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Childhood Depressive Symptoms and Early Onset of Alcohol Use

Ping Wu, PhD^{a,b,c}, Hector R. Bird, MD^{b,c}, Xinhua Liu, PhD^a, Bin Fan, MD^c, Cordelia Fuller, MA^b, Sa Shen, PhD^{b,c}, Cristiane S. Duarte, PhD^{b,c}, and Glorisa J. Canino, PhD^d

^aMailman School of Public Health, Columbia University, New York, New York

^bCollege of Physicians and Surgeons, Columbia University, New York, New York

^cNew York State Psychiatric Institute, New York, New York

^dBehavioral Sciences Research Institute, University of Puerto Rico, San Juan, Puerto Rico

Abstract

OBJECTIVES—Few studies have assessed the relationship between depressive symptoms and early onset of alcohol use in children and early adolescents. We aimed to determine whether depressive symptoms in children are associated with subsequent initiation of alcohol use and, if so, whether this association is merely a result of demographic, parental, and/or individual risk factors shared by depression and alcohol use or independent of these shared risk factors.

METHODS—Analyses were based on a subsample of 10- to 13-year-old children ($N = 1119$) from the Boricua Youth Study, a longitudinal study of psychopathology among Puerto Rican children and early adolescents. Children in the study were assessed over 3 waves between 2000 and 2004. In-person structured interviews were conducted with both parents and children.

RESULTS—Depressive symptoms and alcohol use shared some significant risk and protective factors, such as parental psychopathology, parenting, child exposure to violence, and antisocial behaviors. After controlling for these factors, the association between depressive symptoms and alcohol use was reduced, but childhood depressive symptoms were still positively associated with subsequent alcohol use initiation. Children with medium or high levels of depressive symptoms were more than twice as likely to use alcohol as those with <2 depressive symptoms.

CONCLUSIONS—The finding of the current study that early life depressive symptoms may lead to earlier onset of alcohol use indicates the importance of identifying and treating depressive symptoms in preadolescent children. It also demonstrates the importance of examining shared risk and protective factors for understanding the relationship between depressive symptoms and alcohol use.

Keywords

depression; alcohol/drug use; age at onset; children and adolescents

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Address correspondence to Ping Wu, PhD, Columbia University-NYSPI, 1051 Riverside Dr, Unit 43, New York, NY 10032. pw11@columbia.edu.

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Underage drinking is a major public health problem in the United States. Alcohol was involved in one third of young drivers' fatal motor vehicle crashes in 2003.¹ Young drinkers are ~2 times as likely as nondrinkers to attempt or contemplate suicide or other self-harm.² Alcohol use also increases a young person's likelihood of having unprotected sex³ and, by early adulthood, of committing criminal or violent acts against others.⁴

Studies have shown that individuals who initiate alcohol use during childhood or adolescence have a greater risk for developing alcohol abuse and dependence, compared with those starting later.^{5–10} Results from a national survey showed that adolescents who begin drinking before age 15 years are 4 times more likely to develop alcohol dependence than those who begin drinking at age 21 years.¹⁰ Alcohol use also increases the risk of use¹¹ and abuse⁴ of other substances.

Depression has been found to be positively associated with alcohol use at various stages of life. In adulthood, depressive illness and alcohol abuse and dependence are highly associated, according to studies based on both clinical samples^{12–16} and community samples.^{17–27} For example, an analysis of data from the National Longitudinal Alcohol Epidemiologic Survey found that having an alcohol use disorder more than tripled an individual's likelihood of also having *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*, major depression, with depression similarly being a strong predictor for alcohol use disorders.²⁷ Such an association has also been found to exist in adolescence.^{28–37} Few studies have examined depression and alcohol use within childhood and early adolescence.^{38–40} Two of these studies found evidence of a significant relationship between early depressive symptoms and early initiation of alcohol use.^{38,39}

In discussing the reasons for the relationship between depression and use and abuse of alcohol and other substances, some studies have pointed to effects of depression on alcohol use and abuse, supporting the idea that the relationship may, to some extent, result from individuals' attempts to "self-medicate" their depressive symptoms by using alcohol.^{31,41} Other studies have pointed to (usually long-term) use of alcohol as a culprit in increases in symptoms of depression over time.^{29,42} Still others have emphasized the likelihood that there exist environmental^{43,44} and/or genetic factors,^{45–48} which tend to significantly increase individuals' vulnerability to both types of disorders.

Factors that have been found to be related to early alcohol use initiation include male gender,^{49–51} low levels of parental monitoring,^{52,53} frequent parental alcohol use,^{54,55} parental emotional disorders,^{56,57} child abuse,⁵⁸ and poor parent-child relationships,^{50,59} as well as child novelty-seeking tendencies⁶⁰ and conduct disorder symptoms.^{8,61} Some of these factors have also been found to be associated with depressive symptoms.^{62,63} Thus, when exploring the relationship between depressive symptoms and alcohol use initiation, it is important to control for these factors.

The current study uses data from the Boricua Youth Study, a longitudinal community study of psychopathology among Puerto Rican children and early adolescents. The children in this study were assessed at a relatively early stage of life, with the majority being alcohol naïve at baseline, thus providing us with a valuable opportunity to examine the impact of early depressive symptoms on onset of alcohol use. Two recent studies support the idea that depressive symptoms in childhood are a risk factor for early initiation of alcohol use.^{38,39} These studies, however, did not control for many of the family and parental factors that can affect individuals' risks for depression and alcohol use and abuse. This article assesses the relationship between depressive symptoms in children at baseline and subsequent initiation of alcohol use and examines whether demographic, parental, and/or individual factors can

explain the relationship between childhood depressive symptoms and subsequent initiation of alcohol use in children.

METHODS

Sample

The Boricua Youth Study is a longitudinal study of psychopathology among Puerto Rican children and early adolescents. The study has assessed representative samples of children of Puerto Rican background in 2 contexts where there are high concentrations of Puerto Ricans: the South Bronx in New York City and the San Juan Standard Metropolitan Area in Puerto Rico. Data were collected from probability samples, at both sites, of children who were age 5 to 13 years when their household was enumerated ($N = 2491$), assessed over 3 waves between 2000 and 2004. The overall completion rate at baseline was 85%, and completion rates for waves 2 and 3 were 92% and 88% of the baseline sample, respectively. A detailed description of the study design and procedures can be obtained elsewhere.^{64,65} The present analyses examine depressive symptoms in early life and subsequent onset of alcohol use among a subsample of children who, at baseline, were 10 to 13 years old and reported never having used alcohol and who completed interviews both at baseline and at one of the follow-ups ($N = 1119$).

In-person structured interviews were conducted with both parents and children in the family homes of all of the children included in these analyses. The protocol included the Diagnostic Interview Schedule for Children, Version IV (DISC-IV),⁶⁶ which assesses affective disorders (major depressive disorder and dysthymia), anxiety disorders (generalized anxiety disorder, separation anxiety disorder, panic disorder, social phobia, and posttraumatic stress disorder), disruptive behavior disorders (attention-deficit/hyperactivity disorder, conduct disorder, and oppositional defiant disorder), and substance abuse and dependence, according to the criteria set by the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*. The DISC-IV is available in English and Spanish, and its psychometric properties have been tested. Information on a wide array of risk factors, as well as family sociodemographic factors, was also obtained.^{64,65}

Measurement of Alcohol Use

Child alcohol use was assessed using questions regarding lifetime and past-year alcohol use, as well as by the alcohol abuse section of the DISC-IV. Alcohol use was defined as drinking a full can or bottle of beer, a glass of wine or wine cooler, a shot of liquor, or a mixed drink with liquor 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 this kind of use. Children who, at baseline, had never yet used alcohol, were selected to be included in our analyses. Use of alcohol at either of the follow-up waves is used as the outcome variable.

Measurement of Depressive Symptoms

Child psychopathology in the year preceding the interview was assessed by the DISC-IV at each wave of data collection. Baseline depressive symptom counts were used in the present analyses. A symptom was considered to be positive if reported by either the parent or the child.⁶⁶ Initially the children were divided into approximate quartiles based on numbers of depressive symptoms, that is, <2 , 2 to 5, 6 to 9, or ≥ 10 symptoms. The middle 2 groups, however, were found to be very similar with regard to alcohol use and other factors; these 2 groups were, therefore, combined into 1 for the final analyses. The final 3 groups were: (1) those having <2 depressive symptoms (low-level depressive symptom count), (2) those having 2 to 9 depressive symptoms (medium-level depressive symptoms), and (3) those having ≥ 10 depressive symptoms (high-level depressive symptoms).

Measures of Parental Factors

Parental psychopathology (parent report) was measured using the Family History Screen for Epidemiologic Studies.⁶⁷ This variable was coded as 1 if, at baseline, any emotional, alcohol, or drug problems were reported for a child's mother or father.

Parental monitoring (parent report) is a 9-question Likert-type scale measuring parental monitoring of the child's daily activities, such as television watching and video games, and other activities in general either inside or outside of the home.⁶⁸ A high score represents a high level of monitoring.

Parental discipline (parent report) was measured using 6 items from the parent interview covering various forms of punishment, including physical and verbal abuse, and withholding of affection.⁶⁹

Maternal warmth and supportiveness (parent report) is a Likert-type scale using 13 parent interview questions about the mother-child relationship (adapted from Hudson's Index of Parental Attitudes),⁷⁰ covering level of mutual trust and understanding, as well as closeness, between the mother and the child. High scores indicate a close relationship.

Lifetime physical abuse (child report) is based on 4 items. Physical abuse was considered as present if there was a positive response to any of the 4 items, including being hit, beaten, or hurt badly.

Measures of Individual Level Factors

Stressful life events (child report) was measured by the 21-item stress scale.^{69,71} A dummy dichotomized variable was created, placing those with <2 past-year stressful life events in 1 group and those with ≥2 events in another group.

Sensation seeking (child report) was measured by an abbreviated version of Russo et al's^{72,73} sensation-seeking scale.⁶⁴

Exposure to violence (child report) was measured by Richters and Martinez's⁷⁴ exposure to community violence scale as modified by Raia.⁷⁵ These questions address whether the child experienced violence him/herself, saw it happen to others, or heard it happening to someone he/she knew.

Antisocial behavior (child and parent reports) is based on a 5-category classification of antisocial behaviors along a hierarchy of seriousness or severity of antisocial behaviors, using conduct disorder and oppositional defiant disorder information from the DISC-IV and from the Elliot Delinquency Scales, as rated by 9 mental health clinicians.⁷⁶ A dummy variable was used in the analyses, coded as 1 for those subjects who had a rating of ≥3 (moderate to serious).

Church attendance (child report) information was used to divide the children into 3 groups: never attend, attend irregularly, and attend regularly.

Sociodemographic and Family Factors

Sociodemographic (parent report) variables include child age, gender, and highest parental level of education at baseline. Family structure variables include family composition (ie, single versus 2 parental figures).

Statistical Analysis

First, we examined the bivariate association between depression in the 12 months before baseline and alcohol use at any subsequent (follow-up) wave. Second, we examined the relationship of these 2 variables, namely baseline depression and alcohol use at follow-ups, with the available family, parental, and individual level variables that had been found, in previous studies, to be associated with depression, alcohol use, or both. These analyses allowed us to identify factors associated with both depressive symptoms and alcohol use. Finally, multiple logistic regression analyses were conducted hierarchically (in 3 steps) to understand the effects of baseline depressive symptoms on subsequent alcohol use (binary outcome), controlling for potential confounding factors. In model 1, we included the main predictors for baseline depression, as well as sociodemographic factors and study site (South Bronx or San Juan), as control variables. Subsequently we added into the model those parental level factors that our bivariate analyses had found to be associated both with onset of alcohol use at follow-up and with baseline depressive symptoms (model 2). The last model (model 3) included all of the variables in model 2 plus individual level factors found to be associated with both alcohol use and depressive symptoms. These hierarchical analyses were conducted to determine whether the relationship between early depressive symptoms and subsequent onset of alcohol use could be explained by these shared risk factors.

SUDAAN 8.0 software (Research Triangle Institute, Research Triangle Park, NC)⁷⁷ was used to take into account the complex features of the sampling design, correcting variance estimates of the parameters estimated by the models.

RESULTS

Bivariate Analysis

Among the 1119 children who had never used alcohol at baseline, 110 (9.8%) did report past year use of alcohol at ≥ 1 follow-up. Bivariate analyses showed that the rates of alcohol use at follow-up differed significantly by level of depression at baseline, being 4.1% for those who had reported ≤ 1 depressive symptom, 10.2% for those reporting 2 to 9 depressive symptoms, and 14.1% of those with ≥ 10 depressive symptoms at baseline (Fig 1).

Table 1 shows the bivariate associations between alcohol use at follow-up risk/protective factors reported at baseline, grouped in 3 areas: sociodemographic, parental, and individual. Among sociodemographic factors, child age was positively associated with onset of alcohol use. The association between parental education and child alcohol use was only marginally significant. Gender and having a single parent were not associated with alcohol use. No differences were found between the 2 sites in the rates of alcohol use. Among parental variables, parental psychopathology and child lifetime physical abuse were positively associated with alcohol use in children. Parental monitoring was negatively associated with child alcohol use. Maternal close relationship and parental discipline were not significantly associated with later alcohol use. Among the individual level factors, child sensation seeking, exposure to violence, and antisocial behavior seemed to be risk factors for later alcohol use. Stressful life events and church attendance were not associated with later alcohol use.

To properly assess the independent effect of baseline depressive symptoms on later alcohol use, we needed to identify factors associated with both alcohol use and depressive symptoms and to control for them in the analyses. Table 2 shows the results of bivariate analyses of the relationships between baseline depressive symptoms and the same 3 groups of risk/protective factors. Among sociodemographic factors, the only factor significantly associated with depressive symptoms was being from a single parent family. Again, geographic site (Puerto Rico or South Bronx) did not seem to have an impact on depressive symptoms. All

of the parental factors were significantly associated with the depressive symptom counts. All of the individual level factors, excepting church attendance, were significantly associated with depressive symptom counts.

Multiple logistic regression analyses were conducted in 3 steps (Table 3). In the first step, we fit the model with main predictors for depressive symptoms and treated site and the family and sociodemographic factors as control variables. Then, we added into the model the parental (model 2) and individual (model 3) factors that were associated with both alcohol use and depressive symptoms.

It can be seen from model 1 in Table 3 that, controlling for sociodemographic factors, children with high-level depressive symptoms (adjusted odds ratio [AOR]: 4.0; $P < .01$) and those with medium-level depressive symptoms (AOR: 2.8; $P < .01$) were more likely to start to use alcohol than those with <2 depressive symptoms. The results for models 2 and 3 show that, even after controlling for sociodemographic factors and for shared parental and individual level factors, baseline depression still had an independent impact on subsequent onset of alcohol use. Compared with children with <2 depressive symptoms, those with medium- and high-level depressive symptoms were more likely to begin drinking (AOR: 2.2; $P < .05$; AOR: 2.5; $P < .05$; for medium- and high-level depressive symptoms, respectively).

Among the 3 baseline individual level factors, sensation-seeking characteristics and child antisocial behaviors still significantly predicted later alcohol use even after controlling for sociodemographic and parental factors. Among the 3 parental variables that were significantly associated with alcohol use at the bivariate level, parental monitoring and child physical abuse remained marginally significant after controlling for the sociodemographic factors (model 2); however, when the individual level variables were further controlled for (model 3), these factors were no longer significant.

DISCUSSION

Using data from a longitudinal community study, this article describes the association between depressive symptoms in children (10–13 years old) and subsequent onset of alcohol use. Strengths of this study are its longitudinal nature and the young age of the sample at baseline, most of whom were alcohol naïve at that time, making possible this investigation of the impact of depressive symptoms on the onset of alcohol use. In addition, the study collected information on a wide range of risk factors for child psychopathology and substance use, thus allowing for a relatively precise assessment of the relationship between depressive symptoms and onset of alcohol use in children, adjusting for potentially confounding factors. Consistently, with 2 previous longitudinal studies,^{38,39} our study also found positive associations between depressive symptoms and initiation of alcohol use in childhood and adolescence. Our analyses, however, represent a further step toward a true understanding of this relationship, because we were able to take into account many of the risk and protective factors that may be related to both depression and alcohol use.

Our results indicate that adolescent depression and alcohol use do share some risk and protective factors, such as parental psychopathology, parenting styles, child exposure to violence, and child antisocial behavior. Most of these associations had already been reported in the literature.^{8,50,52–55,57–59,61–63} The relationship between depressive symptoms and alcohol use can be partially explained by these factors. When these factors were controlled for, the magnitude of the relationship between early depressive symptoms and subsequent onset of alcohol use was reduced.

In multivariate analyses, the relationship between early depressive symptoms and subsequent alcohol use remained significant after we adjusted for an array of potentially confounding factors. This finding is similar to those of previous studies of adults^{15,78,79} as well as youth.^{31,39,80} Because the association was still significant after controlling for many of the risk factors that are associated with both alcohol use and depressive symptoms, it is quite robust. In addition, child age, child sensation seeking, antisocial behaviors, and parental college education were also predictive of child alcohol use. The effects of parental psychopathology, parental monitoring, physical abuse, and exposure to violence were no longer significant here. Further analyses found that the relationship between parental psychopathology and child alcohol use became nonsignificant when child depressive symptoms were controlled for, indicating the possibility that the impact of parental psychopathology on child alcohol use was mediated by depression in the child.

Previous studies have shown that early onset of alcohol use is related to the development of alcohol abuse/dependence and other substance use problems.^{4-6,10} For example, an analysis of data from the National Longitudinal Alcohol Epidemiologic Survey found that individuals who had initiated drinking before the age of 15 years were more than twice as likely to be alcohol dependent at some time in their lives compared with those who began drinking at age 18 years and 4 times as likely to become dependent as those beginning drinking at age 21 years.¹⁰ A longitudinal study by Ellickson et al⁴ found that adolescents who had initiated alcohol use by grade 7 were much more likely to have multiple substance use problems by grade 12 compared with grade 7 nondrinkers.

The finding of the current study that early life depressive symptoms may lead to early onset of alcohol use indicates the importance of identifying and treating depressive symptoms in preadolescent children. Based on these results, future studies should examine the benefits of stimulating the use of coping strategies that do not involve substance use or abuse, particularly in children demonstrating early signs of depression, as a way of staving off alcohol abuse and dependence at a later stage.

Our results also indicate the importance of understanding the potential role of shared risk factors in the development of both depression and alcohol use. Community programs to improve parenting skills or reduce neighborhood violence may ultimately help in preventing depression, as well as alcohol use, in children. Programs aimed at preventing alcohol use in children should take depressive and other internalizing disorder symptoms into account.

This study is limited by the relatively short follow-up period, after which the only alcohol-related outcome measure that could be assessed was onset of alcohol use, rather than other more severe alcohol-related behaviors, such as alcohol use disorder or relapse to drinking after a period of abstinence. Another limitation of the study is the fact that the children in this study were all of Puerto Rican background. Caution should be used when generalizing the findings to other ethnic groups. Studies in other populations are needed to assess whether these findings apply to other groups.

Abbreviations

DISC-IV	Diagnostic Interview Schedule for Children, Version IV
AOR	adjusted odds ratio

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FIGURE 1.

Alcohol use at follow-ups among children who were not alcohol users at baseline, according to level of depressive symptoms at baseline ($N = 1119$). Low indicates <2 symptoms; medium, 2 to 9 symptoms; high, ≥ 10 symptoms. $P = .001$, χ^2 test

TABLE 1Risk Factors at Baseline and Alcohol Use at Either Follow-up (*N* = 1119)

Baseline Factors	Total (<i>N</i> = 1119)	No Use (<i>N</i> = 1009)	Use (<i>N</i> = 110)	<i>P</i> ^a
Sociodemographic/parental factors				
Age, mean, y	11.5	11.4	12.4	<.001
Girl	48.3	48.0	50.9	.522
Parental education				
Less than high school	20.8	20.9	20.0	.093
High school	45.9	46.8	37.3	
College or higher	33.3	32.3	42.7	
Single parent family	38.2	38.1	40.0	.691
Site				
South Bronx	45.0	44.5	49.1	.372
Puerto Rico	55.0	55.5	50.9	
Parental psychopathology	39.3	38.1	50.5	.017
Parental monitoring, mean	13.3	13.4	12.3	<.001
Maternal warmth and supportiveness, mean	2.4	2.4	2.3	.278
Parental discipline, mean	0.5	0.5	0.6	.115
Lifetime physical abuse	12.1	11.2	21.1	.020
Individual-level factors				
Stressful life event	19.1	18.7	23.6	.222
Sensation seeking, mean	3.6	3.4	4.8	<.001
Exposure to violence, mean	2.3	2.2	3.3	<.001
Antisocial behavior	24.8	22.8	43.6	<.001
Church attendance				
Never	9.7	9.6	11.0	.241
Irregular	34.5	33.7	41.3	
Regular	55.8	56.7	47.7	

Values are percentages except where otherwise noted.

^aFor categorical variables, χ^2 test *P* value; for continuous variables, analysis of variance.

TABLE 2

Risk Factors and Depression at Baseline ($N = 1119$)

Baseline Factors	Level of Depressive Symptoms			<i>pa</i>
	Low, 0–1 Symptoms (<i>N</i> = 220)	Medium, 2–9 Symptoms (<i>N</i> = 658)	High, ≥ 10 Symptoms (<i>N</i> = 241)	
Sociodemographic/parental factors				
Age, mean, y	11.5	11.5	11.5	.679
Girl	51.8	47.6	46.9	.499
Parental education				
Less than high school	22.8	20.4	20.1	.701
High school	45.7	44.8	49.9	
College or higher	31.5	34.8	31.0	
Single parent family	33.8	37.2	45.2	.035
Site				
Bronx	45.9	43.6	47.7	.488
Puerto Rico	54.1	56.4	52.3	
Parental psychopathology	24.2	40.1	50.8	<.001
Parental monitoring, mean	13.8	13.3	12.7	<.001
Maternal warmth and supportiveness, mean	2.5	2.4	2.2	<.001
Parental discipline, mean	0.3	0.5	0.6	<.001
Lifetime physical abuse	4.6	10.8	22.4	<.001
Individual-level factors				
Stressful life event	7.8	17.8	33.2	<.001
Sensation seeking, mean	3.1	3.5	4.1	<.001
Exposure to violence, mean	0.9	2.2	3.8	<.001
Antisocial behavior	7.3	22.6	46.9	<.001
Church attendance				
Never	7.5	8.7	14.6	.124
Irregular	36.0	34.1	34.3	
Regular	56.5	57.2	51.1	

Values are percentages except where otherwise noted.

^aFor categorical variables, χ^2 test P value; for continuous variables, analysis of variance.

TABLE 3

Logistic Regression Predicting Alcohol Use at Either Follow-up

Baseline Factors	Model 1, AOR (95%CI)	Model 2, AOR (95%CI)	Model 3, AOR (95%CI)
Level of depressive symptoms (reference = low [<2 symptoms])			
Medium (2–9 symptoms)	2.8 (1.33–5.80) ^a	2.4 (1.11–4.99) ^b	2.2 (1.01–4.94) ^b
High (≥10 symptoms)	4.0 (1.78–9.14) ^a	3.0 (1.31–7.02) ^b	2.5 (1.04–6.19) ^b
Age ^c	2.2 (1.77–2.71) ^d	2.2 (1.72–2.68) ^d	2.0 (1.62–2.55) ^d
Girl	1.1 (0.74–1.71)	1.2 (0.76–1.80)	1.3 (0.85–2.14)
Parental education (reference = collage)			
No high school	0.6 (0.30–1.06) ^e	0.6 (0.29–1.07) ^e	0.6 (0.31–1.16)
High school	0.5 (0.34–0.87) ^b	0.6 (0.36–0.96) ^b	0.6 (0.36–0.98) ^b
Single parent	1.1 (0.71–1.68)	1.0 (0.65–1.60)	1.0 (0.63–1.57)
Parental psychopathology		1.4 (0.89–2.16)	1.3 (0.84–2.05)
Parental monitoring ^c		0.9 (0.86–1.01) ^e	0.9 (0.88–1.03)
Physical abuse		1.7 (0.91–3.04) ^e	1.4 (0.74–2.49)
Sensation seeking ^c			1.1 (1.02–1.25) ^b
Exposure to violence ^c			1.0 (0.85–1.08)
Antisocial behavior			1.6 (1.00–2.69) ^b

Site was controlled for.

^a $P < .01$.^b $P < .05$.^c Continuous variables.^d $P < .001$.^e $P < .10$.