

## **Validating new summary indices for the Childhood Trauma Interview: Associations with first onsets of major depressive disorder and anxiety disorders**

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### **Abstract:**

Childhood and adolescent adversity is of great interest in relation to risk for psychopathology, and interview measures of adversity are thought to be more reliable and valid than their questionnaire counterparts. One interview measure, the Childhood Trauma Interview (CTI; Fink et al., 1995), has been positively evaluated relative to similar measures, but there are some psychometric limitations to an existing scoring approach that limit the full potential of this measure. We propose several new summary indices for the CTI that permit examination of different types of adversity and different developmental periods. Our approach creates several summary indices: one sums the severity scores of adversities endorsed; another utilizes the number of minor and major (moderate to severe) adversities. The new indices were examined in association with first onsets of major depressive disorder (MDD) and anxiety disorders across a 5-year period using annual clinical diagnostic interviews (Structured Clinical Interview for DSM–IV–TR). Summary scores derived with the previously used approach were also examined for comparison. Data on 332 participants came from the Youth Emotion Project, a longitudinal study of risk for emotional disorders. Results support the predictive validity of the proposed summary scoring methods and indicate that several forms of major (but typically not minor) adversity are significantly associated with first onsets of MDD and anxiety disorders. Finally, multivariate regression models show that, in many instances, the new indices contributed significant unique variance predicting disorder onsets over and above the previously used summary indices

**Keywords:** childhood | adolescence | adversity | major depressive disorder | anxiety disorders

### **Article:**

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several new summary indices for the CTI that permit examination of different types of adversity and different developmental periods. Our approach creates several summary indices: one sums the severity scores of adversities endorsed; another utilizes the number of minor and major (moderate to severe) adversities. The new indices were examined in association with first onsets of major depressive disorder (MDD) and anxiety disorders across a 5-year period using annual clinical diagnostic interviews (Structured Clinical Interview for DSM–IV–TR). Summary scores derived with the previously used approach were also examined for comparison. Data on 332 participants came from the Youth Emotion Project, a longitudinal study of risk for emotional disorders. Results support the predictive validity of the proposed summary scoring methods and indicate that several forms of major (but typically not minor) adversity are significantly associated with first onsets of MDD and anxiety disorders. Finally, multivariate regression models show that, in many instances, the new indices contributed significant unique variance predicting disorder onsets over and above the previously used summary indices

Despite these advantages and the CTI's potential for widespread use, one significant barrier to its effective use in research is that there are significant limitations, from a psychometric standpoint, to the previously employed data reduction procedures. Given that the measure assesses a range of adversity from the most mild (e.g., in the emotional abuse domain: siblings insulting each other) to the most severe, it is normative for participants to endorse a number of adversities. Each pattern of adversity endorsed is rated by the interviewer on three scales: duration in months, plus two ordinal scales (severity and frequency), producing a large volume of data. Originally, to validate the CTI, three separate sums of severity, frequency, and duration were calculated for each of the six adversity domains, and these sums were multiplied in three-way interactions to predict scores on an adversity questionnaire (Fink et al., 1995). One study extended this scoring method by calculating a multiplied score ( $\text{Severity} \times \text{Frequency} \times \text{Duration}$ ) in each domain (Simeon et al., 2001). Although this has the advantage of producing a single index for each domain, it has a key disadvantage. Specifically, it is not psychometrically permissible to multiply ordinal measurement scales (Stevens, 1951). This leads to at least three psychometric issues: such scales do not contain an absolute zero, and the distance between scale points is not equivalent either within or across scales.

These three issues lead to several practical problems. First, the lack of an absolute zero for scales renders multiplied scores difficult to interpret, in the same way that 80° Fahrenheit is not “twice as hot” as 40° Fahrenheit. Second, the issue of nonequivalent distances between scale points within a scale is most clearly illustrated by the frequency scale, where a score of 2 represents one to two times per year, and a score of 6 represents daily occurrences. Third, the issue of nonequivalent distances between scale points across scales is best conveyed through an example. In the multiplicative scoring approach, a person reporting being raped on two occasions over a period of a month (severity = 6, frequency = 2, duration = 1, referring to a pattern enduring for a month or less, for a total score of  $6 \times 2 \times 1 = 12$ ) would have an identical score for that adversity as someone who reports that a peer showed him or her inappropriate sexual photographs a few times per month over a 3-month period of time (severity = 1, frequency = 4, corresponding to a rating of between two and four times per month, and duration = 3 months, for a total score of  $1 \times 4 \times 3 = 12$ ). Because these problems would be likely to reduce the validity of measurement, and therefore increase the error variance, they are unlikely to cause false positive findings. Instead these problems might be more likely to result in underestimated effect sizes and false negative results. Thus, the existing findings based on this approach to scoring the CTI are likely to be true

positive findings; however, studies may have overlooked additional significant associations. Therefore, we sought to develop and validate new, manageable summary indices for the CTI.

To formulate new summary indices, we considered three factors. First, we prioritized dimensional scales, which enhance power compared with dichotomized scales (e.g., Cohen, 1983). To address this need, we adopted a scoring approach using the sum of adversity severities. Second, research on adversity in relation to major depressive disorder (MDD) suggests that only stressful life events with substantial impact or threat significantly increase risk for MDD onsets (e.g., Brown & Harris, 1978; Monroe, 2008). These threatening events have often been coined “major” stressful life events in the stress and depression research literature and include moderately to severely impactful or threatening events (e.g., Brown & Harris, 1978). From this perspective, including minor adversities may impede the prediction of outcomes like MDD. This might be particularly important because minor adversities are more prevalent than moderate or severe adversities (Table 1). To address this additional need, we adopted a second scoring approach with separate scales for the number of minor adversities and the number of major (moderate to severe) adversities.

Third, the ability to examine adversity occurring in different developmental periods may benefit future studies using the CTI, given that aspects of vulnerability and resilience are thought to change with development (e.g., Cicchetti & Rogosch, 2002). Both childhood and adolescence are considered sensitive periods, during which rapid neurologic, biological, and social development may increase sensitivity to adverse experiences (e.g., Dahl, 2004; Manly, Kim, Rogosch, & Cicchetti, 2001). Consequently, for each of the two scoring approaches we adopted, we created separate indices for childhood and adolescence. Although we have integrated a factor not previously considered in scoring (age), neither scoring approach we describe uses information about the duration and frequency of each adversity—two types of information incorporated in the flawed multiplicative approach. Thus, it is important to provide evidence that the new scales are associated with important outcomes.

To provide evidence of the predictive validity of the new scales, we examined their association with first onsets of MDD and anxiety disorders. Prediction focused on first onset cases (i.e., those that began after the period of time the CTI covered) in order to reduce the likelihood that reported effect sizes represent bidirectional associations between adversity and emotional disorders. That is, because adversity precedes disorder onsets in time, it is less likely that effect sizes are due to depression or anxiety causing participants to be treated more harshly. MDD was selected because it is relatively common, providing sufficient power, and because it is relatively well established from epidemiological studies that early adversity is associated with increased risk for later MDD. For example, in a large epidemiological sample, Kessler and Magee (1993) showed that various forms of early adversity predict first onsets of depression in adulthood. Evidence from other large epidemiological samples suggests that childhood adversity (as indicated by low socioeconomic status, family disruption, and residential instability) contribute not only to risk for depression but also to a greater likelihood of recurrence and chronicity of depression (Gilman, Kawachi, Fitzmaurice, & Buka, 2003). Further, in a study examining time decay of risks conferred by childhood adversity, Kessler, Davis, and Kendler (1997) found evidence that the enhanced risk associated with adversity persists beyond childhood.

**Table 1** Prevalence and Characteristics of Minor, Moderate, and Severe Adversity by Domain

Adversity domain/severity level	Age of onset (years) (when endorsed) M (SD)	Perpetrator (%) (when endorsed)		Prevalence			Duration in months (when endorsed)	
		Family	Nonfamily	% of sample endorsing any	M (SD) no. of adversities	Frequency (when endorsed) M (SD) (on 1– 6 scale)	Mean (SD)	Range
Separation from/loss of caregiver								
Minor	9.25 (3.93)	99.4	0.6	56.6	1.59 (1.95)	2.44 (1.47)	35.88 (33.56)	1–120
Moderate	7.57 (4.48)	99.6	0.4	36.7	0.84 (1.42)	1.89 (1.27)	47.53 (31.95)	1–132
Severe	5.07 (3.76)	100.0	0.0	7.5	0.09 (0.36)	1.32 (1.25)	53.81 (28.16)	12–108
Neglect by caregiver								
Minor	12.00 (2.56)	99.7	0.3	88.3	3.17 (2.32)	3.32 (1.08)	30.80 (21.72)	1–192
Moderate	10.12 (3.81)	99.2	0.8	30.4	0.80 (1.71)	3.03 (1.38)	30.27 (34.90)	1–192
Severe	9.81 (5.79)	100.0	0.0	1.8	0.02 (0.19)	2.75 (1.98)	19.51 (14.24)	1–36
Emotional abuse								
Minor	9.03 (3.76)	78.7	21.3	84.0	2.77 (2.28)	3.58 (1.24)	60.53 (46.14)	1–192
Moderate	10.16 (3.54)	72.6	27.4	29.5	0.67 (1.29)	3.58 (1.43)	50.77 (44.65)	1–192
Severe	11.75 (6.01)	50.0	50.0	0.6	0.01 (0.12)	2.50 (2.12)	51.02 (72.10)	1–102
Physical abuse								
Minor	7.32 (3.58)	83.8	16.2	66.0	1.64 (1.81)	2.43 (1.25)	34.92 (33.30)	1–180
Moderate	7.99 (3.58)	80.0	20.0	24.4	0.61 (1.38)	2.40 (1.24)	47.88 (47.86)	1–168
Severe	10.71(4.47)	42.9	57.1	1.8	0.02 (0.16)	1.71 (1.50)	6.88 (11.70)	1–24
Witnessing violence								
Minor	8.30 (3.69)	77.0	23.0	24.1	0.49 (1.06)	2.39 (1.12)	35.52 (33.01)	1–144
Moderate	9.19 (4.13)	64.5	35.5	24.4	0.47 (1.11)	2.19 (1.31)	33.16 (41.40)	1–144
Severe	9.36 (3.91)	44.4	55.6	4.5	0.06 (0.35)	1.78 (1.31)	20.02 (31.87)	1–108
Sexual abuse/assault								
Minor	11.12 (3.72)	23.8	76.2	13.0	0.20 (0.68)	2.35 (1.58)	12.75 (30.23)	1–156
Moderate	11.00 (4.21)	17.6	82.4	3.6	0.05 (0.33)	2.06 (1.68)	6.05 (14.68)	1–60
Severe	10.38 (5.64)	50.0	50.	1.2	0.01 (0.11)	2.00 (1.16)	6.02 (6.91)	1–12

Anxiety disorders are also associated with early adversity. Several types of very severe childhood adversity have been associated, retrospectively, with post-traumatic stress disorder (PTSD) in large-scale epidemiological and convenience samples (Cogle, Timpano, Sachs-Ericsson, Keough, & Riccardi, 2010; Gibb, Chelminski, & Zimmerman, 2007; Kilpatrick et al., 2003). Additionally, a number of studies have reported that individuals with anxiety disorders other than PTSD also recall greater histories of childhood adversity than individuals without those disorders. For example, several studies have shown that retrospectively reported childhood sexual abuse is associated with elevated prevalence of anxiety disorders measured in adulthood (e.g., Cogle et al., 2010; MacMillan et al., 2001; Mancini, Van Ameringen, & MacMillan, 1995; Spataro, Mullen, Burgess, Wells, & Moss, 2004). A smaller body of research has demonstrated an association between childhood physical abuse and the presence of an anxiety disorder in adulthood (e.g., MacMillan et al., 2001; Mancini et al., 1995). Finally, a few studies have reported that emotional abuse is associated with a higher prevalence of anxiety disorders measured in adulthood (Young, Abelson, Curtis, & Nesse, 1997), with particular associations observed between emotional abuse and social phobia (Gibb et al., 2007) and emotional neglect and obsessive–compulsive disorder (Lochner et al., 2002).

The current study also attempts to overcome some issues faced by the extant literature on adverse childhood experiences and later MDD and anxiety. Nearly all of the previous studies required a long duration of retrospective recall in which adults were asked to recall childhood experiences that occurred several decades prior to the time of the study. Additionally, with several exceptions (e.g., Kessler & Magee, 1993; Spataro et al., 2004), in most studies it is not possible to date disorder onset to ensure that the early adversity occurred prior to the onset of the disorder. Further, with the exception of Cogle et al. (2010), the majority of studies did not account for the presence of other disorders (e.g., mood disorders when testing for anxiety disorders, and vice versa) that may explain a significant portion of the variance in associations between early adversity and anxiety disorders.

To our knowledge, this is the first report to examine the relationship between CTI adversity and first onsets of MDD and anxiety disorders, including social phobia, specific phobia, obsessive–compulsive disorder, PTSD, panic disorder with or without agoraphobia, generalized anxiety disorder, and agoraphobia without panic disorder. Thus, this report makes two key contributions: (a) describing new CTI summary scoring methods, and (b) testing associations between the CTI and first onsets of MDD and anxiety disorders. We hypothesized that the new indices would contribute significant, unique variance to the association with MDD and anxiety disorders over the previously used multiplicative approach, but not vice versa—a stringent test, given that all indices come from the same instrument. We also hypothesized that the number of major adversities would contribute unique variance over that of minor adversities, but not vice versa. Given theory and evidence about the effects of adversity in both developmental periods examined, we hypothesized that both childhood and adolescent adversity would be significantly associated with MDD and anxiety disorder onsets.

## **Method**

### **Participants**

High school juniors were recruited from two ethnically and socioeconomically diverse schools: one in suburban Chicago, Illinois, and the other in suburban Los Angeles, California. Prior to

recruitment into the Youth Emotion Project, students participated in a screening phase by completing the Neuroticism subscale from the revised 23-item Eysenck Personality Questionnaire (EPQ–R–N; Eysenck, Eysenck, & Barrett, 1985). Students were categorized as low scorers (with scores 7), medium scorers (scores 8–11), and high scorers (12). In order to maximize the number of emotional disorder onsets observed in the longitudinal phase, recruitment for this phase oversampled individuals in the highscoring category, presuming that they would be at higher risk for later emotional disorders (Clark, Watson, & Mineka, 1994; Krueger, Caspi, Moffitt, Silva, & McGee, 1996). A total of 627 participants (69% female) consented to participate and completed the baseline assessment, including 59% high, 23% medium, and 18% low EPQ–R–N scorers (see Zinbarg et al., 2010 for more detailed information). Participants were recruited and entered the study in three cohorts, each starting in successive years.

At a baseline interview during each participant's junior year in high school, participants completed the Structured Clinical Interview for DSM–IV–TR Axis I Disorders–Nonpatient Edition (SCID–I/NP; First, Spitzer, Gibbon, & Williams, 2001) for the diagnosis of lifetime mental disorders. Participants were invited to repeat the SCID on an annual basis to assess psychopathology present since the previous interview. The present report includes diagnostic data from the baseline interview plus four annual follow-up interviews. Participants ( $n = 456$ ) completed the CTI by phone beginning in the sixth year of the Youth Emotion Project, when they ranged in age from approximately 22 to 24 years. Participants provided informed consent. Institutional review boards at both universities approved all protocols.

Those who completed the CTI did not differ from those who did not complete the CTI in gender (both proportions female = .69;  $\chi^2(1) = 0.001$ , ns); minority group status (completer proportion White .42, noncompleter .44;  $\chi^2(1) = 0.245$ , ns); socioeconomic status (SES; completer  $M = 48.69$ ,  $SD = 12.57$ , noncompleter  $M = 46.43$ ,  $SD = 13.80$ ;  $F(1, 611) = 3.719$ , ns), or screener EPQ–R–N (completer  $M = 11.88$ ,  $SD = 4.39$ , noncompleter  $M = 11.91$ ,  $SD = 4.89$ ;  $F(1, 625) = 0.006$ , ns).

Participants were included in the present analyses if they completed the baseline diagnostic interview ( $N = 627$ ), the CTI ( $n = 456$ ), and at least one follow-up SCID (all but  $n = 2$  who completed the CTI). Approximate dates of disorder onset were recorded from the baseline SCID and subsequent follow-up SCIDs. A total of 122 participants with either a current or a past diagnosis of MDD ( $n = 39$ ), or one or more anxiety disorders ( $n = 58$ ), or both MDD and one or more anxiety disorders ( $n = 25$ ) during the window of time covered by the CTI (i.e., from birth to age 16) were excluded from analyses.<sup>2</sup> Onsets of MDD and anxiety disorders after the CTI therefore represent the first manifestation of either MDD or an anxiety disorder for each individual. The final sample comprised 332 participants (226 or 68.1% females) who were on average 16.9 years old ( $SD = 0.4$ ) at the baseline interview and who were African American/Black (12.7%), Asian (4.5%), White (50.0%), Hispanic/Latino (14.8%), mixed race/ethnicity (11.4%) and other races/ethnicities (6.0%). Hollingshead SES scores ( $M = 48.53$ ,  $SD = 12.50$ , range 12–66) indicate that the sample ranged from very low SES to high SES and was upper-middle class on average (Hollingshead, 1975). Participants completed a mean of 4.39 ( $SD = 0.86$ ) out of five possible diagnostic interviews.

### **Assessment of MDD and Anxiety Disorders**

In addition to the baseline interview, which assessed lifetime psychopathology, clinically significant MDD and anxiety disorders occurring in the interim since each previous interview were diagnosed at each of the annual follow-up assessments using the SCID. Interviewers completed an extensive training process and demonstrated agreement with “gold standard” diagnoses before

administering the SCID to participants. Interviewers were blind to the results of previous assessments. Final diagnoses were assigned by consensus in supervision with a doctoral-level clinical psychologist. Interrater reliability was assessed for individual interviewers' diagnoses for approximately 10% of all SCIDs conducted in the larger study. Kappa values adjusted due to departure from equiprobable distributions (i.e., low base rates of diagnoses) across the five SCID assessments ranged from .82 to .94 for MDD and from .72 to .85 for anxiety disorders. There were 57 first onsets of MDD observed, and 39 first onsets of anxiety disorders. Two individuals were diagnosed with onsets of two separate anxiety disorders, for a total of 41 anxiety disorders. The 41 anxiety disorder onsets included social phobia (n = 16); specific phobia (n = 10); obsessive-compulsive disorder (n = 5); PTSD (n = 4); panic disorder with or without agoraphobia (n = 3); generalized anxiety disorder (n = 2); and agoraphobia without panic disorder (n = 1).

### **Assessment of Childhood and Adolescent Adversity**

The Childhood Trauma Interview (Fink et al., 1995) is a semistructured interview for the retrospective assessment of adversity occurring during childhood and adolescence. Interviewers completed an extensive CTI administration and scoring training protocol that included information on local legal and ethical requirements for reporting abuse of minors to child protection governmental agencies. They were also provided with guidance about asking potentially sensitive interview questions. Participants were asked about the six domains of adversity listed earlier from birth through the age of 16. (The CTI as originally described assesses adversity through age 18; however, in the Youth Emotion Project, age 16 was used as an endpoint because other measures in the study provide coverage after this age.)

Interviewers rated the severity of each adversity endorsed based on more than 260 coding examples in an interview manual, using a scale ranging from 1 (minimal or mild) to 6 (very extreme, sadistic; see Table 2 for examples in each domain). Thus, the CTI is designed to elicit reports of a full range of severity of adversities, not only traumatic adversity as its name might imply. Interviewers also characterized each adversity on its frequency of occurrence using an ordinal scale ranging from 1 (less than once per year on average) to 6 (at least daily). The duration in months of each pattern of adversity, the perpetrator, and the participant's age at the start and end of each pattern of adversity were also recorded. Adversities were counted separately if they differed in perpetrator, severity, frequency, or duration.

Consistent with scoring manual descriptors, severity scores of 3 or higher were considered "major" and include moderate (scores of 3 and 4) and severe (scores of 5 and 6) adversities. Severe adversities were not sufficiently prevalent to be treated as a separate category (Table 1). Severity scores of 1 and 2 were categorized as "minor." As described earlier, summary indices included the sum of severities in each domain, and the number of major and minor adversities endorsed in each domain. Cross-domain aggregate scores were also calculated. Adversities were considered separately for ages 0–9 years old (early and middle childhood) and 9–16 years old (preadolescence and adolescence). When one pattern of adversity spanned the two developmental periods, it was counted in indices for both developmental periods. Age 9 was chosen because there is evidence of prepubertal gonadal hormone changes by this time, which are thought to influence brain development as well as reactivity or sensitivity to adversity (Romeo, 2010). Additionally, age 9 was midway through the period of time assessed by the CTI and roughly corresponds to the mean age of adversity onset in this sample. As discussed later, we conceptualize these distinctions in age and severity somewhat flexibly for application in future studies.

**Table 2** Examples of Minor, Moderate, and Severe Adversities on the Childhood Trauma Interview

Domain	Minor adversities (scores of 1–2)		Major adversities (scores of 3– 6)	
	1, minimal	3, moderate	5, severe	
Separation from or loss of caregiver	Primary caregiver leaving for 1–2 days in an upsetting manner	Separation from primary caregiver for weeks to months due to parental incarceration	Death of both parents or of a sole remaining primary caregiver	
Neglect by caregiver	Coming home from school as a teen and being without supervision for a few hours	Being left at home alone overnight as a teenager	Being left home alone as a small child for long periods of time, including overnight	
Emotional abuse	Yelling more than is reasonable, e.g., “I can’t believe you broke that!”	Derogatory characterizations of the child, e.g., “You can’t do anything right!”	Threats to kill or seriously injure the child, e.g., “I brought you into this world, and I’ll take you out!”	
Physical abuse <sup>a</sup>	Slap on the hand or spank on top of clothing	Hit with an object through clothing leaving marks or bruises	Multiple punches to the body leaving bruises, potentially includes punches to the face.	
Sexual abuse and assault	Being shown sexual photographs by a similar-age peer	Fondling genitals or breasts through clothing	Oral sex, performed by or on the victim	

Note. Severity scored on a scale ranging from 1 to 6

<sup>a</sup> These incidents are scored at the same severity in “witnessed violence” when viewed by the Childhood Trauma Interview respondent.



For the sake of comparison, the previously used but psychometrically problematic multiplicative scores were calculated by multiplying severity, frequency, and duration of each adversity and summing across the products within each domain. In order to assess within-site and cross-site interrater reliability of these indices, recordings of slightly more than 10% of CTIs ( $n = 47$  within site,  $n = 47$  cross-site) were scored by a second rater blind to the interviewer's scores. Interrater reliabilities (intraclass correlation coefficients, or ICCs) were calculated for the number of minor childhood adversities (within-site .82, cross-site .79), major childhood adversities (within-site .84, cross-site .90), minor adolescent adversities (within-site .83, cross-site .72), and major adolescent adversities (within-site .92, cross-site .94).

## **Analytic Plan**

To control our experiment-wise Type I error rate, we used as the first step of our three-step main analyses a logistic regression using an aggregate composite variable (across adversity domains) for each type of index. To maximize power and further control our experiment-wise Type I error rate, we first predicted whether participants had either a first onset of MDD or a first onset of an anxiety disorder—a single combined dependent variable. As a second step, when effects involving adversity on this first step were significant, we conducted follow-up logistic regressions for each domain separately for this combined dependent variable. The third step was to test whether domains that were significantly associated with the combined variable predicted the individual outcomes separately: (a) MDD covarying anxiety onsets, and (b) anxiety onsets covarying MDD onsets (Table 3). Multivariate logistic regressions tested hypotheses about statistically unique contributions of adversity to the association with combined first onsets of MDD and anxiety disorders, as well as MDD and anxiety disorders separately (Table 4).

SES measured using Hollingshead's index (Hollingshead, 1975) and gender were covaried in analyses. Mean replacement for SES score was applied for nine individuals (2.7%) missing baseline SES information. All adversity variables were standardized for ease of comparison across indices. Odds ratios (ORs) refer to the increase in odds of disorder onset associated with a one standard deviation increase in the independent variable.

## **Results**

### **Prevalence and Characteristics of Adversity**

Of the 332 participants included, all but two endorsed at least one adversity of any severity level between the ages of 0 and 16. A total of 3,794 adversities were scored, and the overall mean age of onset was 9.64 years ( $SD = 3.93$ ). Details of the prevalence and characteristics of minor, moderate, and severe adversity across the six domains are presented in Table 2, including information on perpetrators, frequency, and duration of adversities. In general, minor adversities were the most prevalent, with several types (minor separations/losses, neglect, emotional abuse, and physical abuse) being quite common, with prevalence ranging from 56.6% to 88.3%. Severe adversities were rare, with prevalence ranging from 0.6% for severe emotional abuse to 7.5% for severe separations/losses. The number of minor adversities endorsed was modestly and significantly correlated with the number of major adversities endorsed in both childhood ( $r = .29$ ,  $p < .001$ ) and adolescence ( $r = .22$ ,  $p < .001$ ).

## **Associations With Combined First Onsets of MDD and Anxiety Disorders**

All aggregate indices of adversity but one (number of minor childhood adversities, OR 1.21) were significantly associated with combined MDD and anxiety disorder first onsets (ORs 1.48 – 1.81; Table 3). With limited exceptions, three adversity domains were consistently associated with first onsets of emotional disorders across developmental periods and different scoring systems: emotional abuse (ORs 1.38–2.16), physical abuse (ORs 1.36–1.46), and witnessing violence (ORs 1.37–1.54). Exceptions to this pattern were (a) the number of minor adversities in childhood and adolescence in each of these three domains was not typically significantly associated with disorder onsets, (b) the sum of severity scores for adolescent neglect was also significantly associated with disorder onsets (OR = 1.31), and (c) the number of minor adolescent separation/loss adversities was significantly associated with disorder onsets (OR = 1.33). Surprisingly, contrary to our predictions, sexual abuse was not associated with disorder first onsets, a topic addressed in further analyses below.

We followed up significant findings for combined MDD and anxiety disorder onsets by examining associations with MDD and anxiety disorder onsets separately. When predicting MDD, we covaried anxiety disorder onsets and vice versa (Table 3). Although somewhat different patterns emerged for associations of adversity with MDD versus anxiety disorders, the present sample is underpowered to test whether prediction to one dependent variable is significantly stronger than prediction to the other.

## **Statistically Unique Contributions**

We used multivariate logistic regression models to evaluate hypotheses about statistically unique contributions to risk for the combined dependent variable and for MDD and anxiety disorders separately (Table 4). First, for major versus minor adversity, separate multivariate models were examined for childhood and adolescence. In Models 1 and 2, the number of minor and major adversities was entered simultaneously. With the exception of Model 1 for MDD, in which major adversities only approached significance (OR = 1.29,  $p = .092$ ) during both childhood and adolescence, major adversities (ORs 1.46), but not minor adversities (ORs 1.30), contributed significant unique variance to the association with MDD and anxiety disorders. The number of minor adolescent adversities approached significance predicting combined MDD and anxiety disorder onsets (OR = 1.30,  $p .051$ ).

Second, in Models 3 and 4, we used two multivariate logistic regressions to examine the unique associations of the novel summary variables versus the previously used multiplicative index: one for the sum of severity indices and one for the count of adversity indices (Table 4). In each model, the multiplicative aggregate summary score and the novel aggregate scores for both childhood and adolescence were entered simultaneously. (In the approach where major and minor severities are separated, only major adversities were included in the multivariate model.) In no case did the problematic multiplicative scoring approach contribute significant unique variance to predicting onsets (although, in Model 3, it approached significance for the combined dependent variable, OR = 1.52,  $p .080$ ). In several cases, the new scoring approaches contributed significant unique variance to prediction of onsets. The number of major adolescent adversities contributed significant unique variance for MDD onsets (Model 3; OR = 1.58), and the sum of severities for adolescent adversities contributed significant unique variance for combined MDD and anxiety disorder onsets and for MDD onsets separately (Model 4; ORs 1.61). For anxiety disorders, in

**Table 3** Association of New and Old Indices of Early Adversity With First Onset Major Depressive Disorder (MDD) and Anxiety Disorders

Age/measure/domain	Combined MDD and anxiety disorders			MDD covarying anxiety onset			Anxiety covarying MDD onsets		
	<i>B (SE)</i>	OR [95% CI]	<i>p</i>	<i>B (SE)</i>	OR [95% CI]	<i>p</i>	<i>B (SE)</i>	OR [95% CI]	<i>p</i>
Early & middle childhood									
Sum of adversity severity scores									
Aggregate	<b>.41 (.13)</b>	<b>1.51 [1.17, 1.95]</b>	<b>.002</b>	.22 (.14)	1.25 [0.95, 1.65]	.113	<b>.48 (.15)</b>	<b>1.62 [1.21, 2.17]</b>	<b>.001</b>
Separation/loss	.15 (.12)	1.16 [0.91, 1.48]	.222						
Neglect	.06 (.12)	1.06 [0.84, 1.34]	.614						
Emotional abuse	<b>.44 (.13)</b>	<b>1.55 [1.19, 2.00]</b>	<b>.001</b>	.25 (.15)	1.28 [0.96, 1.71]	.096	<b>.46 (.16)</b>	<b>1.58 [1.16, 2.16]</b>	<b>.004</b>
Physical abuse	<b>.38 (.12)</b>	<b>1.46 [1.15, 1.86]</b>	<b>.002</b>	<b>.28 (.14)</b>	<b>1.33 [1.02, 1.74]</b>	<b>.038</b>	<b>.37 (.15)</b>	<b>1.45 [1.09, 1.93]</b>	<b>.012</b>
Witnessing violence	<b>.37 (.12)</b>	<b>1.44 [1.14, 1.83]</b>	<b>.003</b>	.23 (.13)	1.26 [0.97, 1.63]	.087	<b>.41 (.13)</b>	<b>1.51 [1.16, 1.97]</b>	<b>.002</b>
Sexual abuse	.13 (.11)	1.13 [0.91, 1.42]	.268						
No. of minor adversities									
Aggregate*	.19 (.12)	1.21 [0.95, 1.54]	.127						
Separation/loss	.08 (.13)	1.08 [0.84, 1.39]	.559						
Neglect	.05 (.13)	1.05 [0.82, 1.35]	.701						
Emotional abuse	.17 (.12)	1.18 [0.93, 1.51]	.174						
Physical abuse	.17 (.12)	1.18 [0.94, 1.50]	.161						
Witnessing violence	-.02 (.13)	0.99 [0.77, 1.27]	.910						
Sexual abuse	.12 (.13)	1.13 [0.88, 1.44]	.341						
No. of major adversities									
Aggregate*	<b>40 (.13)</b>	<b>1.50 [1.16, 1.93]</b>	<b>.002</b>	.25 (.14)	1.28 [0.97, 1.69]	.084	<b>.46 (.15)</b>	<b>1.59 [1.19, 2.13]</b>	<b>.002</b>
Separation/loss	.14 (.12)	1.15 [0.91, 1.45]	.244						
Neglect	.06 (.12)	1.07 [0.84, 1.35]	.593						
Emotional abuse	<b>.34 (.13)</b>	<b>1.40 [1.09, 1.81]</b>	<b>.010</b>	<b>.34 (.14)</b>	<b>1.41 [1.07, 1.85]</b>	<b>.015</b>	.20 (.17)	1.22 [0.88, 1.70]	.230
Physical abuse	<b>.36 (.13)</b>	<b>1.44 [1.12, 1.84]</b>	<b>.004</b>	.19 (.14)	1.21 [0.92, 1.60]	.177	<b>.41 (.14)</b>	<b>1.51 [1.14, 2.00]</b>	<b>.004</b>
Witnessing violence	<b>.41 (.12)</b>	<b>1.50 [1.19, 1.90]</b>	<b>.001</b>	<b>.28 (.13)</b>	<b>1.32 [1.03, 1.70]</b>	<b>.031</b>	<b>.42 (.13)</b>	<b>1.52 [1.17, 1.98]</b>	<b>.002</b>
Sexual abuse	.06 (.11)	1.06 [0.86, 1.31]	.564						
Preadolescence & adolescence									
Sum of adversity severity scores									
Aggregate	<b>.59 (.14)</b>	<b>1.81 [1.39, 2.35]</b>	<b>.000</b>	<b>.49 (.14)</b>	<b>1.63 [1.23, 2.15]</b>	<b>.001</b>	<b>.46 (.15)</b>	<b>1.58 [1.17, 2.14]</b>	<b>.003</b>

(Table 3 continued)

Separation/loss	.15 (.12)	1.17 [0.92, 1.47]	.201						
Neglect	<b>.27 (.13)</b>	<b>1.31 [1.02, 1.67]</b>	<b>.035</b>	.24 (.14)	1.27 [0.97, 1.68]	.087	.20 (.16)	1.22 [0.89, 1.66]	.219
Emotional abuse	<b>.77 (.14)</b>	<b>2.16 [1.63, 2.85]</b>	<b>.000</b>	<b>.65 (.15)</b>	<b>1.92 [1.44, 2.56]</b>	<b>.000</b>	<b>.58 (.15)</b>	<b>1.78 [1.32, 2.41]</b>	<b>.000</b>
Physical abuse	<b>.33 (.13)</b>	<b>1.39 [1.09, 1.78]</b>	<b>.009</b>	<b>.33 (.14)</b>	<b>1.39 [1.06, 1.82]</b>	<b>.018</b>	.19 (.16)	1.21 [0.89, 1.65]	.223
Witnessing violence	<b>.38 (.13)</b>	<b>1.46 [1.13, 1.89]</b>	<b>.004</b>	.19 (.15)	1.21 [0.91, 1.60]	.199	<b>.42 (.15)</b>	<b>1.53 [1.14, 2.04]</b>	<b>.005</b>
Sexual abuse	.19 (.12)	1.21 [0.95, 1.53]	.127						
No. of minor adversities									
Aggregate	<b>.39 (.13)</b>	<b>1.48 [1.15, 1.90]</b>	<b>.002</b>	.27 (.14)	1.31 [0.99, 1.73]	.055	.25 (.16)	1.28 [0.94, 1.75]	.125
Separation/loss	<b>.29 (.12)</b>	<b>1.33 [1.05, 1.69]</b>	<b>.019</b>	.18 (.14)	1.20 [0.92, 1.58]	.180	.12 (.16)	1.13 [0.82, 1.55]	.471
Neglect	.23 (.13)	1.26 [0.98, 1.63]	.071						
Emotional abuse	<b>.33 (.13)</b>	<b>1.38 [1.08, 1.77]</b>	<b>.010</b>	.14 (.15)	1.15 [0.87, 1.53]	.331	<b>.46 (.16)</b>	<b>1.58 [1.16, 2.16]</b>	<b>.003</b>
Physical abuse	.17 (.12)	1.18 [0.94, 1.49]	.161						
Witnessing violence	-.06 (.13)	0.94 [0.73, 1.22]	.646						
Sexual abuse	.08 (.11)	1.08 [0.87, 1.35]	.480						
No. of major adversities									
Aggregate	<b>.51 (.13)</b>	<b>1.67 [1.28, 2.17]</b>	<b>.000</b>	<b>.46 (.14)</b>	<b>1.58 [1.19, 2.09]</b>	<b>.001</b>	<b>.42 (.15)</b>	<b>1.52 [1.13, 2.04]</b>	<b>.006</b>
Separation/loss	-.01 (.13)	1.00 [0.78, 1.27]	.970						
Neglect	.16 (.13)	1.17 [0.92, 1.50]	.206						
Emotional abuse	<b>.68 (.14)</b>	<b>1.97 [1.49, 2.61]</b>	<b>.000</b>	<b>.69 (.15)</b>	<b>2.00 [1.49, 2.68]</b>	<b>.000</b>	<b>.37 (.14)</b>	<b>1.44 [1.09, 1.91]</b>	<b>.011</b>
Physical abuse	<b>.31 (.13)</b>	<b>1.36 [1.06, 1.73]</b>	<b>.015</b>	<b>.31 (.14)</b>	<b>1.37 [1.04, 1.80]</b>	<b>.026</b>	.19 (.15)	1.21 [0.89, 1.63]	.224
Witnessing violence	<b>.43 (.14)</b>	<b>1.54 [1.18, 2.01]</b>	<b>.002</b>	.19 (.14)	1.21 [0.92, 1.59]	.178	<b>.45 (.15)</b>	<b>1.56 [1.17, 2.09]</b>	<b>.003</b>
Sexual abuse	.19 (.13)	1.21 [0.94, 1.56]	.137						
Psychometrically flawed multiplicative score <sup>a</sup>									
Aggregate	<b>.54 (.14)</b>	<b>1.71 [1.31, 2.24]</b>	.000	<b>.38 (.15)</b>	<b>1.47 [1.10, 1.95]</b>	<b>.008</b>	<b>.44 (.15)</b>	<b>1.56 [1.15, 2.10]</b>	<b>.004</b>
Separation/loss	.14 (.12)	1.15 [0.91, 1.45]	.238						
Neglect	.11 (.11)	1.12 [0.90, 1.40]	.319						
Emotional abuse	<b>.67 (.14)</b>	<b>1.96 [1.48, 2.59]</b>	.000	<b>.43 (.15)</b>	<b>1.54 [1.15, 2.07]</b>	<b>.004</b>	<b>.64 (.16)</b>	<b>1.89 [1.39, 2.59]</b>	<b>.000</b>
Physical abuse	<b>.32 (.12)</b>	<b>1.37 [1.08, 1.74]</b>	.010	<b>.27 (.13)</b>	<b>1.32 [1.02, 1.69]</b>	<b>.032</b>	.17 (.14)	1.18 [0.90, 1.56]	.239
Witnessing violence	<b>.31 (.14)</b>	<b>1.37 [1.04, 1.80]</b>	.023	.19 (.15)	1.21 [0.90, 1.62]	.213	<b>.37 (.15)</b>	<b>1.45 [1.08, 1.95]</b>	<b>.014</b>
Sexual abuse	.03 (.14)	1.03 [0.79, 1.34]	.819						

**Table 4** Multivariate Logistic Unique Associations With Major Depressive Disorders (MDD) and Anxiety Disorders

Model/variable	Combined MDD and anxiety disorders			MDD covarying anxiety onset			Anxiety covarying MDD onsets		
	<i>B (SE)</i>	OR [95% CI]	<i>p</i>	<i>B (SE)</i>	OR [95% CI]	<i>p</i>	<i>B (SE)</i>	OR [95% CI]	<i>p</i>
Model 1									
No. of minor childhood adversities	.09 (.13)	1.09 [0.84, 1.42]	.508	-.02 (.15)	0.98 [0.73, 1.32]	.894	.12 (.17)	1.13 [0.81, 1.57]	.476
No. of major childhood adversities	<b>.38 (.14)</b>	<b>1.46 [1.12, 1.90]</b>	<b>.006</b>	.25 (.15)	1.29 [0.96, 1.72]	.092	<b>.43 (.16)</b>	<b>1.53 [1.13, 2.08]</b>	<b>.006</b>
Model 2									
No. of minor childhood adversities	.26 (.13)	1.30 [1.00, 1.69]	.051	.15 (.15)	1.16 [0.87, 1.55]	.313	.13 (.17)	1.14 [0.81, 1.59]	.462
No. of major childhood adversities	<b>.43 (.14)</b>	<b>1.54 [1.17, 2.02]</b>	<b>.002</b>	<b>.41 (.15)</b>	<b>1.51 [1.12, 2.02]</b>	<b>.006</b>	<b>.38 (.16)</b>	<b>1.46 [1.07, 2.00]</b>	<b>.017</b>
Model 3									
Multiplicative aggregate CTI score	.42 (.24)	1.52 [0.95, 2.43]	.080	.28 (.27)	1.32 [0.78, 2.21]	.300	.10 (.28)	1.10 [0.63, 1.92]	.731
No. of minor childhood adversities	-.13 (.22)	0.88 [0.57, 1.36]	.569	-.28 (.25)	0.75 [0.46, 1.23]	.257	.29 (.26)	1.33 [0.79, 2.23]	.278
No. of major childhood adversities	.30 (.20)	1.34 [0.91, 1.98]	.134	<b>.46 (.22)</b>	<b>1.58 [1.03, 2.42]</b>	<b>.037</b>	.15 (.23)	1.16 [0.74, 1.82]	.528
Model 4									
Multiplicative aggregate CTI score	.25 (.27)	1.28 [0.75, 2.18]	.367	.24 (.30)	1.27 [0.71, 2.27]	.426	-.06 (.32)	0.94 [0.50, 1.76]	.843
No. of minor childhood adversities	-.11 (.23)	0.90 [0.58, 1.40]	.642	-.33 (.25)	0.72 [0.44, 1.18]	.193	.37 (.27)	1.45 [0.85, 2.47]	.173
No. of major childhood adversities	<b>.48 (.21)</b>	<b>1.61 [1.07, 2.43]</b>	<b>.023</b>	.54 (.23)	<b>1.71 [1.10, 2.67]</b>	<b>.018</b>	.24 (.24)	1.27 [0.79, 2.05]	.325

Note. Analyses predicting first onsets of MDD covaried first onsets of anxiety disorders, and vice versa. Other covariates were socioeconomic status and gender. All independent variables were standardized for ease of interpretation across indices. Significant associations ( $p < .05$ ) are bolded. SE standard error; OR = odds ratio; CI = confidence interval; CTI = Childhood Trauma Interview

## **Association of Sexual Abuse with MDD and Anxiety Disorders**

We very conservatively predicted first onsets of MDD and anxiety disorders, excluding individuals who had either of these types of disorders during the window of time covered by the CTI (from birth to age 16). We wondered whether sexual abuse and assault might have contributed to disorder onsets more proximally to those adverse experiences (i.e., during the window of time covered by the CTI). This would have obscured the association of sexual abuse with disorder onsets in young adulthood. When we included participants with baseline interview diagnoses of MDD and anxiety disorders, the sum of severity of sexual abuse in both childhood  $B(SE) = .268(.124)$ ,  $OR = 1.307$ , 95% confidence interval (CI) [1.026, 1.666],  $p = .030$ , and adolescence,  $B(SE) = .137(.069)$ ,  $OR = 1.147$ , 95% CI = [1.003, 1.313],  $p = .046$ , was significantly associated with disorder. This supports that sexual abuse and assault enhance risk for depression and anxiety and suggests that our conservative approach of examining first onsets of disorders obscured this relationship.

## **Discussion**

In the present study, we show that certain types of childhood and adolescent adversity, as captured by two new summary scoring alternatives for the Childhood Trauma Interview (CTI), are associated with first onsets of MDD and anxiety disorders. Although the CTI has been evaluated positively compared with other similar measures (Roy & Perry, 2004), the only previously articulated scoring approach multiplied ordinal scales. This multiplicative procedure has important psychometric problems, which we believe obscure interpretation and also may reduce the predictive power of the measure. We therefore developed two new summary scoring approaches (a sum of adversity severity scores and the number of major and minor adversities endorsed, respectively) to examine the six different domains of adversity assessed by the CTI. For both scoring approaches, we examined adversity separately for two developmental periods, early to middle childhood and preadolescence to adolescence. Taken together, the results indicate significant associations between first onsets of these emotional disorders and several kinds of childhood and adolescent adversity (emotional abuse, physical abuse, and witnessing violence), as well as adversity aggregated across domains.

## **Role of Adversity Severity**

Results further indicate that relatively more severe forms of adversity uniquely associate with risk for MDD and anxiety disorders over and above contributions by minor adversities. Grouping together minor and major adversities in past studies may therefore have resulted in underestimation of the strength of associations between moderate to severe forms of adversity and psychopathology outcomes. Additionally, it is interesting that moderate adversities comprised the bulk of major adversities (combined moderate and severe adversities), as severe adversities were relatively rare. It could be that these moderate adversities are more likely than severe adversities to be overlooked by official records, highlighting a valuable role for measures such as the CTI to complement research based on official records. Toward this end, the new summary scoring methods may facilitate more frequent application of this interview measurement of childhood and adolescent adversity in psychopathology research. Of note, we conceptualize several aspects of these new summary scoring procedures as flexible: Depending on the sample characteristics and the research questions at hand, future studies could separately examine moderate and severe adversities and

could stratify age differently. Similarly, if particular domains are deemed of interest, summary scores across only those domains of interest could be calculated (in contrast to our approach of calculating the total number of major adversities during adolescence across all six domains).

### **Conceptual Strengths of New Scoring Approaches**

Both of our two new approaches to summarizing CTI responses performed no worse than the psychometrically invalid multiplicative scoring approach (Models 3 and 4; Table 4), and both new approaches had unique associations with disorder onset, over and above the multiplicative scoring approach. However, the two new approaches also have different conceptual strengths relative to each other. The approach utilizing the sum of severities is a fully dimensional scale, which may have several advantages including enhanced power to detect significant associations (e.g., Cohen, 1983). By contrast, the count of adversities acknowledges a qualitative distinction between major and minor adversities, which may be useful in certain contexts. This categorical distinction between major and minor adversities was not wholly contraindicated, in that minor adversities rarely demonstrated significant associations with disorder onsets (with several previously noted exceptions). Moreover, in no case did minor adversities contribute significant unique variance to MDD or anxiety onsets over and above major adversities. By contrast, major adversities did contribute significant unique variance over and above minor adversities in all tests except one. However, a weakness of this approach may be some loss of power associated with dichotomizing severity, particularly in instances when major adversities are infrequently endorsed.

### **Unanticipated Results**

Several outcomes were unexpected. First, although we report several significant associations between childhood adversity and MDD as predicted, in multivariate models neither the number of major childhood adversities nor the sum of childhood adversity severities contributed significant unique variance over and above their respective adolescent counterpart variables. One substantive possibility for this outcome is that more recent adversities may have more impact on current functioning. This is consistent with evidence from several studies that later adversity mediates the effects of earlier adversity on depression (Hazel, Hammen, Brennan, & Najman, 2008; Turner & Butler, 2003). However, a more mundane possibility is that participants may have better recollection of the preadolescent to adolescent time period (ages 9–16 years) than the full span of the childhood period (birth–9 years). Consequently, strong conclusions about the relative potency of adversity during childhood versus adolescence are not appropriate. However, the findings about adolescent adversity support recent arguments that adolescence serves as a second sensitive period (e.g., Dahl, 2004; Eiland & Romeo, 2013), during which environmental adversity has important implications for development and well-being.

Second, in general, there were few findings in the specific areas of neglect, separation/loss, and sexual abuse for first onsets of emotional disorders. However, when including individuals who experienced onsets concurrent to the childhood and adolescent adversity examined, we found significant associations between experiences of sexual abuse and emotional disorders. Additionally, low base rates of sexual abuse may have contributed to reduced power to detect associations with first onsets of MDD and anxiety disorders. Indeed, in this sample, endorsement of major sexual abuse was uncommon (3.6% endorsed moderate sexual abuse, and 1.2% endorsed severe sexual abuse; Table 1), though rates were similar in a very large epidemiological sample,

ranging from 1% for repeated rape to 3.8% for repeated molestation (Kessler et al., 1997). The low number of significant associations of neglect and separation/loss with MDD and anxiety disorders regardless of the scoring method used was unexpected, especially as adversity in these domains was fairly common.

## **Limitations**

In addition to several strengths (e.g., interview measures of psychopathology and of adversity), this study has several limitations. First, the CTI was administered retrospectively, when the participants were between 22 and 24 years of age, whereas the diagnoses reported here occurred prior to that time. One potential drawback of retrospective reporting is noted here, but a full discussion of retrospective reports is beyond the present scope and has been previously articulated (e.g., Hardt & Rutter, 2004). We assessed adversity occurring between ages 0 and 16, which would have been prior to the first onsets of emotional disorders, but we cannot rule out the possibility that the presence of these disorders from ages 16 to 21 may have biased reporting at ages 22–24. (Unfortunately, no measure of current mood at the precise time of CTI administration is available.) Brown and Harris (1989, p. 13) referred to this phenomenon as “effort after meaning,” in which individuals may unintentionally catastrophize previous experiences to provide an explanation for a negative outcome. For this reason, we conservatively characterize relationships between early adversity and later MDD as associations rather than predictions. However, some have concluded that evidence shows that psychopathology does not bias such reports (Brewin, Andrews, & Gotlib, 1993). Alternatives to retrospective reports also have drawbacks; objective sources such as documented records may underestimate rates of adversity and prospective longitudinal childhood adversity research presents feasibility challenges including long duration follow-ups.

Second, individuals who experienced high levels of childhood and adolescent adversity may have become depressed soon after that adversity (i.e., prior to the study period); those with MDD and anxiety disorders prior to the study period were excluded from analyses. This could artificially lower effect size estimates of the effect of adversity. Therefore, our results might reasonably be interpreted as conservative. However, we elected to predict first onsets of MDD and anxiety disorders rather than lifetime cases to help assure temporal precedence—that is, the adversity was reported to have occurred prior to the MDD and anxiety onsets. This reduces concern that actively depressed children or adolescents may have elicited more adverse treatment from parents, peers, or teachers, or that current depression before age 16 influenced perception and encoding of how they were treated.

Third, although we were able to address several methodological limitations of the existing literature on early adversity and anxiety disorders, we had insufficient prospective cases of each type of anxiety disorder to conduct analyses separately for each one. It might be particularly important to examine relationships with PTSD onsets, which were quite rare in this sample ( $n = 4$ ). However, severe adversities occurring in childhood or adolescence might be expected to trigger the onsets of PTSD relatively rapidly on average (meaning those individuals would have been excluded from analyses due to baseline diagnoses), rather than enhancing risk over the more protracted period studied here. Future work in very large epidemiological samples should address whether particular forms of adversity might be related more strongly to some anxiety disorders than to others. By a similar token, based on conventions in the research literature on recent stressful life events and depression onsets (e.g., Brown & Harris, 1978), we combined indices of moderate and severe adversities into an index of the number of “major” adversities instead of examining



them separately. Unfortunately the present sample did not provide sufficient power to separately examine severe adversities (scores of 5 and 6), which were rare in this sample, with prevalence ranging from 0.6% for severe emotional abuse to 7.5% for severe separations and losses (Table 1).

Fourth, the sample studied here may not be representative of the general population in several ways. Although the sample's SES ranged from very low to very high, the sample was on average upper-middle class. Given that early adversity is more prevalent at lower SES levels, it is possible that we have underestimated the effects of adversity, assuming that lower adversity prevalence contributed to reduced power. Additionally, individuals scoring in the top tertile on a screening measure of neuroticism were oversampled for recruiting into the longitudinal study. Some from our group have shown that oversampling does not bias regression effect size estimates but does prevent certain other statistical modeling problems that can arise when predicting low base rate outcomes (Hauner, Zinbarg, & Revelle, 2013). Therefore, we do not expect that oversampling for neuroticism influenced the pattern of findings.

Fifth, one possible drawback to these two new dimensional scoring approaches is that some of the rich information collected in the CTI is not used, namely, the duration, frequency, and perpetrator of each adversity. However, results of multivariate analyses using the new scoring approaches and the problematic multiplicative scoring system (which incorporated duration and frequency but not perpetrator) indicate that the new scoring approach contributed significant unique variance in the association with depression, whereas the previously used approach did not. We interpret this to mean that the new scoring approaches certainly perform no worse than the multiplicative one incorporating frequency information and that, by contrast, they appear to better capture the important variance in adversity. However, it is possible that frequency and duration are important characteristics of specific types of adversity that might be even more damaging than others (e.g., chronic abuse perpetrated by a primary caregiver). Future research should explore whether new ways to incorporate frequency information adds to prediction, over and above the prior multiplicative approach and even the severity-only approaches proposed here.

Finally, the present study was underpowered to test whether gender moderates the effect of adversity on MDD and anxiety disorder onsets, as males were only 30% of the sample. This was because invited females were more likely than males to agree to participate, and because of the sampling strategy for high levels of neuroticism, a trait on which females are higher on average (Costa, Terracciano, & McCrae, 2001).

## **Conclusion**

We have shown that certain types of childhood and adolescent adversity, as captured by two new summary scoring alternatives for the Childhood Trauma Interview (CTI; Fink et al., 1995), are associated with first onsets of MDD and anxiety disorders. Our new summary scoring methods for the CTI avoid psychometric problems associated with a previous scoring approach. We recommend that in the future, researchers employing the CTI consider use of these scoring methods and that investigators begin to focus on why childhood and adolescent adversity increases risk for depression and anxiety disorders.

## Notes

1 Many would argue that any sexual exposure, abuse, or assault constitutes a “major” adversity, and we would not disagree with this. However, most would probably also agree that a continuum of severity exists (see Table 2). For this reason, and to use consistent language across domains of adversity, we refer to “minor” sexual abuse adversities, inaccurate though that may be.

2 Dates of onset for MDD cases relative to the CTI window were readily determined. These cases come from all five interviews. Due to greater temporal ambiguity of anxiety disorder onsets, anxiety disorders were included as cases if the first onset was diagnosed at any of the four follow-up interviews. We additionally inspected by hand notes from the SCIDs of each of the 58 cases of anxiety disorders diagnosed at baseline (and not already excluded due to prior MDD) to determine whether the anxiety disorders onset during or after the period of time covered by the CTI but before the baseline interview. Onsets at ages 8–14 were prevalent. In six cases, it was unclear when the disorder had onset. In two cases, it appeared that the onset occurred after the CTI window but before the baseline interview. Out of an abundance of caution, we treated all baseline cases of anxiety disorder as present during the CTI window and therefore excluded the cases from analysis.

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