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Childhood and adolescent onset psychiatric disorders, substance use, and failure to graduate high school on time

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ABSTRACT

We examined the joint predictive effects of childhood and adolescent onset psychiatric and substance use disorders on failure to graduate high school (HS) on time. Structured diagnostic interviews were conducted with a US national sample of adults (18 and over). The analysis sample included respondents with at least 8 years of education who were born in the US or arrived in the US prior to age 13 (N = 29,662). Psychiatric disorders, substance use and substance use disorders were examined as predictors of termination or interruption of educational progress prior to HS graduation, with statistical adjustment for demographic characteristics and childhood adversities. Failure to graduate HS on time was more common among respondents with any of the psychiatric and substance use disorders examined, ranging from 18.1% (specific phobia) to 33.2% (ADHD-combined type), compared with respondents with no disorder (15.2%). After adjustment for co-occurring disorders, significant associations with failure to graduate on time remained only for conduct disorder (OR = 1.89, 95% CI 1.57–2.26) and the three ADHD subtypes (Inattentive OR = 1.78, 95% CI 1.44–2.20, Hyperactive–Impulsive OR = 1.38, 95% CI 1.14–1.67, and Combined OR = 2.06, 95% CI 1.66–2.56). Adjusting for prior disorders, tobacco use was associated with failure to graduate on time (OR = 1.97, 95% CI 1.80–2.16). Among substance users, substance use disorders were not associated with on-time graduation. The findings suggest that the adverse impact of childhood and adolescent onset psychiatric disorders on HS graduation is largely accounted for by problems of conduct and inattention. Adjusting for these disorders, smoking remains strongly associated with failure to graduate HS on time.

Childhood and adolescent psychiatric disorders may have negative effects across the lifespan through their impact on educational attainment (Kessler et al., 1995). In particular, termination or interruption of educational progress prior to graduation from high school (HS) has wide ranging negative implications for adult physical and mental health (Muntaner et al., 2004; Cutler and Lleras-Muney, 2006), economic productivity (Renna, 2007) and social functioning (Lochner and Moretti, 2004; Freudenberg and Ruglis, 2007). A recent study of a US national sample found that 12 out of the 14 psychiatric disorders examined were associated with subsequent failure to complete 12 years of education by age 18, after adjustment for other early life predictors of educational attainment (Breslau et al., 2008). However, due to comorbidity among psychiatric disorders, substance use and substance use disorders (Angold et al., 1999; King et al., 2004; Roberts et al., 2007), it is unclear which particular disorders account for adverse educational trajectories. In this study we probe the interrelationship among co-occurring psychiatric disorders, substance use and substance use disorders as they relate to HS graduation, with the goal of evaluating whether the observed pervasive associations between early-onset psychiatric disorders and failure to graduate on time are attributable to a smaller subset of specific disorders.

Sorting out which disorders are most likely to affect educational progress is important because different disorders might affect educational outcomes through distinct causal pathways and might require different approaches to (and timing of) interventions. There is strong evidence that the association between ADHD and HS dropout (Barkley et al., 2006; Currie and Stabile, 2006) is due at least in part to the negative impact of attention problems on the acquisition of academic skills, which begins in primary school (Duncan et al., 2007) and continues through high school (Breslau

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et al., 2009b). Students with low academic achievement in high school are less likely to graduate on time (Rumberger and Larson, 1998). Conduct disorder and internalizing disorders, i.e. depressive and anxiety disorders, are *not* associated with poor academic performance after adjustment for co-occurring attention problems, but may affect HS dropout through different causal sequences. Conduct disorder leads to repeated disciplinary action, which is likely to affect student's engagement with schooling. Internalizing disorders are likely to disrupt students' overall social functioning and perceived competence leading to diminished motivation (Fletcher, 2008; Quiroga and Janosz, 2009).

Substance use and substance use disorders have also been reported to predict failure to graduate HS (Bryant et al., 2003; Fergusson et al., 2003; Bachman et al., 2008; Breslau et al., 2008). However, substance use and progression to disorder (abuse and/or dependence) are associated with prior psychiatric disorders (Glantz et al., 2008). The potential effects of substance use and disorders on graduation, net of pre-existing psychiatric disorders, have not been examined.

In this study we evaluate evidence on the role of specific early-onset psychiatric disorders in HS graduation, using data from a national study of the US adult population. Controlling for childhood adversities, we examine the association of failure to graduate high school by age 18 with (1) individual early-onset psychiatric disorders, adjusting for co-occurring disorders and (2) use of tobacco, alcohol and illegal drugs and associated disorders of abuse and dependence, taking into account multiple substance use and disorder as well as pre-existing psychiatric disorders.

1. Methods

1.1. Sample

Data come from waves 1 and 2 of the National Epidemiological Survey of Alcohol and Related Conditions (NESARC). The survey sampled the US household population age 18 and older at the time of wave 1 data collection (2001–2002). 43,093 respondents were interviewed at wave 1 (Grant et al., 2003), and 34,653 (86.7% of eligible respondents) were re-interviewed at wave 2 (2004–2005) (Grant and Kaplan, 2005). The response rate at wave 1 was 81% and the combined response rate for wave 1 and wave 2 was 70%. Trained non-clinician interviewers conducted face-to-face in-home interviews in Spanish and English using a fully structured instrument, the Alcohol Use Disorders and Associated Disabilities Interview Schedule (AUDADIS), loaded on laptop computers. Fieldwork was conducted by the US Bureau of the Census. Study procedures received ethical review and approval from the US Bureau of the Census and the US Office of Management and Budget.

1.2. Definitions of key variables

Interview responses were used to assess DSM-IV criteria and age of onset for mood (major depressive disorder (MDD), bipolar disorder, dysthymia), anxiety (specific phobia, social phobia, generalized anxiety disorder (GAD), panic disorder with or without agoraphobia (PD), and posttraumatic stress disorder (PTSD)), impulse control (conduct disorder, ADHD) and substance use (alcohol abuse and dependence, drug abuse and dependence) disorders.

Test–retest reliability for psychiatric and substance use disorder diagnoses was examined in re-interview studies in both waves of the NESARC. Reliability for lifetime mood and anxiety diagnoses ranged from $\kappa = 0.42$ (PD, GAD) to $\kappa = 0.65$ (MDD), for substance use disorders ranged from $\kappa = 0.60$ (tobacco dependence) to $\kappa = 0.70$ (alcohol abuse and dependence), and for childhood ADHD was found to be $\kappa = 0.71$. Reliability of bipolar disorder and conduct disorder diagnoses has not been studied. Respondents were classified as substance users if there was the potential for their substance use to impact their completion of high school on time, i.e. if they reported use prior to the earlier of their age at completion of education or age 18. Alcohol initiation was defined as 'drinking, not counting small sips', illegal drug initiation was defined as first use, and smoking initiation was defined as age of first cigarette for respondents who smoked at least 100 cigarettes in their lifetime.

Childhood adversities were statistically controlled to adjust for their potential influence on risk for both psychiatric disorders and HS dropout. Four scales comprised of Likert scored items administered in the wave 2 interview were used to control for neglect/maltreatment (10 items), parental marital violence (4 items), sexual abuse (4 items) and family support (5 items). These assessments have been described in detail elsewhere (Ruan et al., 2008). Financial hardship was defined using information on receipt of government income assistance prior to age 18. Parental substance use disorders, depression and antisocial personality disorder were considered present if the respondent reported at least one parent with a disorder. Family disruption was defined as having lived apart from at least one parent at some point during childhood vs. having lived with both parents throughout childhood. Additional controls were included for age, sex, nativity (US-born vs. Foreign-born), region of the US (Northeast, South, Midwest, West), and race–ethnicity (Hispanic, Non-Hispanic White, Non-Hispanic Black, Non-Hispanic Other).

The primary outcome of interest, termination or interruption of educational progress prior to HS graduation, was defined as having less than 12 years of education, having GED as the highest level of educational attainment or completing 12 years of education at age 19 or higher. GED and late HS graduation were included in this definition because neither confers health, social and economic benefits equivalent to on-time high school graduation (Heckman and Rubinstein, 2001; Renna, 2007).

1.3. Sample used in the analysis

Since some key control variables (e.g. sexual abuse) and psychiatric disorders (e.g. ADHD) were assessed only in the wave 2 interview, we conducted this analysis in the wave 2 sample. Respondents were excluded if they (1) were not eligible to enter high school (i.e. had less than 8 years of education) or (2) were born outside of the US and did not arrive in the US until age 13 or later. Foreign-born individuals who arrived in the US at age 13 or older were excluded because prior research suggests very different levels of psychiatric morbidity in this group, compared to the US-born (Breslau et al., 2009a) and because much of their education occurred prior to arrival in the US. All analyses were conducted using data on the remaining 29,662 respondents.

1.4. Statistical methods

A series of logistic regression models was specified with failure to complete high school on time as the outcome, early-onset psychiatric disorders, substance use and substance use disorders as the primary predictors of interest and statistical controls for childhood adversities and demographic characteristics. Information on age of onset was used to specify temporal ordering of psychiatric disorders, initiation of substance use, onset of substance use disorders and completion of education. Individuals with co-occurring psychiatric disorder and substance use were counted as having a psychiatric disorder only if the onset of the disorder preceded the initiation of substance use. Events were counted only if they occurred prior to respondents' age at completion of