

Trauma, Posttraumatic Stress Symptoms, and Alcohol-Use Initiation in Children*

PING WU, PH.D.,[†] HECTOR R. BIRD, M.D.,[†] XINHUA LIU, PH.D.,[†] CRISTIANE S. DUARTE, PH.D., M.P.H.,[†] CORDELIA FULLER, M.A.,[†] BIN FAN, M.D.,[†] SA SHEN, PH.D.,[†] AND GLORISA J. CANINO, PH.D.[†]

Department of Psychiatry, College of Physicians and Surgeons, Columbia University, Unit 43, New York, New York 10032

ABSTRACT. Objective: This study examined initiation of alcohol use among adolescents, in relation to their earlier traumatic experiences and symptoms of posttraumatic stress disorder (PTSD). **Method:** Data were from a longitudinal study of children of Puerto Rican background living in New York City's South Bronx and in San Juan, Puerto Rico. The subsample ($n = 1,119$; 51.7% male) of those who were 10-13 years old and alcohol naive at baseline was used in the analyses. **Results:** Alcohol-use initiation within 2 years after baseline was significantly more common among children reporting both trauma exposure and 5 or

more of a maximum of 17 PTSD symptoms at baseline (adjusted odds ratio = 1.84, $p < .05$) than among those without trauma exposure, even when potentially shared correlates were controlled for. Children with trauma exposure but with fewer than five PTSD symptoms, however, did not differ significantly from those without trauma exposure, with regard to later alcohol use. **Conclusions:** PTSD symptoms in children 10-13 years old may be associated with early onset of alcohol use. It is important to identify and treat PTSD-related symptoms in pre-adolescent children. (*J. Stud. Alcohol Drugs*, 71, 326-334, 2010)

SEVERE CHILDHOOD TRAUMA is often reported by those presenting with posttraumatic stress disorder (PTSD) comorbid with a substance-use disorder (Epstein et al., 1998; Jelley, 2003; Schumacher et al., 2006; Waldrop et al., 2007; Weinstein, 1998). There is evidence that PTSD, or PTSD symptoms, following childhood traumatic experiences may be related to later substance-use disorders, especially among girls and women (Duncan et al., 1996; Epstein et al., 1998; Jelley, 2003; Lipschitz et al., 2003; Ullman et al., 2005) but also among men (Deykin and Buka, 1997; Grice et al., 1995; Jelley, 2003; Weinstein, 1998). Only retrospective information on childhood experiences and on PTSD symptoms preceding the onset of substance-use disorders was available to these researchers, however. Such information is vulnerable to the effects of recall bias (Schroeder and Costa, 1984).

The relationships among childhood trauma, PTSD, and substance-use disorder can be better understood if examined prospectively. In addition, research focusing on a very early stage of the process, such as the onset of alcohol use, has the

potential to be especially informative. Studies have shown that initiation of alcohol use during the pre-adolescent and early adolescent years is associated with traumatic experiences of earlier childhood (Bensley et al., 1999; Hamburger et al., 2008; Sartor et al., 2007). Such early alcohol-use initiation is, in turn, predictive of the development of alcohol and other substance-use-related problems in adolescence (Bensley et al., 1999; Kandel, 2002; Sartor et al., 2007) and of alcohol and drug dependence in adulthood (Bensley et al., 1999; DeWit et al., 2000; Ellickson et al., 2003; Hingson et al., 2006; Hingson and Zha, 2009; McGue et al., 2001; Sartor et al., 2007; Warner and White, 2003).

It has been suggested that early alcohol-use initiation results partly from a sense of dissatisfaction, on the part of the child, with the world as he or she has known it (Zucker et al., 2008). The painful affect and disturbing memories associated with symptoms of PTSD would help to create such a sense of dissatisfaction in a child (Flood et al., 2009). Previous studies examining the relationship between childhood trauma and early initiation of alcohol use have not, however, taken PTSD symptomatology into account. The current longitu-

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[†]Correspondence may be sent to Ping Wu, Departments of Psychiatry

and Epidemiology, Columbia University, 1051 Riverside Drive, Unit 43, New York, NY 10032 or via email at: pw11@columbia.edu. Ping Wu is also with the Mailman School of Public Health, Columbia University, and the New York State Psychiatric Institute, New York, NY. Hector R. Bird, Cristiane S. Duarte, Cordelia Fuller, Bin Fan, and Sa Shen are with the New York State Psychiatric Institute, New York, NY. Xinhua Liu is with the Mailman School of Public Health, Columbia University, New York, NY. Glorisa J. Canino is with the Behavioral Sciences Research Institute, University of Puerto Rico, San Juan, Puerto Rico.

dinal study examines both childhood traumatic experiences and PTSD symptoms, in relation to subsequent alcohol-use initiation.

PTSD and early onset of alcohol use share other common antecedents in addition to childhood traumatization, a fact that can complicate efforts to understand their relationship. For example, factors related to alcohol-use initiation in pre-adolescence and early adolescence include frequent parental alcohol use (Casswell et al., 1991), parental emotional disorders (Cortes et al., 2009; Mowbray and Oyserman, 2003), low levels of parental monitoring (Gilbreth, 2001; O'Donnell et al., 2008), and a poor parent-child relationship (Cohen et al., 1994; DeWit et al., 1999), as well as child sensation-seeking tendencies (Martin et al., 2004), and conduct problems and antisocial behaviors (Kuperman et al., 2005; McGue et al., 2001). Many of these factors have also been found to be associated with exposure to trauma (Breslau et al., 1991), and with PTSD symptoms (Saigh et al., 1999). Thus, when exploring the relationship of trauma and PTSD symptoms with alcohol-use initiation, it is important to take these factors into account, as they could potentially confound or mediate the relationship of interest.

A developmental perspective on the interrelationships among exposure to trauma, PTSD, and alcohol use is essential to the effectiveness of efforts to improve early detection of trauma-related psychiatric symptoms and prevent early onset of alcohol use and the subsequent development of alcohol-use disorders. The current study (a) examines the relationship between childhood traumatic experiences and PTSD symptoms, and subsequent initiation of alcohol use; and (b) investigates whether the observed relationship of trauma and PTSD symptoms with alcohol-use initiation can be explained by shared risk factors.

Method

Sample

The Boricua Youth Study is a three-wave longitudinal study of psychopathology and substance use among Puerto Rican children in two contexts with high concentrations of Puerto Ricans: the South Bronx in New York City and the San Juan Standard Metropolitan Area in Puerto Rico. Probability samples of boys and girls ages 5-13 years ($N = 2,491$) were obtained from both sites and assessed between 2000 and 2004. The completion rates for Waves 2 and 3 were 92% and 88% of the baseline sample, respectively. A subsample, consisting of children who at baseline were ages 10-13 years and reported never having used alcohol, and who completed interviews both at baseline and at either of the two follow-ups ($n = 1,119$; 51.7% male), was used for these analyses. The Wave 2 and Wave 3 follow-up interviews were conducted 1 and 2 years after baseline, respectively. Analyses comparing those who dropped out of the study

after the baseline interview with those who remained in the study showed that those lost to attrition were more likely to come from families with more highly educated parents and were also more likely to belong to the South Bronx sample.

Procedures

Structured in-person interviews were conducted by trained lay interviewers separately with parents and children in the families' homes, in English or in Spanish. For children 10 or older at baseline, information on child psychiatric disorders, family sociodemographic factors, and a wide array of risk factors was obtained from both the parent and the child (Bird et al., 2006a, 2006b).

Children who, at baseline, were 10 years old or older and had never used alcohol, were selected to be included in our analyses ($n = 1,119$; 51.7% boys). The mean age at baseline was 11.5 years. About 20.8% of the children were from families in which neither parent had finished high school; 33.3% were from families in which at least one parent had finished college. Data on 503 child subjects from the Bronx site, and 616 children from the Puerto Rico site, were used in this study. The two groups were not found to differ from each other with regard to the outcome variable of alcohol-use initiation. They did, however, differ on some of the independent variables. Compared with children from the Puerto Rico site, for example, those from the South Bronx site were more likely to report trauma exposure; their parents tended to have a lower level of education; and they were more likely to come from single-parent families. Because of these observed site differences, study site was controlled for in all of the regression analyses.

Written informed consent was obtained from the adult informants, and the youth informants signed assent forms. Consent forms and procedures were approved by the institutional review boards of the New York State Psychiatric Institute and the University of Puerto Rico Medical School. The interviews were conducted using laptop computers. Sample maintenance procedures followed guidelines provided by Stouthamer-Loeber and Van Kammen (1995). More detailed information about the survey procedures can be obtained elsewhere (Bird et al., 2006a; Bird et al., 2007).

The institutional review board of the New York State Psychiatric Institute reviewed and approved the analyses used in the current study.

Measures

Measures of alcohol use. Child alcohol use was assessed using questions regarding lifetime and past-year alcohol use as well as questions from the alcohol-abuse section of the National Institute of Mental Health Diagnostic Interview Schedule for Children, DSM-IV version (DISC-IV; Shaffer et al., 2000). Alcohol use was defined as drinking a full

can or bottle of beer, a glass of wine or wine cooler, a shot of distilled spirits, or a mixed drink with distilled spirits in it (not just sips from another person's drink). A child was considered an alcohol user if either the child or the parent reported such use. Only children who had not used alcohol at baseline were included in the study sample. Self-reported use of alcohol at either follow-up interview was therefore considered to represent alcohol-use initiation. For the survival analyses, the time (in years) from baseline to a child's initiation of alcohol use was used as the outcome variable.

Measures of trauma and PTSD symptoms. At baseline, child traumatic event exposure and PTSD symptoms were assessed by the DISC-IV (Shaffer et al., 2000), based on DSM-IV PTSD criteria (American Psychiatric Association, 1994). The DISC-IV first identifies children meeting criteria for trauma exposure (i.e., those who have experienced, witnessed, or been confronted with any of the eight types of life-threatening events listed and who experienced intense sensations of fear, helplessness, and/or horror at the time). For those meeting these criteria, a series of 17 PTSD symptom questions were then asked. For our analyses, a symptom is considered to be positive if the corresponding question item received a positive response from either the parent or the child (Shaffer et al., 2000). Trauma exposures and PTSD symptom counts, as reported at baseline, were used as predictors. The children were divided into three groups for the purposes of the analyses: (a) those not reporting, at baseline, any trauma exposure; (b) those with reported trauma exposure but falling below the 50th percentile, with regard to number of PTSD symptoms, of those with exposure (i.e., those having fewer than five PTSD symptoms); and (c) those at or above the 50th percentile with regard to PTSD symptoms (i.e., having five or more PTSD symptoms).

Parental factors. Parental psychopathology was measured by the Family History Screen for Epidemiological Studies (FHS; Lish et al., 1995) and questions developed for the Boricua study measuring DSM-IV criteria for antisocial behavior disorder, which were included in the parent interview. Three dichotomous variables were created: (a) parental emotional problems was coded as 1 if one or more of six items in the FHS, covering depressive symptoms, suicide attempts, nervous attacks, and other emotional problems, received a positive response; (b) the parental substance-use problems variable was created based on parent informants' responses to two items in the FHS, one on drinking problems and the other on drug problems, in the parent informant and/or his or her co-parent; and (c) the probable parental antisocial personality disorder variable was created using responses to a set of questions based on DSM-IV criteria for antisocial behavior and one additional question taken from the FHS regarding the parent's being arrested or convicted of a crime.

Parental monitoring was assessed using a Likert-type scale based on nine questions from the parent interview about parents' monitoring of the child's daily after-school

activities and general awareness of the child's whereabouts. A high score represents a high level of parental monitoring. The scale has fair reliability (Cronbach's $\alpha = .55$; Patterson and Stouthamer-Loeber, 1984).

Parental discipline was measured using six items from the parent interview covering various forms of physical punishment, as well as verbal abuse and withholding of affection. The scale's reliability is fair (Cronbach's $\alpha = .54$; Goodman et al., 1998). Maternal Warmth and Supportiveness is a Likert-type scale using 13 parent interview questions about the mother-child relationship. A high score indicates a close relationship. The scale's reliability is satisfactory (Cronbach's $\alpha = .72$; Bird et al., 2006a; Hudson, 1982).

Individual-level factors. Sensation seeking was measured by an abbreviated version of Russo et al.'s (1991, 1993) sensation-seeking scale (Bird et al., 2006a), included in the child interview. The Cronbach's α for this scale is .72 (Bird et al., 2006a).

Antisocial behavior is a five-category classification of antisocial behaviors based on severity ratings assigned by nine mental health clinicians to items from the conduct disorder and oppositional defiant disorder sections of the DISC-IV and from the Elliot Delinquency Scales; it ranks children along a hierarchy of seriousness or severity of antisocial behaviors (Bird et al., 2005).

Church attendance information was obtained in the child interview and children were divided into three groups: never attend, attend irregularly, and attend regularly.

Sociodemographic factors. Sociodemographic variables include child age, gender, and parents' highest number of years of education completed. Family structure variables include family composition (i.e., single vs. two parental figures).

Statistical analysis

The children in the study sample were divided into three groups, as described above, according to their baseline reports of traumatic experiences and PTSD symptoms. For each of the three groups, rates of alcohol-use initiation since the baseline interview, reported at either follow-up, were calculated. In the bivariate analyses, *t* test or analysis of variance was used to test for group differences in continuous variables, and chi-square test was used to detect bivariate associations between categorical variables, particularly the associations of baseline trauma exposure and levels of PTSD symptoms, and of subsequent alcohol-use initiation reported at follow-up, with site (South Bronx, Puerto Rico) and other factors at the family, parental, and individual levels as measured at baseline. Last, site-stratified Cox proportional hazards models for time from baseline to onset of alcohol use were used to examine the relationship of trauma exposure and PTSD symptoms at baseline with time to alcohol initiation, adjusting for sets of other baseline variables hier-

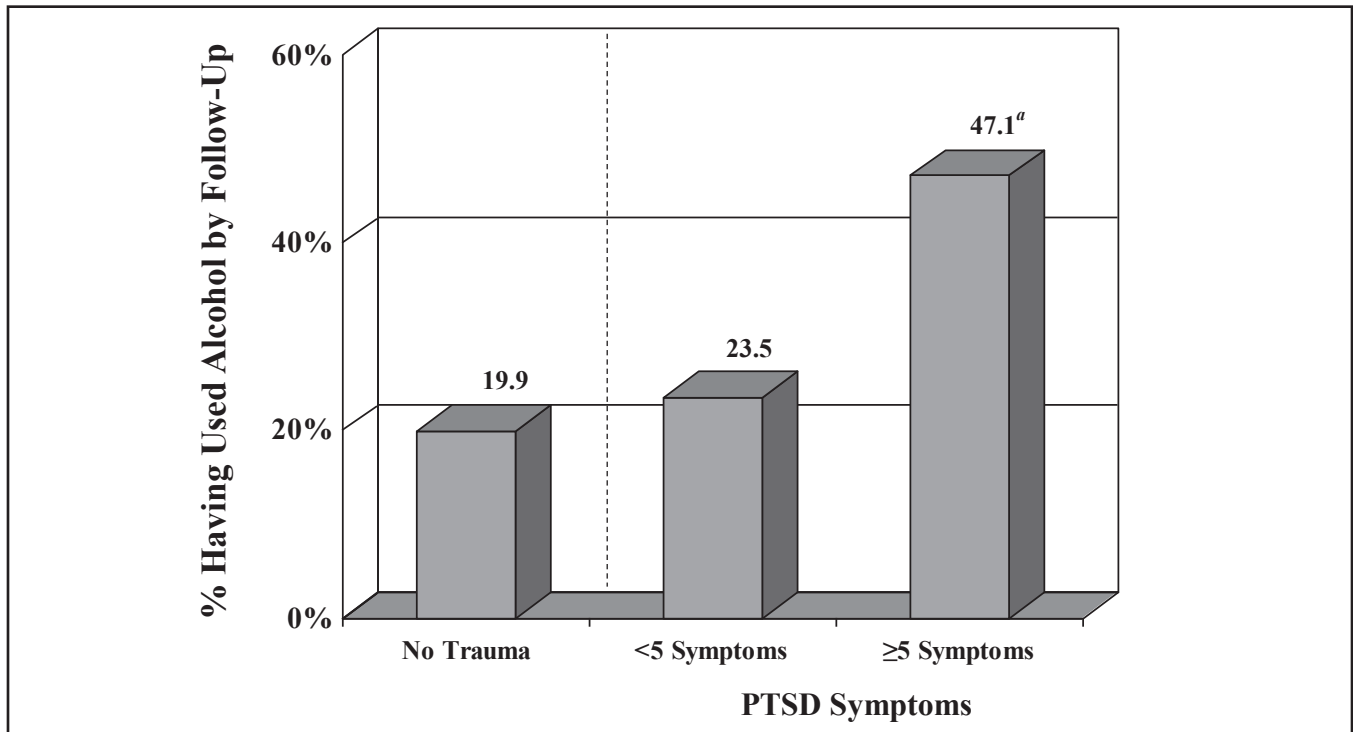


FIGURE 1. Traumatic events and posttraumatic stress disorder (PTSD) symptoms at baseline and alcohol-use initiation by follow-up, among adolescents who were not alcohol users at baseline ($n = 1,119$). ^aSignificantly different from the “no-trauma” group, $p = .001$.

archically. Model 1 included main predictors of exposure to trauma and PTSD symptoms at baseline. Model 2 included additional family-level sociodemographic variables (age, gender, single-parent family, and parental education level). Model 3 further included the parental factors that were associated with the alcohol initiation outcomes and the main predictors in bivariate analysis. Model 4 was an extension of Model 3 with child antisocial behavior as an additional covariate, to test whether the observed relationship of trauma and PTSD with alcohol initiation was mediated by antisocial behaviors. Relative risks, along with 95% confidence intervals, were derived from the models to aid interpretation.

SUDAAN software (Research Triangle Institute, 2001) was used to obtain corrected estimates of the variances of the parameters, by taking the complex features of the sampling design into account.

Results

Bivariate analyses

The majority of these children (unweighted $n = 960$) did not report any exposure to traumatic events; 82 children reported exposure to traumatic events but had fewer than five PTSD symptoms; and 77 children reported both trauma exposure and five or more PTSD symptoms. By Wave 3 of the

study, 265 of the children reported that they had consumed at least one drink. Figure 1 shows that the rate of alcohol-use initiation of the group with five or more PTSD symptoms was more than double that of the group with no trauma experience (47.1% vs. 19.9%). The rate of alcohol initiation for those with trauma experience but with few PTSD symptoms (23.5%) was not significantly different from that of the no-exposure group, however.

Bivariate analyses were also conducted to identify, from among a set of baseline sociodemographic, parental, and individual-level factors, variables associated both with alcohol initiation and with the PTSD measures (trauma exposure and PTSD symptoms; Table 1).

Table 1 shows that a number of baseline sociodemographic, parental, and individual-level factors—specifically, child age, probable parental antisocial personality disorder, parental discipline, child sensation seeking, and child antisocial behavior—were found to be significantly and positively associated with initiation of alcohol use, whereas parental monitoring and maternal warmth and supportiveness were negatively associated with alcohol initiation. Rates of parental emotional problems and substance-use problems were also higher among the parents of adolescent alcohol-use initiators than among those of the nonusers. These differences were only marginally significant, however.

The pattern of associations found with trauma exposure

TABLE 1. Factors associated with alcohol use initiation, exposure to traumatic events, and PTSD ($n = 1,119$)

| Independent variables (baseline) | Alcohol use by follow-up | | Exposure to trauma and PTSD Symptoms at baseline | | |
|--|--------------------------|----------------------|--|----------------------------------|--|
| | No use ($n = 854$) | Use ($n = 265$) | Exposed to traumatic event(s) | | |
| | | | No traumatic event ($n = 960$) | <5 PTSD symptoms ($n = 82$) | ≥ 5 PTSD symptoms ($n = 77$) |
| Age, in years, M (SE) | 11.3 (0.05)** | 12.2 (0.08)*** | 11.5 (0.05) | 11.6 (0.16) | 11.9 (0.15)* |
| Female, % | 49.9 | 49.4 | 49.3 | 51.2 | 52.9 |
| Parental education, % | | | | | |
| <High school | 29.7 | 23.3 | 28.2 | 36.1 | 22.2 |
| High school | 49.7 | 49.7 | 49.3 | 46.5 | 58.6 |
| \geq College | 20.6 | 27.0 | 22.5 | 17.4 | 21.2 |
| Single-parent family, % | 45.2 | 46.2 | 43.1 | 54.1 | 59.6* |
| Parental emotional problems, % | 35.0 | 42.6 [§] | 36.2 | 32.3 | 57.0* |
| Parental substance-use problems, % | 12.8 | 19.7 [§] | 13.9 | 13.4 | 19.9 |
| Probable parental ASPD, % | 13.0 | 23.4* | 14.7 | 13.6 | 23.5 |
| Parental monitoring, M (SE) | 13.6 (0.12) | 12.5 (0.26)*** | 13.5 (0.14) | 12.9 (0.36) | 12.4 (0.43) [§] |
| Maternal warmth and supportiveness, M (SE) | 2.4 (0.02) | 2.3 (0.04)* | 2.4 (0.02) | 2.3 (0.06) | 2.2 (0.04) |
| Parental discipline, M (SE) | 0.4 (0.03) | 0.6 (0.05)** | 0.5 (0.03) | 0.5 (0.06) | 0.5 (0.07) |
| Child sensation seeking, M (SE) | 3.5 (0.11) | 4.9 (0.20)*** | 3.8 (0.11) | 3.6 (0.30) | 4.3 (0.31) |
| Child antisocial behavior, M (SE) | 1.2 (0.06) | 2.1 (0.13)*** | 1.4 (0.06) | 1.6 (0.19) | 2.1 (0.21)** |
| Child church attendance, % | | | | | |
| Never | 13.4 | 14.3 | 14.7 | 9.1 | 7.1 |
| Irregular | 37.7 | 38.1 | 37.6 | 42.1 | 35.5 |
| Regular | 48.8 | 47.6 | 47.7 | 48.8 | 57.4 |

Notes: PTSD = posttraumatic stress disorder; ASPD = antisocial personality disorder.

[§] $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

and PTSD symptom levels is in some ways similar to that found for alcohol-use initiation, with significant differences found for child age, parental emotional problems, and child antisocial behavior. Parental monitoring appeared to be negatively related to the measure of trauma and PTSD, but the difference was only marginally significant. Unlike alcohol-use initiation, the trauma exposure and PTSD symptoms measure was significantly positively associated with belonging to a single-parent family.

Site-stratified Cox proportional hazards models for time since baseline to the onset of alcohol use were applied and the results are reported in Table 2. The major demographic factors, as well as the other factors that had been found, in bivariate analyses, to be associated both with alcohol initiation and with trauma exposure and PTSD symptoms (including those that were marginally significant), were added into the model in a hierarchical sequence. Children who had experienced trauma but had few PTSD symptoms did not differ significantly from those without trauma experience, with regard to alcohol initiation. Children with both trauma experience and a higher level of PTSD symptoms were more likely to initiate alcohol use after baseline than those without trauma experience. It can be seen in Models 1-4 in Table 2 that other factors associated both with PTSD symptoms and with alcohol initiation do partially explain the association between PTSD and risk of alcohol initiation. For the comparison between (a) children with trauma experience

and high PTSD symptoms and (b) those without trauma experience, the estimated relative risk after adjusting for other baseline factors for alcohol initiation did fall from 3.13 ($p < .001$) in Model 1 to 2.29 ($p < .05$) in Model 4 (in which all of the associated factors were controlled for); however, it remained significant. The Model 4 results also show that, in addition to high PTSD symptom level, child older age and child antisocial behavior were both independently predictive of alcohol initiation. Low parental monitoring also appeared to be associated with child initiation of alcohol use, but this relationship was only marginally significant. To test for a gender difference in the relationship of trauma and PTSD with subsequent initiation of alcohol use, we also examined the statistical interaction between our main predictor and gender; the interaction was not statistically significant.

Discussion

Many previous studies of adults have retrospectively linked adult alcohol and other substance-use disorders with childhood traumatization (Brems et al., 2004; Epstein et al., 1998; Sartor et al., 2007; Weinstein, 1998), and others have provided evidence that such a link is at least partially explained by PTSD or PTSD symptoms (Duncan et al., 1996; Epstein et al., 1998; Weinstein, 1998; Zlotnick et al., 2006). Few, if any, studies have addressed the issue prospectively and focused on children and adolescents. To our knowledge,

TABLE 2. Relative risk of initiation of alcohol use after baseline^a

| Independent variables (at baseline) | Model 1 Relative risk ^b [95% CI] | Model 2 Relative risk [95% CI] | Model 3 Relative risk [95% CI] | Model 4 Relative risk [95% CI] |
|---|---|--------------------------------------|--------------------------------------|--------------------------------------|
| Main predictor | | | | |
| Trauma exposure and level of PTSD symptoms (ref. = no traumatic events) | | | | |
| Low PTSD symptoms (<5) | 1.16 [0.56, 2.42] | 1.08 [0.51, 2.31] | 1.02 [0.48, 2.15] | 1.06 [0.50, 2.25] |
| High PTSD symptoms (≥5) | 3.13*** [1.75, 5.60] | 2.48** [1.28, 4.77] | 2.49** [1.31, 4.75] | 2.29* [1.19, 4.41] |
| Control variables | | | | |
| Age ^c | | 1.99*** [1.66, 2.39] | 1.96*** [1.62, 2.36] | 1.91*** [1.57, 2.31] |
| Girl | | 1.32 [0.84, 2.08] | 1.26 [0.82, 1.95] | 1.48 [0.92, 2.38] |
| Parental education (ref. = college) | | | | |
| No high school | | 0.82 [0.41, 1.65] | 0.83 [0.42, 1.65] | 1.04 [0.51, 2.12] |
| High school | | 0.99 [0.57, 1.70] | 1.11 [0.63, 1.95] | 1.20 [0.67, 2.13] |
| Single parent | | 0.93 [0.62, 1.41] | 0.90 [0.60, 1.35] | 0.82 [0.54, 1.23] |
| Parental emotional problems | | | | |
| | | | 0.85 [0.56, 1.30] | 0.72 [0.46, 1.13] |
| Parental monitoring ^c | | | | |
| | | | 0.89** [0.81, 0.97] | 0.92§ [0.84, 1.02] |
| Child antisocial behavior ^c | | | | |
| | | | | 1.39*** [1.17, 1.65] |

Notes: CI = confidence interval; ref. = reference; PTSD = posttraumatic stress disorder. ^aDerived from proportional hazards model; ^brelative risk adjusting for site and other factors in the model; ^ccontinuous variables. §*p* < .10; **p* < .05; ***p* < .01; ****p* < .001.

no previous study has prospectively examined both childhood trauma and related PTSD symptoms in relation to subsequent early onset of alcohol use.

Children with five or more PTSD symptoms were significantly more likely to become alcohol users than those without exposure to trauma, whereas those with trauma experience but with fewer than five PTSD symptoms did not have an elevated rate of alcohol-use initiation. These findings lend support to the idea that PTSD symptoms may lead traumatized youth to begin or increase their use of alcohol or other substances as a means of self-medication for their PTSD symptoms and that comorbidity between PTSD and alcohol and other substance-use-related problems may develop as a result of this process. Studies that attempt to examine the relationship of childhood trauma with later substance use or substance-use disorders may produce incomplete findings if PTSD symptoms are not taken into account.

Our findings are consistent with those of previous studies (Brown and Wolfe, 1994; Deykin and Buka, 1997) that have found that PTSD and problematic substance use share many risk factors. In our study, child age, child antisocial behavior, and parental monitoring were found to be associated with both PTSD symptoms and alcohol initiation. The observed association between PTSD symptoms and alcohol-use initiation was partially explained by those shared factors, but it

did remain significant in multivariate analyses. This pattern highlights the importance of controlling for these crucial factors when examining the relationship between PTSD symptoms and alcohol use.

Limitations

This study is limited by its focus on a particular ethnic group. Because the children in this study were all of Puerto Rican background, caution should be used when generalizing the findings to other ethnic groups. Another limitation pertains to the measurement of PTSD. Because of the low prevalence of PTSD in the community and the young age of this sample, only PTSD symptom counts, rather than definitive diagnoses, were used in our analyses. It should be noted, however, that even subthreshold PTSD has been shown to be associated with impairment and comorbid psychiatric problems in children (Copeland et al., 2007). Also, because of the limited information obtained in the study regarding the characteristics of each child's traumatic experience(s), it was not possible to examine the specific effects of particular types of traumas. It should also be noted that general issues that can interfere with the ability of survey studies to collect accurate information with regard to trauma exposure among children may also have affected our findings. Studies have

indicated that a child who has experienced sexual abuse at the hands of a family member or family friend, for example, is unlikely, to disclose information about it to any adult outside of the family until many years after the abuse begins (Fontes, 1993; London et al., 2007; Priebe and Svedin, 2008). The mandated child abuse reporting requirements for survey research may also help to suppress reporting of such experiences by child survey participants (Copeland et al., 2007). Thus, some of the more severe childhood traumas, and those to which girls may be disproportionately subjected, are likely to have been underreported by our study sample. This underreporting may have affected our study's findings with regard to gender differences.

Implications

The findings from this longitudinal study, which examined a wide range of shared risk or protective factors in a large sample of children from a specific ethnic group, have important clinical and policy implications. PTSD tends to be a persistent disorder (Green et al., 1990; Kessler et al., 1995; Kulka et al., 1990; Perkonig et al., 2005), and early onset of alcohol use increases the risk of later substance-use disorders. The age range covered by this study allowed us to focus on the transition period from childhood to adolescence, when the conditions of interest are beginning to develop; thus, it represents a unique contribution for prevention efforts.

Our finding that family-level risk and protective factors (e.g., parental emotional problems and parental monitoring) are predictive both of alcohol initiation and of PTSD symptoms points to the potential impact of interventions that help parents to improve their parenting skills. The finding that antisocial behaviors are associated with both alcohol initiation and PTSD symptoms also suggests the importance of early intervention for children with antisocial behaviors, given that conduct problems and oppositional behaviors in childhood can be prevented (Olds et al., 1998) and treated (Webster-Stratton et al., 2004), if addressed early in life.

The current study's main finding—that PTSD symptoms in children 10-13 years old may be associated with early onset of alcohol use, whereas exposure to traumatic events with low levels of PTSD symptoms may not—underscores the importance of identifying and treating PTSD-related symptoms in pre-adolescent children. Understanding PTSD symptoms in early adolescents and associated alcohol use, therefore, has direct clinical and policy relevance. Early detection and effective treatment of even subthreshold PTSD may help in delaying subsequent onset of alcohol use by children and adolescents and in reducing the negative impact of alcohol-use disorders over their life span.

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