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## Measuring trauma and stressful events in childhood and adolescence among patients with first-episode psychosis: Initial factor structure, reliability, and validity of the Trauma Experiences Checklist

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### Abstract

Past trauma and stressful events, especially in childhood and adolescence, are common among individuals with serious mental illnesses like schizophrenia. Traumatic experiences are thought to be a socio-environmental risk factor not only for poorer outcomes, but also potentially for the onset of these disorders. Because improved measurement tools are needed, we developed and studied, among 205 first-episode psychosis patients, the factor structure, internal consistency reliability, and initial validity of the Trauma Experiences Checklist (TEC), our measure of trauma and stressful events during childhood/adolescence. We assessed validity of subscales using correlations with Childhood Trauma Questionnaire-Short Form, Parental Harsh Discipline, Violence Exposure, and TEC-Informant Version scores. Exploratory factor analysis resulted in two internally consistent subscales (Cronbach's  $\alpha$ 's = 0.79 and 0.80, respectively), *interpersonal abuse and family stress*, and *violence, death, and legal involvement*. Scores from the former subscale were substantially associated with CTQ-SF physical, emotional, and sexual abuse ( $r=0.42-0.57$ , all  $p<0.001$ ) and Violence Exposure ( $r=0.49$ ,  $p<0.001$ ). On the other hand, *violence, death, and legal involvement* scores were most highly correlated with Violence Exposure ( $r=0.49$ ,  $p<0.001$ ), and not with most CTQ-SF subscales. The TEC is a potentially useful tool in assessing diverse traumatic life events across various social contexts during childhood and adolescence.

### Keywords

First-episode psychosis; Psychosis; Schizophrenia; Stressful life events; Trauma; Traumatic experiences

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## 1. Introduction

In recent years, abundant evidence has accumulated revealing high rates of prior traumatic experiences among persons with serious mental illnesses (Carmen et al., 1984; Goff et al., 1991; Lipschitz et al., 1996; Mueser et al., 1998; Goodman et al., 2001; Read et al., 2005; Bendall et al., 2008). Notably, a history of trauma is associated with a variety of poor outcomes for such individuals, including greater symptom severity (Beck and van der Kolk, 1987; Bryer et al., 1987; Muenzenmaier et al., 1993; Goodman, et al., 1997a), a higher prevalence of risky sexual behaviors (Craine et al., 1988; Briere et al., 1997; Goodman and Fallot, 1998), substance abuse (Beck and van der Kolk, 1987; Nelson et al., 2002), and homelessness (Carmen et al., 1984; Goff et al, 1991; Davies-Netzley et al., 1996; Goodman et al., 1997b). Current understandings identify the role of trauma as a necessary factor in the development of posttraumatic stress disorder, but trauma is also thought to play a causal role in other mental illnesses, including depression, anxiety disorders, eating disorders, substance abuse, sexual dysfunction, personality disorders, and dissociative disorders, as well as suicidality (Bushnell et al., 1992; Mullen et al., 1993; Lange et al., 1995; Fergusson et al., 1996; Hyun et al., 2000; Kendler et al., 2000; Grilo and Masheb, 2002; Christoffersen et al., 2003).

Trauma and stressful events in childhood and adolescence (e.g., childhood abuse; Read et al., 2005; Üçok and Bikmaz, 2007) are also known to be more prevalent among individuals with schizophrenia and other psychotic disorders than in the general population. Furthermore, trauma is predictive of a poorer course of psychotic disorders, including greater positive and dissociative symptoms at the first episode (Üçok and Bikmaz, 2007), earlier age at onset (Goff et al., 1991), poorer social outcomes (Cusak et al., 2004), and higher rates of suicide (Roy, 2005). Other findings support the role of childhood trauma as a socio-environmental risk factor for psychotic symptoms (Read et al., 2003; Bebbington et al., 2004; Spauwen et al., 2006; Spence et al., 2006; Bendall et al., 2008; Kelleher et al., 2008; van Winkel et al., 2008), and research on the potential etiological relationship between trauma/stressful events in childhood/adolescence and psychotic disorders is evolving.

Three decades of research has led to the theory that symptoms of schizophrenia are the result of dopaminergic dysfunction, with hypoactivity in the prefrontal cortex linked to negative symptoms and hyperactivity in the striatum associated with positive symptoms (Howes and Kapur, 2009). One proposed link between trauma and psychosis is that repeated exposures could cause hyperactive dopaminergic neurotransmission in the mesocorticolimbic circuit, which, in turn, diminishes regulatory cognitive processes in the prefrontal cortex and alters reward-related learning (van Os et al., 2010). Other proposed mechanisms for the association between trauma and psychotic disorders include alterations in social cognition, negative beliefs about self, and heightened sensitivity to stress (Read et al., 2005). Animal studies of social isolation and subordination indicate that this type of stress causes striatal dopaminergic hyperactivity (Howes and Kapur, 2009). Similar physiological processes may explain how other environmental risk factors, such as growing up in an urban environment, immigration, minority group position, and a lack of close friends, contribute to risk of psychosis (Howes and Kapur, 2009; van Os et al., 2010).

Adolescence is marked by substantial changes in neural networks and is widely considered a critical period for the pathophysiology of schizophrenia and other psychotic disorders (Uhlhaas and Singer, 2011). As our understanding of the complex relationship between serious mental illnesses, trauma, and psychological and physiological stress develops, more information is needed on the role of trauma and stress during adolescence, and perhaps early

adolescence specifically. Inquiry into this subject can be facilitated by the collection of detailed data used to derive continuous scores of traumatic and stressful events, across various domains, in childhood and adolescence. Indeed, research in this area has often suffered from a lack of methodological rigor regarding the use of enhanced, valid, and reliable measures (Bendall et al., 2008).

The available measures typically assess specific aspects of trauma. For example, the relatively commonly used *Childhood Trauma Questionnaire–Short Form* (CTQ-SF; Bernstein et al., 2003) assesses childhood physical, emotional, and sexual abuse, as well as physical and emotional neglect, but it does not cover other types of trauma, such as natural disasters or family violence. Similarly, the *Life Experience Questionnaire* (Bryer et al., 1987) only measures physical/sexual abuse and neglect; the *Assessing Environments–III* (Berger et al., 1988) primarily rates physical abuse; the *Childhood Abuse and Trauma Scale* (Sanders and Becker-Lausen, 1995) is a measure of childhood physical, emotional, and sexual abuse; and the *Sexual Abuse Exposure Questionnaire* (Rodriguez et al., 1997) only assesses childhood sexual trauma. Few instruments are available that address childhood abuse and neglect as well as other traumatic experiences. While measures of childhood trauma tend to focus on family-related abuse/neglect, adolescent peer relationships are also critical, with both domains (family and peers) potentially influencing one other (Brown and Bakken, 2011). Thus, research on trauma and stress during the crucial developmental period of adolescence should include items on the adolescent’s experiences with family members as well as peers.

In light of limited available instruments, especially those that yield continuous scores for traumatic exposures in multiple areas of children’s and adolescents’ lives, we developed a new measure of trauma and stressful events in childhood and adolescence (the *Trauma Experiences Checklist*, TEC), which we administered to patients with first-episode psychosis. In this report, we describe the instrument and give an initial report of its factor structure, as well as reliability and validity of derived subscale scores. We conducted an exploratory factor analysis of the instrument’s 41 items and then assessed internal consistency reliability of derived factors. To assess validity of subscale scores, we examined associations between those scores and several other instruments tapping trauma and stressful events in childhood and adolescence.

## 2. Methods

### 2.1. Development of the measure

We developed the TEC to thoroughly measure traumatic and stressful events across a range of social, familial, and environmental contexts during childhood and adolescence. The TEC is a 41-item instrument in which participants are asked to endorse the frequency (0, 1, 2, 3 or >3 times; the latter being coded as 4 for scoring purposes) of a broad range of traumatic and stressful experiences that might have happened before the age of 18 years. Only one item (#41, “Have you ever had a parent who did drugs?”) relies on a no (0) or yes (1) format. Examples of trauma and stressful events include personal injury (e.g., #5: “Have you ever been hit by a car?” and #31: “Have you ever had a knife pulled on you and you were physically wounded?”); extreme environmental stress (e.g., #17: “Have you ever been evicted from your home?” and #32: “Have you ever had a gun pointed at you?”); interpersonal violence (e.g., #28: “Have you ever been hurt by a family member?” and #40: “Have you ever been raped by a family member?”); and other forms of relational trauma (e.g., #7: “Have you ever had a parent in jail?” and #13: “Have you ever had a close friend commit suicide?”). The questions were written using wording that we thought would be most understandable to our population of interest, as well as our familiarity with what they tend to experience in terms of trauma and stressful events. For example, having been hit by a

car is a relatively common accident among our participants. Another example is having been threatened with a gun; unfortunately, gun violence is commonly experienced in our sample.

To facilitate rapport and reduce shame and perceived stigma associated with some traumatic experiences, we attempted to strategically order the questions; for example, we started with natural disasters and car accidents, and asked about gun violence, physical abuse, sexual abuse, and rape toward the end. Furthermore, in order to elicit more accurate recall, the TEC relies on specific questions, (e.g., #27: “Have you ever seen or heard a member of your family physically hurting another family member?”) as opposed to more general questions such as “Did family members hurt each other?” We also strove to write the items in everyday language and ensure that they are culturally relevant (e.g., #8: “Have your parents ever split up or gotten a divorce?” and #33: “Have you ever witnessed a drive-by shooting?”).

An analogous version of the TEC was developed for use with close relatives, friends, or others (“informants”), who can report on the index patient’s traumatic and stressful events in childhood and adolescence. Called the *TEC-Informant Version*, this instrument is identical to the TEC (e.g., items were also anchored to “before the age of 18”), except for adapting the wording of items; for example, “Have you ever been in a car accident?” was changed to “Has the patient ever been in a car accident?” While we view the patient’s self-report ultimately to be more valid, the *TEC-Informant Version* was administered for the purposes of one aspect of validation, as described below.

## 2.2. Setting and sample

A total of 205 participants were recruited between August 2008 and December 2012 from five inpatient settings. From the primary site (in Atlanta, Georgia), participants were recruited from a large, urban, university-affiliated, public-sector hospital ( $n=147$ ), a suburban county psychiatric crisis center ( $n=34$ ), and a local state psychiatric hospital ( $n=14$ ). The two inpatient settings of the secondary site (Washington, D.C.), which only recently joined the study, included a private, university-affiliated hospital ( $n=7$ ), and a community hospital ( $n=3$ ). Criteria for inclusion were that participants were hospitalized for a first-episode, non-affective psychotic disorder, between the ages of 18 and 40 years, and English speaking. Participants were excluded if they had known or suspected mental retardation, a Mini-Mental State Examination (Folstein et al., 1975; Cockrell and Folstein, 1988) score of  $<24$ , a significant medical condition that compromised ability to participate, a prior hospitalization  $>3$  months before the index hospitalization, prior antipsychotic treatment for  $>3$  months, or an inability to provide informed consent. Written informed consent was obtained from all patients prior to study participation. All procedures were approved by the universities’ institutional review boards and the hospitals’ research oversight committees as applicable.

In addition to the first-episode psychosis patients participating in the overarching study, informants who knew the patient well were also enrolled to obtain collateral data on some aspects of the patient’s life and recently evolving psychotic disorder. A “primary informant” was interviewed for 136 patients (66.3%); such informants were predominantly mothers (62.6%), siblings (16.5%), fathers (8.7%), or other relatives (10.5%). Additionally, a “secondary informant” was also available for 65 patients (31.7%), and these informants tended to be siblings (35.5%), fathers (19.4%), or other relatives (29.1%). Informants were asked to complete the *TEC-Informant Version* only when they endorsed having seen the patient at least weekly for at least three years when the patient was 12–18 years old.

### 2.3. Procedures and materials

Data for this analysis came from the detailed clinical research assessment completed as part of an ongoing study of premorbid cannabis use and the early course of non-affective psychotic disorders. This project collected detailed data from approximately 250 hospitalized patients with a first episode of a schizophrenia-spectrum disorder, most of whom were socially disadvantaged, low-income, and African American. The overall clinical research assessment for the parent study lasted about six hours and was typically administered over the course of two days during the participant's hospital stay. The assessment was designed to measure multiple variables such as symptom severity, cognitive deficits, neurological signs, diagnosis, drug and alcohol history, family history, and past trauma and stressful life events, among others. The assessment was begun only after initial stabilization of symptoms (hospital day mean and median of 6.9 and 5.0). Diagnoses of psychotic disorders were made using the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID; First et al., 1998) based on a chart review, information from the participant's treating clinicians, and a semi-structured diagnostic interview.

In addition to the TEC and *TEC-Informant Version*, we assessed childhood/adolescent trauma and stressful life experiences using three other instruments. First, the CTQ-SF (Bernstein et al., 2003) is a 28-item scale used extensively to assess past physical, emotional, and sexual abuse, as well as physical and emotional neglect. Each item begins with the phrase, "When I was growing up," and is rated using a 5-point frequency of occurrence scale: (1) never true, (2) rarely true, (3) sometimes true, (4) often true, and (5) very often true. Each subscale score ranges from 5 (no history of abuse or neglect) to 25 (very extreme history of abuse and neglect), with three items assessing the tendency to minimize or deny abuse. Good construct validity and internal consistency have been demonstrated (Bernstein et al., 2003), as has test-retest reliability (Paivio and Cramer, 2004) and gender and race invariance of the five-factor structure (Thombs et al., 2007). Second, we measured *Parental Harsh Discipline* by assessing five domains: yelling, spanking, slapping, hitting with a belt or some other object, and telling one to get out or locking one out of the house (Ge et al., 1994; Mrug et al., 2008). Participants rated the frequency of each experience with their parents or primary caregiver between 12 and 18 years on a 5-point Likert scale (never=1 to always=5). Thus, a higher score indicates a greater level of harsh discipline, ranging from 5 to 25. Third, *Violence Exposure* was measured with a 7-item scale assessing the following domains between the ages of 12 and 18 years: (1) hearing a threat of physical violence directed toward someone else, (2) seeing physical violence (someone being hit, kicked, punched, or beaten up), (3) witnessing a threat or actual violence involving a weapon (e.g., gun or knife) directed toward someone else, (4) being personally threatened with physical violence, (5) personally experiencing physical violence, (6) being physically injured by someone to the extent that medical care was needed (this item asks the number of times as opposed to yes/no), and (7) personally experiencing a threat or actual injury from a weapon (Mrug et al., 2008).

### 2.4. Data analysis

Distributions of the 41 items of the TEC were examined to assess the degree of missing data. Although a total of 205 participants were recruited between August 2008 and December 2012 for the overall 6-hour assessment of the previously described parent study, only 170 had complete data for the TEC factor analysis. Since TEC factor indicators were dichotomous or ordinal rather than continuous, the exploratory factor analysis was conducted using a robust weighted least squares means and variance adjusted (WLSMV) estimation. We carried out the analysis using the exploratory structural equation modeling procedure in *Mplus7.1* (Asparouhov and Muthén, 2009). All indicators were free to load on all factors and an oblique (GEOMIN) rotation was used to allow for correlations between



factors. A scree plot was reviewed to identify the appropriate number of factors. Factor indicators were considered for elimination if: (1) a factor loading (parameter estimate/standard error) was not statistically significant at  $p < 0.05$ , (2) the item's factor loadings were statistically significant for multiple factors, or (3) the group of indicators for each factor had poor face validity. The chi-square difference test was used to compare nested factor models (one-factor versus two-factor models) using DIFFTEST, and fit statistics were computed, including the Bentler's comparative fit index (CFI), the Tucker-Lewis index (TLI), and the root mean square error of approximation (RMSEA). Cronbach's alpha internal consistency coefficient was estimated for each factor and a score was created by summing responses across all factor indicators.

In order to initially assess concurrent validity of these subscales, despite the lack of a "gold standard," we computed associations between the derived TEC subscale scores (based on the two-factor model described below), and each of the following: the primary informant's TEC-Informant Version subscale scores, when available; the mean of the primary and secondary informants' TEC-Informant Version subscale scores, when relevant; the Parental Harsh Discipline scale score; the Violence Exposure scale score; and the 5 subscale scores of the CTQ-SF (physical abuse, emotional abuse, sexual abuse, physical neglect, and emotional neglect).

### 3. Results

#### 3.1. Sociodemographic and Clinical Characteristics of Participating First-Episode Patients

Sociodemographic characteristics of the study sample are shown in Table 1. The mean age of participants was  $24.2 \pm 4.8$  years and the mean years of educational attainment was  $11.9 \pm 2.2$ . The majority of participants were male (151, 73.7%), African American (173, 84.4%), single and never married (180, 87.8%), and living with family members in the month prior to hospitalization (131, 63.9%). More than one-third had been raised by their mothers only (86, 42%), and about one-third had been raised by both parents (64, 31.2%). The majority of patients were unemployed prior to admission (138, 67.3%); just over two-thirds had a history of incarceration (141, 68.8%); and nearly half lived below the federally defined poverty level (72, 43.4%) based on reported household income, the number of people in the household, and published poverty thresholds for the year of the patient's participation in the study.

Diagnostic characteristics of the study sample are shown in Table 2. Over half of the sample (123, 60%) met SCID criteria for schizophrenia (87 with paranoid type, 26 with undifferentiated type, and 10 with disorganized type), 28 (13.7%) for psychotic disorder not otherwise specified, 25 (12.2%) for schizoaffective disorder (five with bipolar type and 20 with depressive type), 23 (11.2%) for schizophreniform disorder, four (2%) for delusional disorder, and two (1%) for brief psychotic disorder.

#### 3.2. Factor Analysis and Internal Consistency Reliability of Derived Subscales

Evaluation of the scree plot revealed either a two- or three-factor model. Comparison of a single-factor model and the two-factor model indicated an improved fit for the two-factor model (chi-square difference = 146.59,  $df=32$ ,  $p < 0.0001$ ). A total of eight factor indicators were not included, leaving 33 indicators with significant loadings on the two factors. The two-factor model chi-square value was 646.69 ( $df=463$ ,  $p < 0.0001$ ), with CFI=0.87, TLI=0.86, and RMSEA=0.048, indicating good fit. A three-factor model was then compared with the nested two-factor model. Results from the difference test indicated improved fit with a three-factor model (chi-square difference=81.92,  $df=31$ ,  $p < 0.0001$ ) and good fit indices (final model chi-square=572.52,  $df=432$ ,  $p < 0.0001$ ), with CFI=0.90, TLI=0.88, and

RMSEA=0.044; however, although the three-factor model fit slightly better, in this model 10 additional TEC indicators were eliminated, leaving one factor with only two items (and a Cronbach's alpha <0.50). For these reasons, we chose to keep the two-factor TEC model, which displayed good fit to the data. Table 3 gives the individual TEC items and factor loadings for the two-factor model (selected as the final model). Cronbach's alphas were 0.79 for factor A and 0.80 for factor B. The correlation between the factors was  $r=0.36$  ( $p<0.0001$ ).

The 14-item TEC factor A was termed the *interpersonal abuse and family stress* subscale because it included items pertaining to: being verbally abused by a family member (#26), hearing verbal abuse within the family (#25), being hurt by a family member (#28), witnessing physical abuse within the family (#27), sexual abuse by a family member (#38), sexual abuse by a non-family member (#37), rape by a non-family member (#39), bullying that caused injury (#24), and bullying that felt threatening (#23). This factor also included items tapping stress due to a family situation: having a parent who did drugs (#41), being evicted (#17), having a parent in jail (#7), having a family member in the hospital for a major illness (#9), and parental divorce (#8). Among 172 patients with available data on these 14 items, the mean subscale score was  $11.98\pm 9.01$ , with a range of 0–40.

TEC factor B, comprised of 19 items, was termed the *violence, death, and legal involvement* subscale because it included items pertaining to, for example, being kidnapped, witnessing a drive-by shooting, having been held at gun-point, having been shot at, having been robbed, having had a close friend who was murdered, having been hit by a car, and being in a car-jacking or car theft. This factor also included several items pertaining to death or near-death (e.g., house burned down, was in a car accident, close friend committed suicide or otherwise died), as well as a history of arrest and incarceration. Among 182 patients with available data on the 19 items comprising this factor, the mean subscale score was  $10.40\pm 8.40$ , with a range of 0–56.

### 3.3. Concurrent Validity of the Derived Subscales

Concurrent validity of the two derived subscales was examined in four ways. First, we computed correlations between the patients' TEC subscale scores and their respective primary informants' TEC-Informant Version subscale scores. Among 109 primary informants with available data on the 14 *interpersonal abuse and family stress* subscale items, the mean subscale score was  $8.00\pm 6.23$ , with a range of 0–33. Among 108 primary informants with available data on the 19 *violence, death, and legal involvement* subscale items, the mean subscale score was  $5.19\pm 4.46$ , with a range of 0–20. As shown in Table 4, the correlation between the patient's subscale score and the informant's subscale score was  $r=0.37$  ( $p<0.001$ ) for both subscales ( $n=89$  and  $n=90$ , respectively). Second, we examined correlations between the patients' TEC subscale scores and the mean of the primary and secondary informants' TEC-Informant Version subscale scores. Among 50 averaged informant scores for *interpersonal abuse and family stress*, the mean subscale score was  $7.68\pm 4.22$ , with a range of 0–16.5. Among 47 averaged informant scores for *violence, death, and legal involvement*, the mean subscale score was  $4.64\pm 3.28$ , with a range of 0–13.5. As given in Table 4, the correlation between the patients' subscale score and the mean of the primary and secondary informants' TEC-Informant Version subscale scores were  $r=0.28$  ( $p=0.07$ ,  $n=42$ ) and  $r=0.35$  ( $p<0.05$ ,  $n=44$ ), respectively.

Next, we assessed zero-order correlations between TEC subscale scores and scores from the 5 subscales of the CTQ-SF, the Parental Harsh Discipline scale, and the Violence Exposure scale. As shown in Table 4, *interpersonal abuse and family stress* scores were substantially associated with CTQ-SF physical, emotional, and sexual abuse ( $r=0.42$ – $0.57$ , all  $p<0.001$ ), as well as Violence Exposure ( $r=0.49$ ,  $p<0.001$ ). On the other hand, *violence, death, and*

*legal involvement* scores were most highly correlated with Violence Exposure ( $r=0.49$ ,  $p<0.001$ ), and not associated (or only minimally associated) with most CTQ-SF subscales.

Fourth, regression analysis was then conducted given that the two TEC subscales were moderately correlated with one another. Table 5 displays the point estimate, standard error, and  $R^2$  (a measure of explained variance of the dependent variable), from seven models in which the two TEC subscale scores were regressed on the 5 subscale scores of the CTQ-SF, the Parental Harsh Discipline score, and the Violence Exposure score. Both TEC factors were significantly associated with Parental Harsh Discipline ( $p<0.01$ ) and Violence Exposure ( $p<0.0001$ ). Only *interpersonal abuse and family stress* was significantly and positively related to four of the five CTQ-SF subscales: physical abuse, emotional abuse, and sexual abuse (all  $p<0.0001$ ), as well as emotional neglect ( $p<0.001$ ). Both TEC factors explain a substantial portion of the variance in the Parental Harsh Discipline score ( $R^2=0.153$ ) and Violence Exposure score ( $R^2=0.333$ ).

#### 4. Discussion

Trauma and stressful events in childhood and adolescence are known to be highly prevalent and associated with poorer illness outcomes among persons with serious mental illnesses. Furthermore, these socio-environmental risk factors are of increasing interest to researchers focusing on the social determinants of, and exacerbating factors for, schizophrenia and other psychotic disorders. Traumatic experiences may play a causal role and may lead to poorer course and outcomes, perhaps through alterations in the dopaminergic system. For further progress in this area, enhanced measurement tools are needed. We developed the 41-item TEC and, in a relatively large sample of first-episode psychosis patients, uncovered two subscales that appear to have acceptable internal consistency reliability and concurrent validity. Our instrument is designed to provide continuous scores (thereby enhancing variability and facilitating statistical analyses) of traumatic and stressful events across a range of social, familial, and environmental contexts specifically during childhood and adolescence.

Our initial testing of concurrent validity had to be conducted with several existing measures of more restricted concepts (i.e., childhood maltreatment, parental harsh discipline, violence exposure) and informants' TEC-Informant Version ratings, rather than a "gold-standard" comparator (as one is lacking). It is therefore not surprising that validity effect sizes were generally in the medium range ( $r=0.30-0.50$ ) rather than the large range ( $r>0.50$ ). Validity may be further supported by recently reported associations between the total TEC score and years of education achieved ( $r=-0.27$ ), positive symptom severity at initial hospitalization ( $r=0.29$ ), estimated total lifetime alcohol use ( $r=0.38$ ), and estimated total lifetime cannabis use ( $r=0.50$ ) in 61 of our first-episode participants (Ramsay et al. 2011a).

Current approaches to measuring childhood and adolescent traumatic experiences are varied, and each technique has specific advantages and limitations. For example, objective approaches to measuring childhood maltreatment include retrieval of data on child abuse from police agencies and child abuse services (Cutajar et al., 2010). Yet, there are multiple systematic biases to this method. First, it likely under-reports trauma to a considerable extent as most childhood abuse cases are never reported to the police or social service organizations, or else only the most severe incidents are reported (Read et al., 2006). Second, in addition to a likely under-reporting, administrative data or "objective" measures likely restrict the ability to determine "dose-response" relationships due to constricted variability. Third, for the cases that are identified by relevant authorities, the young person may no longer be at risk for ongoing abuse, which could potentially provide a protective effect.



Collateral reports may be informative when available, but friends and family members are sometimes, if not often, unaware of traumatic experiences that their loved one may have experienced, or they may be reluctant to report trauma due to embarrassment or liability concerns. (Of note, either of these may have occurred in the present study, potentially accounting for the medium effect sizes with regard to the correlations between patients' self-report TEC scores and informants' TEC-Informant Version scores.) Given clear limitations of administrative data and collateral/informant reports, self-report might well be the best method for obtaining retrospective data on a whole host of traumatic exposures and stressful life events and can thus give valuable insight into patients' experiences of trauma and stress during childhood and adolescence. While some have raised concerns about biases related to self-report, research suggests that self-report might actually lead to an under-reporting, rather than over-reporting, of childhood abuse (Hardt and Rutter, 2004). Self-report is widely used in schizophrenia research and its reliability and validity have been demonstrated on multiple occasions (Read et al., 2005). In a recent study involving patients with first-episode psychosis, for example, self-report measures had good concurrent validity, reasonable convergent validity with case reports, and high levels of stability over a seven-year period (Fisher et al., 2011).

Several methodological limitations should be considered. First, our overarching study was focused on first-episode psychosis and we were therefore unable to study the factor structure and psychometric properties of the TEC in a broader psychiatric or general population sample. Factor structure, reliability, and validity must be studied in other samples before use in broader research areas. Second, in addition to the restricted clinical profile of our sample, study participants were primarily urban, low-income, and socially disadvantaged African Americans, by virtue of the treatment settings where our study was conducted. Sociodemographic characteristics of this sample are consistent with those of a previous independent sample of 109 hospitalized first-episode patients recruited from the primary site (Compton et al., 2009; Compton et al., 2010a; Compton et al., 2010b; Goulding et al., 2010; Compton et al., 2011a; Compton et al., 2011b; Ramsay et al., 2011b). Given the specific nature of our sample, factor invariance across more diverse samples should be established, as well as reliability and validity in a broader patient population. Third, we were unable to assess test-retest reliability, which would be important to document in future studies.

Increased risk for psychotic disorders seems to be connected to adverse childhood experiences across cultures (Myers, 2011). A recent meta-analysis suggested that childhood exposure to adversity makes a child 2.72 times more likely to develop psychosis, and that a dose-response relation between trauma and the development of psychotic symptoms is likely (Varese et al., 2012). The TEC gives us the opportunity to investigate the concept of "doses" further by measuring the severity of childhood and adolescent trauma on a continuous scale. Instruments such as the TEC might help to determine whether or not certain risks for developing a psychotic disorder are interactive or independent, such as the yet-to-be-settled possibility that early cannabis use and childhood trauma interact (Houston et al., 2008; Houston et al., 2011). In the future, the TEC could be modified to assess the age at which traumas occur, in order to flesh out what traumas matter (e.g., bullying, sexual abuse), when (to identify sensitive periods), and how accumulating adversities during certain periods may further elevate risk for a psychotic episode in high-risk youth (Myers, 2012).

There is evidence that focusing on trauma engages people with a psychotic disorder in research, and that trauma-informed interventions might be particularly attractive to newly diagnosed youth in need of services (Amsel et al., 2012). Addressing trauma identified by instruments such as the TEC could have clinical relevance, as the presence of childhood trauma appears to raise the possibility of post-psychosis posttraumatic stress disorder (Bendall et al., 2012). The consequences of childhood/adolescent trauma are far-reaching,

and the TEC might be useful for a number of research questions, and potentially also for informing how we can improve recovery outcomes for young people with early-course psychotic disorders.

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**Table 1**Sociodemographic Characteristics of the Study Sample ( $n=205$ )

Age at hospitalization, years	24.2±4.8 (range: 18–39)
Educational attainment, years	11.9±2.2 (range: 7–18)
Gender, male	151 (73.7%)
Race	
<i>African American</i>	173 (84.4%)
<i>Caucasian</i>	18 (8.8%)
<i>Asian</i>	4 (2%)
<i>Other</i>	10 (4.9%)
Relationship status	
<i>Single and never married</i>	180 (87.8%)
<i>Married or living with a partner</i>	8 (3.9%)
<i>Separated or divorced</i>	16 (7.8%)
<i>Widowed</i>	1 (.5%)
Who the patient was living with in the month prior to hospitalization	
<i>Parents, siblings, or other family members</i>	131 (63.9%)
<i>Alone</i>	15 (7.3%)
<i>Boyfriend, girlfriend, spouse, or partner</i>	15 (7.3%)
<i>Friends or roommate</i>	10 (4.9%)
<i>Structured living arrangement</i>	2 (1%)
<i>Homeless</i>	21 (10.2%)
<i>Other</i>	11 (5.4%)
Who raised the patient during most of his/her childhood	
<i>Mother</i>	86 (42%)
<i>Both parents</i>	64 (31.2%)
<i>Other family members</i>	35 (17.1%)
<i>Father</i>	13 (6.3%)
<i>Foster family</i>	3 (1.5%)
<i>Other</i>	4 (2%)
Work status in the month prior to hospitalization, unemployed	138 (67.3%)
Legal history, at least one prior incarceration	141 (68.8%)
Family income status, living below the federal poverty level ( $n=166$ )	72 (43.4%)

**Table 2**Clinical and Diagnostic Characteristics of the Study Sample ( $n=205$ )

Age at onset of psychosis, years	21.3±5.3 (range: 3–37)
Length of hospital stay, days	8.9±5.1 (range: 1–29)
SCID-based psychotic disorder diagnosis	
<i>Schizophrenia, paranoid type</i>	87 (42.4%)
<i>Psychotic disorder not otherwise specified</i>	28 (13.7%)
<i>Schizophrenia, undifferentiated type</i>	26 (12.7%)
<i>Schizophreniform disorder</i>	23 (11.2%)
<i>Schizoaffective disorder, depressive type</i>	20 (9.8%)
<i>Schizophrenia, disorganized type</i>	10 (4.9%)
<i>Schizoaffective disorder, bipolar type</i>	5 (2.4%)
<i>Delusional disorder</i>	4 (2%)
<i>Brief psychotic disorder</i>	2 (1%)

**Table 3**

Items, Factor Loadings, and Cronbach's alphas for the Two-Factor TEC Model ( $n=170$ ). Factor loadings in bold are significant at  $p<0.05$ .

		A <sup>a</sup>	B <sup>b</sup>
2	Has your house ever burned down?	0.237	<b>0.326</b>
3	Have you ever been in a car accident?	0.135	<b>0.342</b>
4	Have you ever had a car almost run over you?	0.110	<b>0.417</b>
5	Have you ever been hit by a car?	-0.030	<b>0.528</b>
6	Has anyone ever forced you to give them the keys to your car or forced you out...and stolen it from you?	0.151	<b>0.496</b>
7	Have you ever had a parent in jail?	<b>0.386</b>	0.114
8	Have your parents ever split up or gotten a divorce?	<b>0.230</b>	-0.020
9	Have you ever had a family member go into the hospital for a major illness?	<b>0.352</b>	0.118
11	Have you ever had a close family member who was murdered?	0.067	<b>0.373</b>
13	Have you ever had a close friend commit suicide?	-0.070	<b>0.466</b>
14	Have you ever had a close friend who was murdered?	-0.002	<b>0.623</b>
15	Have you ever had a close friend die, (other than suicide/murder)?	0.039	<b>0.408</b>
16	Has your home ever been broken into?	0.035	<b>0.475</b>
17	Have you ever been evicted from your home?	<b>0.401</b>	0.228
20	Have you ever been arrested, but not incarcerated?	0.159	<b>0.442</b>
21	Have you ever been arrested and incarcerated?	-0.072	<b>0.547</b>
22	Have you ever been robbed?	0.007	<b>0.688</b>
23	Has there ever been a bully in your school or neighborhood that made you feel threatened or scared?	<b>0.483</b>	0.053
24	Has there ever been a bully in your school or neighborhood that hurt you to the point of injury?	<b>0.500</b>	0.168
25	Have you ever heard a member of your immediate family verbally abuse another family member?	<b>0.826</b>	0.007
26	Have you ever been verbally abused by a member of your family?	<b>0.916</b>	-0.069
27	Have you ever seen or heard a member of your family physically hurting another family member?	<b>0.723</b>	0.079
28	Have you ever been hurt by a family member?	<b>0.829</b>	-0.093
31	Have you ever had a knife pulled on you and you were physically wounded?	0.042	<b>0.389</b>
32	Have you ever had a gun pointed at you?	0.120	<b>0.746</b>
33	Have you ever witnessed a drive-by shooting?	-0.067	<b>0.757</b>
34	Have you ever been shot at, but you were not physically wounded?	0.025	<b>0.743</b>
35	Have you ever been shot at and you were physically wounded?	-0.165	<b>0.454</b>
36	Have you ever been kidnapped?	-0.219	<b>0.877</b>
37	Have you ever been touched sexually.. .that made you feel uncomfortable by someone outside your family?	<b>0.423</b>	0.095
38	Have you ever been touched sexually in a way that made you feel uncomfortable by a family member?	<b>0.579</b>	-0.156
39	Have you ever been raped by someone outside your family?	<b>0.448</b>	0.229
41	Have you ever had a parent who did drugs?	<b>0.500</b>	0.100
<i>Cronbach's a for the scale</i>		<i>0.79</i>	<i>0.80</i>
TEC Items Not Included in the Two Factors			
1	Have you ever experienced a tornado, earthquake, flood or hurricane?		

		A <sup>a</sup>	B <sup>b</sup>
10	Have you ever had a close family member commit suicide?		
12	Have you ever had a close family member die, (other than suicide/murder)?		
18	Have you ever been removed from your home or had to leave your home and move to another home or a foster home?		
19	Have you ever lived in a homeless shelter?		
29	Have you ever seen or heard someone outside your household physically hurting someone else?		
30	Have you ever had a knife pulled on you, but you were not physically wounded?		
40	Have you ever been raped by a family member?		

<sup>a</sup>Factor A is called "*interpersonal abuse and family stress*",

<sup>b</sup>Factor B is called "*violence, death, and legal involvement*"

**Table 4**

Correlations between Patients' TEC Factor Scores and Respective Informants' Scores, as well as CTQ-SF, Parental Harsh Discipline, and Violence Exposure Scores

	<b>TEC Factor A</b> <i>interpersonal abuse and family stress</i>	<b>TEC Factor B</b> <i>violence, death, and legal involvement</i>
Primary Informant Score for the Respective Factor ( <i>n</i> =89, 90)	0.37 <sup><i>b</i></sup>	0.37 <sup><i>b</i></sup>
Averaged Primary/Secondary Informant Score ( <i>n</i> =42, 44)	0.28	0.35 <sup><i>a</i></sup>
CTQ-SF Physical Abuse	0.42 <sup><i>b</i></sup>	0.19 <sup><i>a</i></sup>
CTQ-SF Emotional Abuse	0.57 <sup><i>b</i></sup>	0.27 <sup><i>b</i></sup>
CTQ-SF Sexual Abuse	0.46 <sup><i>b</i></sup>	0.12
CTQ-SF Physical Neglect	0.37 <sup><i>b</i></sup>	0.19 <sup><i>a</i></sup>
CTQ-SF Emotional Neglect	0.31 <sup><i>b</i></sup>	0.07
Parental Harsh Discipline	0.32 <sup><i>b</i></sup>	0.28 <sup><i>b</i></sup>
Violence Exposure	0.49 <sup><i>b</i></sup>	0.49 <sup><i>b</i></sup>

<sup>*a*</sup>  
*p*<0.05,

<sup>*b*</sup>  
*p*<0.001



**Table 5**

Associations between TEC Factors and CTQ-SF, Parental Harsh Discipline, and Violence Exposure Scores, Using Regression Analysis

	TEC Factor A <i>interpersonal abuse and family stress</i> (standard error)	TEC Factor B <i>violence, death, and legal involvement</i> (standard error)	R <sup>2</sup>
CTQ-SF Physical Abuse	0.200 (0.037) <sup>c</sup>	0.026 (0.045)	0.176
CTQ-SF Emotional Abuse	0.276 (0.039) <sup>c</sup>	0.036 (0.048)	0.270
CTQ-SF Sexual Abuse	0.268 (0.045) <sup>c</sup>	-0.039 (0.054)	0.180
CTQ-SF Physical Neglect	0.039 (0.021)	-0.004 (0.026)	0.022
CTQ-SF Emotional Neglect	0.187 (0.049) <sup>b</sup>	-0.022 (0.060)	0.083
Parental Harsh Discipline	0.107 (0.035) <sup>a</sup>	0.136 (0.043) <sup>a</sup>	0.153
Violence Exposure	0.109 (0.022) <sup>c</sup>	0.146 (0.027) <sup>c</sup>	0.333

<sup>a</sup>  $p < 0.01$ ,

<sup>b</sup>  $p < 0.001$ ,

<sup>c</sup>  $p < 0.0001$