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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.

Keywords

Psychiatric Disorders; Educational Attainment; Epidemiology; Substance Use; Smoking

Childhood and adolescent psychiatric disorders may have negative effects across the lifespan through their impact on educational attainment (Kessler, Foster et al. 1995). In

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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, Eaton 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, Lane et al. 2008). However, due to comorbidity among psychiatric disorders, substance use and substance use disorders (Angold, Costello et al. 1999; King, Iacono et al. 2004; Roberts, 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, Fischer 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, Dowsett et al. 2007) and continues through high school (Breslau, Miller et al. 2009). 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, Schulenberg et al. 2003; Fergusson, Horwood et al. 2003; Bachman, O'Malley et al. 2008; Breslau, Lane et al. 2008). However, substance use and progression to disorder (abuse and/or dependence) are associated with prior psychiatric disorders (Glantz, Anthony et al. 2008). The potential effects of substance use and disorders on graduation, net of preexisting 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.

METHODS

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 (2001–02). 43,093 respondents were

interviewed at wave 1 (Grant, Kaplan et al. 2003), and 34,653 (86.7% of eligible respondents) were re-interviewed at wave 2 (2004–05) (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.

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 $k = 0.42$ (PD, GAD) to $k = 0.65$ (MDD), for substance use disorders ranged from $k = 0.60$ (tobacco dependence) to $k = 0.70$ (alcohol abuse and dependence), and for childhood ADHD was found to be $k = 0.71$. 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, Goldstein 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).

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, Borges et al. 2009) 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.

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 education. An additional series of models was specified in sub-samples of users of each type of substance to examine whether substance use disorders are associated with HS completion after accounting for risk attributable to initiation of substance use. All analyses were conducted using SUDAAN software to calculate survey design adjusted standard errors using the Taylor-series linearization method.

RESULTS

Table 1 presents socio-demographic characteristics of the initial Wave 1 sample (N=43,093), the Wave 2 sample (N=34,653) and the analysis sample (N=29,662), which includes Wave 2 respondents who had at least 8 years of education and were either born in the US or arrived in the US before age 13. The analysis sample includes a smaller proportion of Hispanics and a slightly smaller proportion of respondents in the West due to the exclusion of immigrants who arrived in the US at age 13 or higher.

5310 respondents, 16.9% of the sample, did not complete high school on time (Table 2). As in US census data (Crissey 2009), failure to graduate from HS on time is more common among men relative to women, among Hispanics and Non-Hispanic Blacks relative to Non-Hispanic Whites and among the youngest and oldest birth cohorts, relative to the two middle cohorts. Cohort differences are consistent with census data (Crissey 2009) and recent studies of secular trends in HS graduation rates (Heckman and LaFontaine 2007).

Among the 73.2% of the sample with no history of any psychiatric disorder before age 18, 15.2% failed to graduate on-time (Table 3). Failure to graduate on time was more common in all other categories, ranging from 18.1% to 26.6% for internalizing disorders, 26.6% to 32.3% for externalizing disorders, 19.5% to 24.0% for substance use and 20.5% to 29.1% for substance use disorders.

Early-onset psychiatric disorders are associated with substance use and substance use disorder (a more detailed analysis of comorbidity between psychiatric and substance use disorders is reported elsewhere (Grant, Stinson et al. 2004). Among people with no psychiatric disorder before age 18, 43.7% used at least one substance (tobacco, alcohol, or

other drug). With the exception of panic disorder (41.7%) and generalized anxiety disorder (40.8%), substance use before age 18 was higher among those with early onset internalizing (46.7%--57.3%) and externalizing (57.7%--84.0%) disorders. Similarly, the prevalence of substance use *disorder* before age 18 was 6.9% among people with no psychiatric disorder, 16.4%--24.8% among people with internalizing disorders and 15.8%--41.6% among people with externalizing disorders.

Table 4 shows associations, presented as odds ratios (ORs), between psychiatric disorders and failure to graduate on time, estimated in a series of logistic regression models. Model 1 was estimated for each disorder in a separate regression, with adjustment only for socio-demographic characteristics (age, sex, nativity, region, and race-ethnicity). Statistically significant associations were found for each psychiatric disorder, with the exception of GAD, with significant ORs ranging from 1.24 (specific phobia) to 2.69 (ADHD-combined type). Adding adjustment for childhood adversities (Model 2) results in attenuation of the estimated associations for each of the disorders, with 8 of the 11 associations remaining significant in the range 1.21 (social phobia) to 2.12 (ADHD-combined type). Model 3 adjusts for co-occurring disorders by including all 11 disorders in a *single multivariable model*. In this model, none of the internalizing disorders remain significantly associated with graduation, while the associations of graduation with conduct disorder (OR=1.89) and all three types of ADHD are sustained. Among ADHD types, the association is strongest for the combined type (OR=2.06), intermediate for the inattentive type (OR=1.78) and weakest for the hyperactive/impulsive type (OR=1.38).

Table 5 presents estimates of the associations of substance use and substance disorders with on-time HS graduation, after adjustment for sociodemographic characteristics, childhood adversities and prior psychiatric disorders. When each of the 6 substance use and substance disorders are examined separately (Model 1), 5 are significantly associated with graduation, with significant OR ranging from 1.24 (illegal drug use) to 1.99 (tobacco use). When *use* of the three substances are examined simultaneously (Model 2), ORs associated with alcohol and illegal drug use are attenuated and are no longer significant, while the OR associated with tobacco use remains significant with negligible attenuation in magnitude (OR=1.97). When substance *disorders* are examined simultaneously (Model 3), nicotine dependence and illegal drug abuse or dependence remain significantly associated with failure to graduate on time.

A final set of models was specified in subsamples restricted to users of each substance in order to determine whether progression to disorders of abuse or dependence is associated with additional increments of risk for failure to graduate on time. Smokers with nicotine dependence were not more likely to fail to graduate on time than non-dependent smokers (OR=1.12, 95% CI 0.86–1.47) and alcohol drinkers with alcohol abuse or dependence were not more likely to fail to graduate on time than non-disordered drinkers (OR=0.94, 95% CI 0.77–1.14). Among users of illegal drugs there is a weak but statistically significant association between disorder and on-time graduation (OR=1.26, 95% CI 1.01–1.58), but this association was not statistically significant (OR=1.20, 95% CI 0.96–1.49) after adjustment for prior tobacco use.

DISCUSSION

The results of this study indicate that the broad, non-specific, pattern of association between early onset psychiatric disorders and subsequent failure to graduate from HS on time, reported in previous studies, is attributable to a small number of disorders. Previous studies have not considered the pervasive comorbidity among early onset disorders, in the evaluation of this relationship. As in previous studies, nearly every disorder was

significantly associated with on time graduation, *when examined in isolation*, and these associations were sustained after adjustment for childhood adversities. However, a far more restricted pattern emerged after additional adjustment for co-occurring disorders. With this additional adjustment, the associations of internalizing disorders (i.e. mood and anxiety) with on time graduation were no longer statistically significant, while associations of externalizing disorders—conduct disorder and all three types of ADHD—with on time graduation were sustained. These findings suggest that the associations between early onset psychiatric disorders and failure to graduate from HS on time may result from a small number of distinct pathways rather than from non-specific, generalized effects of poor mental health.

Use of any of the three types of substances examined, tobacco, alcohol and illegal drugs, and disorders associated with use of tobacco and illegal drugs were all significantly associated with increased risk of failure to graduate from high school on-time, when examined in isolation (i.e. after adjustment for childhood adversities and prior psychiatric disorders, but prior to adjustment for co-occurring substance use or substance disorder). However, after adjustment for multiple substance use, the results changed considerably, highlighting the distinct role of tobacco use as a predictor of the important milestone of on time HS graduation. The pattern of the fully adjusted results (reported in Table 5 and the final paragraph of Results) has three key features: 1) the association between tobacco use and graduation is minimally attenuated and remains statistically significant; 2) the associations of alcohol and illegal drug use with graduation are materially attenuated and are no longer significant; 3) the associations between substance use disorders and graduation are no longer significant when tobacco use is taken into account.

Evidence from this and from previous studies suggests that there are distinct pathways connecting ADHD and Conduct Disorder with educational attainment. In this study, all three types of ADHD were associated with elevated risk of failure to graduate from HS on time, but the types that include inattention—the inattentive and combined types—had stronger associations with graduation than the type that does not include inattention (the hyperactive type). These results may reflect the cumulative adverse effect of inattention on learning across the schooling career. There is evidence that both the inattentive and combined types are associated with impairment of working memory, with greater impairment in the combined type (Schweitzer, Hanford et al. 2006), and that working memory performance in children with and without ADHD is predictive of academic achievement (Gathercole and Pickering 2000; Gropper and Tannock 2009). It is possible that subcomponents that affect working memory such as ability to resist distraction may be an underlying factor that affects performance in academic settings. We suspect impulsivity or the ability to delay gratification is less relevant, given that inattentive symptoms and the Inattentive subtype are not associated with poor delay of gratification (Scheres, Tontsch et al. 2010). Prospective studies have indicated that attention problems assessed at the time of school entry are associated with lower academic achievement, as measured by standardized tests, at the end of primary school (Duncan, Dowsett et al. 2007) and at the end of high school (Breslau, Miller et al. 2009). This increased burden in students with ADHD to perform the tasks that underlie academic performance (i.e. working memory, processing speed, organization of information) may have cumulative negative effects. Inefficiency in learning may enter into considerations that individuals and families make regarding the potential benefits of continuing education versus pursuing alternative careers that do not demand HS graduation as a credential (Cunha and Heckman 2007; Heckman 2007).

Our findings with respect to conduct disorder should be interpreted in light of evidence from previous research that conduct problems are not independently associated with lower academic achievement after their correlation with attention problems is statistically

controlled (Rapport, Scanlan et al. 1999; Duncan, Dowsett et al. 2007; Breslau, Miller et al. 2009). This suggests that there are pathways linking conduct disorder with HS graduation other than poor academic performance. Students with conduct disorder have recurrent clashes with teachers and other authority figures. Frequent conflict with authority may demoralize students and signal to them that their prospects for future success in pursuing formal education are poor, *independent of their actual academic achievement*.

This study also contributes to disentangling the joint effects of early onset psychiatric disorders, substance use and substance disorders on HS graduation. Previous studies of substance use and HS graduation have not considered the potential confounding contribution of prior psychiatric disorders. Further, studies that examine associations between *substance use disorders* and HS graduation have not examined whether these disorders are associated with additional risk beyond the risk associated with substance use (Breslau, Lane et al. 2008). If functional impairments due to substance use were the reason for observed associations between substance use and subsequent failure to graduate on time, we would expect that substance users with disorders of abuse or dependence would be at higher risk than substance users without these disorders.

The finding that substance use disorders are not associated with additional increments of risk for failure to graduate on time beyond that associated with initiation of smoking supports the suggestion that early substance use might be a marker of a pre-existing negative educational trajectory, rather than an effect of substance use (Bryant, Schulenberg et al. 2003; Bachman, O'Malley et al. 2008). If this interpretation is correct, then interventions that focus exclusively on substance use or substance disorders are unlikely to be effective in promoting graduation unless they also address underlying academic challenges that contribute to disaffection, substance use and dropout.

This study also adds to the available evidence that early onset internalizing disorders, including major depression and social phobia, do not have adverse effects on HS graduation after accounting for co-morbid externalizing disorders. In supplementary analyses, we examined whether a co-occurring internalizing disorder amplifies the effect of externalizing disorders on dropout. Associations with dropout were similar for Conduct Disorder with or without a co-occurring internalizing disorder (OR=2.07, 95% CI: 1.60–2.67 and OR=1.75, 95% CI: 1.17–2.63, respectively) as for any ADHD with or without a co-occurring internalizing disorder (OR=1.63, 95% CI: 1.40–1.90 and OR=1.82, 95% CI: 1.47–2.26 respectively). We found no evidence that comorbid internalizing disorders were associated with additional risk for dropout among people with ADHD or Conduct Disorder. It is important to note that there is evidence of adverse consequences of internalizing disorders on other outcomes (Costello, Egger et al. 2005; Lynch and Clarke 2006).

The findings should be interpreted in the context of the limitations of retrospective self-reports of psychiatric symptoms. Prospective studies with periodic assessments from multiple informants would provide a more secure basis for inference. It is noteworthy that where our results can be directly compared with existing prospective studies, there is agreement with respect to effects of specific disorders on graduation. For instance, Miech et al. also report associations of attention problems and conduct disorder with dropout but not between internalizing disorder and dropout based on a New Zealand longitudinal birth cohort study (Miech, Caspi et al. 1999). Johnson et al. found no association between depression and dropout in their prospective cohort study in upstate New York (Johnson, Cohen et al. 1999). It is likely that despite inaccuracies in the memory of the timing of specific events (Prusoff, Merikangas et al. 1988), respondents are able to accurately recall the order of events in relationship to major milestones, such as high school dropout or graduation.

Interpretation of the statistical results should also take account of collinearity among the predictors due to comorbidity among disorders. To evaluate the potential impact of collinearity on the results, the analyses were repeated using broad categories of disorder (e.g. any mood disorder, any anxiety disorder) rather than specific disorders. The results of the grouped analysis were the same as the disorder specific results reported here (available on request).

This study adds to a growing body of research characterizing the intricate interrelationship between early onset externalizing problems, substance use and education. It is very likely that each of these influence the others over the course of childhood and adolescence. The evidence in these data suggests that the ultimate effect on educational attainment may occur through a limited number of pathways, some of which include psychiatric disorders as a cause of educational problems and some of which might originate in academic underachievement. Additional research characterizing these pathways can help identify the appropriate role of mental health interventions in supporting educational attainment.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Characteristics of the total Wave 1 and Wave 2 NESARC samples and the sample used in this study*

	Wave 1 Sample		Wave 2 Sample		Analysis Sample*	
	n	Proportion of Total Sample (%)	n	Proportion of Total Sample (%)	n	Proportion of Total Sample (%)
Sex						
Male	18,518	47.9	14,564	47.9	12,435	47.7
Female	24,575	52.1	20,089	52.1	17,227	52.3
Age						
18–32	11,269	27.7	8,829	27.7	7,793	28.0
33–44	10,779	25.0	8,903	25.0	7,508	24.7
45–59	10,472	25.7	8,909	25.7	7,695	25.9
60+	10,573	21.6	8,012	21.6	6,666	21.5
Race-Ethnicity						
Non-Hispanic White	24,507	70.9	20,174	70.9	19,258	77.7
Hispanic	8,308	11.6	6,356	11.6	3,579	7.0
Non-Hispanic Black	8,245	11.1	6,577	11.0	5,907	11.3
Other	2,033	6.5	1,546	6.5	918	4.0
Nativity						
Immigrant	7,320	14.6	5,338	13.8	1,039	3.0
US-Born	35,662	85.4	29,231	86.2	28,623	97.0
Region						
West	9,737	22.0	7,836	22.0	6,272	20.3
Northeast	8,209	19.7	6,444	19.7	5,326	19.2
Midwest	8,991	23.2	7,540	23.2	7,046	24.9
South	16,156	35.2	12,833	35.2	11,018	35.6
TOTAL	43,093	100	34,653	100	29,662	100.0

* Analysis sample includes all Wave 2 respondents with at least 8 years of education who were born in the US or arrived in the US as immigrants at age 12 or younger. N's are actual counts of respondents; percentages incorporate survey weights.

Table 2

Socio-Demographic Predictors of Failure to Graduate High School On Time (N=29,662)

	Number Failing to Graduate On Time	Proportion of Category (%)	Odds Ratio*	95% CI
Sex				
Male	2,277	17.7	Reference	
Female	3,033	16.1	0.85	(0.79,0.92)
Age				
18–32	1,405	17.1	Reference	
33–44	947	13.0	0.77	(0.68,0.87)
45–59	1,148	13.6	0.85	(0.76,0.94)
60+	1,810	24.9	1.89	(1.71,2.09)
Race-Ethnicity				
Non-Hispanic White	2,830	15.0	Reference	
Hispanic	883	26.2	2.46	(2.14,2.83)
Non-Hispanic Black	1,425	23.4	1.77	(1.59,1.97)
Other	172	17.8	1.41	(1.13,1.75)
Nativity				
Immigrant	230	19.2	Reference	
US-Born	5,080	16.8	1.06	(0.87,1.29)
Region				
West	939	14.1	Reference	
Northeast	893	15.6	1.24	(1.04,1.47)
Midwest	1,193	15.9	1.31	(1.13,1.53)
South	2,285	19.8	1.58	(1.37,1.83)
TOTAL	5,310	16.9		

* Odds ratios estimated in a logistic regression equation with all covariates entered as simultaneous predictors.

Table 3

Prevalence of psychiatric disorders, substance use and substance use disorders in the sample and the prevalence of failure to graduate on time among people with each condition.

	Prevalence in the Total Sample		Prevalence of Failure to Graduate on Time within Each Category	
	Total	Weighted %	n	Weighted %
No Psychiatric Disorder	21592	73.2	3555	15.2
<u>Internalizing Psychiatric Disorders</u>				
Depression/Dysthymia	978	3.2	184	18.7
Mania	204	0.7	51	26.6
Panic	178	0.6	44	24.9
Specific phobia	1972	6.4	368	18.1
Social phobia	996	3.5	210	19.4
PTSD	2696	8.1	613	21.4
GAD	183	0.6	37	18.9
ANY INTERNALIZING DISORDER	5604	17.8	1140	19.0
<u>Externalizing Psychiatric Disorders</u>				
Conduct disorder	1392	5.1	426	31.0
ADHD--Attention Type	785	2.7	239	28.6
ADHD--Hyperactive Type	1321	4.7	285	22.4
ADHD--Combined Type	757	2.6	234	32.3
ANY EXTERNALIZING DISORDER	3841	13.5	1040	27.0
<u>Substance Use</u>				
Tobacco use	9284	33.7	2242	24.0
Alcohol use	8052	28.8	1587	19.5
Illegal drug use	3791	13.4	747	20.3
ANY SUBSTANCE USE	13393	47.7	2799	20.8
<u>Substance Use Disorders</u>				
Tobacco dependence	519	2.1	157	29.1
Alcohol abuse and/or dependence	1673	6.3	340	20.5
Illegal drug abuse and/or dependence	1295	4.8	308	24.6
ANY SUBSTANCE DISORDER	2689	10.0	586	22.0

* Psychiatric disorders include those with onset prior to age of initiation of substance use and age at completion of education.

Table 4

Psychiatric disorders as predictors of failure to graduate high school on time

	Model 1 ¹		Model 2 ²		Model 3 ³	
	OR	95%CI	OR	95%CI	OR	95%CI
<u>Internalizing Psychiatric Disorders</u>						
Depression/Dysthymia	1.30	(1.06,1.60)	1.08	(0.86,1.36)	0.98	(0.78,1.24)
Mania	2.14	(1.39,3.28)	1.72	(1.02,2.91)	1.38	(0.81,2.35)
Panic	1.92	(1.28,2.87)	1.68	(1.09,2.60)	1.51	(0.96,2.37)
Social phobia	1.40	(1.16,1.68)	1.21	(1.00,1.47)	1.11	(0.89,1.37)
Specific phobia	1.24	(1.06,1.44)	1.15	(0.98,1.34)	1.05	(0.89,1.24)
PTSD	1.56	(1.38,1.78)	1.22	(1.06,1.41)	1.11	(0.95,1.28)
GAD	1.35	(0.90,2.03)	1.10	(0.73,1.66)	0.78	(0.51,1.23)
<u>Externalizing Psychiatric Disorders</u>						
Conduct disorder	2.67	(2.27,3.15)	2.06	(1.71,2.47)	1.89	(1.57,2.26)
ADHD Inattentive Type	2.17	(1.78,2.65)	1.75	(1.42,2.16)	1.78	(1.44,2.20)
ADHD Hyperactive Type	1.53	(1.28,1.84)	1.36	(1.13,1.64)	1.38	(1.14,1.67)
ADHD Combined Type	2.69	(2.18,3.31)	2.12	(1.70,2.65)	2.06	(1.66,2.56)

¹Model 1 is estimated with one disorder at a time with control for sociodemographic characteristics (age, sex, race-ethnicity, nativity, and region).

²Model 2 is estimated with one disorder at a time with control for sociodemographic characteristics (age, sex, race-ethnicity, nativity, and region) and childhood adversities (financial hardship, neglect, physical abuse, sexual abuse, parental mental disorder, parental domestic violence, family disruption).

³Model 3 is estimated with all 11 disorders entered as predictors and control for sociodemographic characteristics (age, sex, race-ethnicity, nativity, and region) and childhood adversities (financial hardship, neglect, physical abuse, sexual abuse, parental mental disorder, parental domestic violence, family disruption).

Table 5

Substance use and substance disorders as predictors of failure to graduate high school on time, adjusting for prior psychiatric disorders.

	Model 1¹	Model 2²	Model 3²
<u>Substance Use</u>			
Tobacco Use	1.99 (1.82,2.17)	1.97 (1.80,2.16)	
Alcohol use	1.27 (1.16,1.40)	1.05 (0.95,1.16)	
Illegal drugs use	1.24 (1.08,1.43)	0.98 (0.85,1.13)	
<u>Substance Use Disorders</u>			
Tobacco dependence	1.65 (1.26,2.17)		1.52 (1.13,2.03)
Alcohol abuse and/or dependence	1.15 (0.97,1.36)		1.01 (0.85,1.21)
Illegal drug abuse and/or dependence	1.43 (1.20,1.71)		1.34 (1.11,1.62)

¹ Model 1 is estimated with one substance use or disorder predictor at a time, in addition to statistical controls for sociodemographic characteristics (age, sex, race-ethnicity, nativity, and region) and childhood adversities (financial hardship, neglect, physical abuse, sexual abuse, parental mental disorder, parental domestic violence, family disruption), and prior psychiatric disorders listed in table 4.

² Models 2 and 3 are estimated with all three substance use or disorder variables and statistical controls for sociodemographic characteristics (age, sex, race-ethnicity, nativity, and region), childhood adversities (financial hardship, neglect, physical abuse, sexual abuse, parental mental disorder, parental domestic violence, family disruption), and prior psychiatric disorders listed in table 4.