically, these findings highlight the importance of distinguishing among various aspects of adverse childhood experiences – first as a means of accounting for and modeling variance in a manner that best reflects the data, and second because the associations between risk for unexpected tragedy, family instability, and family violence with adolescent outcomes differed. This points to a potential opportunity to use existing measures of childhood adversity in a novel way to stratify populations at risk, in order to deliver effective prevention services to the young people who are most likely to benefit. Future research studies emphasizing the mechanisms that explain differences in subtypes of childhood adversity and health and psychosocial outcomes, particularly in the context of larger longitudinal studies, are warranted.

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Table 1

Descriptive Statistics for Predictors, Outcomes, and Covariates

Item	Mean (SD)	Percent	N	Source
Predictor				
CTES Total Score	10.60 (5.01)		151	AR
Outcomes				
Quality of Life	36.76 (35.18)		145	AR
Psychological Wellbeing	46.24 (13.18)		150	AR
Cigarette use		Yes: 24%	149	AR
Alcohol Use		Yes: 22%	149	AR
Marijuana Use		Yes: 24%	149	AR
Illicit Substance Use		Yes: 13%	149	AR
Covariates				
Age of entry into care	14.30 (2.94)		151	CPS
Length of stay (years)	3.88 (3.12)		144	CPS
Number of placements	6.11 (4.62)		148	CPS
Age	17.63 (1.40)		151	AR
Gender		Men: 46%	151	AR
Race/ethnicity		White non-Hispanic: 22% African American: 66% White Hispanic: 0% Other: 11%	149	AR

NOTE: SD = Standard Deviation, CTES = Childhood Trust Events Scale, AR = Adolescent Report, CPS = Child Protective Services

Table 2

Standardized Factor Loadings from the Final Model (A) and the Constrained Factor Loadings Model (B).

Item Number From Original CTES	A	B
<u>Risk for unexpected tragedy</u>		
Were you ever in a really bad accident, such as a serious car accident?	0.42 **	0.69 **
Were you ever in a disaster such as a tornado, hurricane, fire, big earthquake, or flood?	0.67 **	0.69 **
Were you ever so badly hurt/sick that you had to have painful/scary medical treatment?	0.39 **	0.69 **
Have you ever been threatened or picked on by a bully (someone outside of your family)?	0.56 **	0.69 **
Have you ever had a family member or someone else very close to you die unexpectedly?	0.51 **	0.69 **
Have you ever seen someone in your neighborhood be beaten up, shot at or killed?	0.77 **	0.69 **
Has someone ever robbed or tried to rob (jump) you or your family with a weapon?	0.75 **	0.69 **
Have you ever had a pet that was hurt or killed on purpose by someone you knew?	0.52 **	0.69 **
Have you ever seen a friend killed?	0.44	0.69 **
<u>Family instability</u>		
Have you ever had a family member who was put in jail/prison or taken by the police?	0.56 **	0.84 **
Have you ever had a time in your life when you did not have the care you needed, such as not having enough to eat, being left in charge of your younger brothers or sisters for long periods of time, or being left with a grownup who used drugs?	0.71 **	0.84 **
Have you ever had a time in your life when you were living in a car, living in a homeless shelter, living in a battered women's shelter, or living on the street?	0.56 **	0.84 **
Have you ever had someone living in your home who abused alcohol or used street drugs?	0.64 **	0.84 **
Have you ever had someone in your home try to hurt or kill himself/herself, such as cutting himself/herself or taking too many pills or drugs?	0.74 **	0.84 **
Have you ever had a family member who was depressed or mentally ill for a long time?	0.60 **	0.84 **
<u>Family violence</u>		
Have you ever had a parent swear at you, insult you, put you down, or say hurtful things such as "You are no good," "You will be sent away because you are bad," or "I wish you were never born"?	0.73 **	1.05 **
Were you ever completely separated from your parent(s) for a long time, such as going to a foster home, your parent living far apart from you, or never seeing your parent again?	0.62 **	1.05 **
Has someone in your home ever been physically violent toward you, such as whipping, kicking, or hitting hard enough to leave marks?	0.83 **	1.05 **
Has an adult ever said they were going to hurt you really badly or kill you, or acted like they were going to hurt you very badly or kill you, even if they didn't actually do it?	0.77 **	1.05 **
Have you ever seen or heard family members act like they were going to kill or hurt each other badly, even if they didn't actually do it?	0.79 **	1.05 **
Have you ever seen or heard a family member being hit, punched, kicked very hard, or killed?	0.87 **	1.05 **
Has someone ever kidnapped you (taken you away from your home when they shouldn't have) or has someone close to you ever been kidnapped?	0.37 *	1.05 **
Has someone ever touched your private sexual body parts when you did not want them to?	0.69 **	1.05 **
Has someone ever made you touch his or her private sexual body parts?	0.66 **	1.05 **
Has an adult ever tied you up, gagged you, blindfolded you, or locked you in a closet or a dark scary place?	0.32 *	1.05 **

*
p < .05;**
p < .01

Table 3.

Inter-Factor Correlations from the Final 3-Factor Model (A) and Constrained Factor Loading Model (B).

Factor	A		B	
	Risk for unexpected tragedy	Family instability	Risk for unexpected tragedy	Family instability
Risk for unexpected tragedy	--	--	--	--
Family instability	0.75 **	--	0.75 **	--
Family violence	0.57 **	0.80 **	0.57 **	0.77 **

**
p < .01

Unstandardized Results from Models Predicting Quality of Life, Psychological Wellbeing, and Substance Use using Summed Subscale Scores for Adolescent-Reported Indicators of ACEs.

Table 4

Item	Quality of Life		Psychological Wellbeing		Cigarette Use		Alcohol Use		Marijuana Use		Illicit Drug Use	
	B	S.E.	B	S.E.	B	S.E.	B	S.E.	B	S.E.	B	S.E.
Risk for unexpected tragedy	0.17	0.18	0.06	0.06	0.10	0.08	-0.5	0.08	-0.06	0.07	-0.04	0.10
Family instability	0.09	0.21	0.03	0.08	0.24**	0.10	0.17	0.10	0.28**	0.09	0.18	0.10
Family violence	0.31*	0.14	0.13**	0.05	0.00	0.50	0.04	0.06	-0.00	0.07	0.02	0.09
Gender	0.66	0.60	0.16	0.21	-0.26	0.27	-0.17	0.27	-0.22	0.25	-0.06	0.31
Age of entry	-0.05	0.09	0.05	0.03	0.03	0.04	0.00	0.04	-0.05	0.04	-0.03	0.05
Residual Variance	11.06**	1.30	1.41**	0.16	1.00	--	1.00	--	1.00	--	1.00	--
R ²	0.11*	0.05	0.12*	0.05	0.22	--	0.08	--	0.16	--	0.08	--

* p < .05;

** p < .01