Associations Between Early-Adolescent Substance Use and Subsequent Young-Adult Substance Use Disorders and Psychiatric Disorders Among a Multiethnic Male Sample in South Florida

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Objectives. We examined the associations among early-adolescent substance use, subsequent young-adult substance use disorders, and psychiatric disorders among a community sample of males.

Methods. Early-adolescent data were collected in classroom surveys (1990–1993), and young-adult data were collected in face-to-face interviews (1998–2000).

Results. We found strong associations between early-adolescent substance use and young-adult substance use disorders and psychiatric disorders. The magnitudes of these associations varied by racial/ethnic group and were strongest among African Americans and foreign-born Hispanics, who reported the lowest early-adolescent substance use.

Conclusions. Early-adolescent substance use is most strongly associated with a later pattern of dysfunction among the racial/ethnic groups that reported the lowest levels of early use. The implications of our findings in the context of primary and secondary prevention are discussed. (*Am J Public Health.* 2004; 94:1603–1609)

Alcohol and illicit drug use among young people in the United States is a widespread problem with serious health and social consequences.[1] Data from the 2001 Monitoring the Future Study found that large proportions of high school seniors reported using alcohol (73.3%) or illicit drugs (41.4%) during the past year or cigarettes during the past 30 days (29.5%).[2] Additionally, substantial numbers of high school seniors reported daily marijuana (5.8%) and alcohol use (3.6%), 1 or more episodes of binge drinking during the past 2 weeks (29.7%), and smoking tobacco daily (19%). Adolescent males consistently reported more drinking and substance use than females did,[2,3] and this difference in behavior persists through the transition into adulthood.[4] These findings indicate that initiation and experimentation with substances have become normative rites of passage among US youth, particularly among males.[5]

Epidemiological studies also have documented significant racial/ethnic variations in patterns of adolescent substance use.[2,4,5] Both rates of use and age of initiation vary dramatically by race/ethnicity, with subgroups such as African Americans and foreign-born Hispanics reporting lower and later use.[4,6,7] Despite lower overall rates of substance use during adolescence compared with non-Hispanic Whites, African Americans and some Hispanic groups have higher rates of substance-related morbidity and mortality in adulthood.[5,8,9] Researchers have hypothesized that racial/ethnic differences in socioeconomic and demographic factors, educational values, religious commitment, acculturation and family factors, or peer-oriented activities, or any of these factors, may help explain racial/ethnic variations in substance use and substance use–related problems.[4,5,7,10] However, few studies have directly addressed the role of such variables in determining rates of adolescent substance use or how adolescent substance use may lead to adult negative outcomes.

One consistent predictor of early-adult substance abuse and dependence is early initiation of alcohol or other drug use. Individuals who use substances before high school are significantly more vulnerable to adult alcohol and drug problems than those who initiate substance use during high school or later.[11] With alcohol, age of initiation and chronicity of use are associated with several negative young-adult outcomes, including high frequency of alcohol use, alcohol-related problems, aggressive behavior, theft, and suicidal ideation.[12] With illicit drugs, both age of initiation and chronicity of use predict young-adult substance use disorders and mental health disorders, although these effects seem to be moderated by current drug use during adulthood.[13] Additionally, drug use during late childhood and adolescence can lead to academic, social, and emotional problems and high-risk behavior and thus impair adaptive psychosocial development.[14] Moreover, there is increasing evidence of comorbid associations between drug use and HIV-transmission[15,16] and violence.[17]

To date, the majority of previous research on the association between adolescent substance use and young-adult outcomes has examined predominantly non-Hispanic White samples. Therefore, little is known about how this association may vary by race/ethnicity. The purpose of our study was twofold. First, we examined racial/ethnic variation in patterns of early-adolescent substance use among a community sample of males in South Florida who were followed from the time they entered middle school until early adulthood. Second, we examined associations between patterns of early-adolescent substance use and young-adult substance use disorders and psychiatric disorders. These associations were examined after we controlled for the early development of substance use and psychiatric disorders.

METHODS

Sample and Procedures

We gathered data from a longitudinal study of youths who were followed from middle school through the transition into early adulthood. The study began in 1990, when all the public middle schools in Miami-Dade County, and subsequently all the high schools, agreed to participate. Completed questionnaires were obtained from 6760 students at wave 1 (year 1, 1990), 6089 students at wave 2 (year 2, 1991), and 5370 students at wave 3 (year 3, 1993). Detailed analyses confirmed that wave 1 participants (mean age=11.1 years) were highly representative of the population from which they were drawn; this also was true for the wave 3 participants.[5] The sample for the study reflected the diverse population of south Florida: 63.6% of the students were Hispanic, 14% were African American, 13.3% were non-Hispanic White, and 6% were Haitian and Caribbean Black. Within the Hispanic group, 40.6% were Cubans, 13.4% were Nicaraguans, and 46% were Central (other than Nicaragua) and South Americans.

In 1998, a fourth wave of data was collected for follow-up by stratifying the original wave 1–3 longitudinal sample by race/ethnicity and then randomly selecting a sample of 1273 participants. The stratification scheme selected the groups that were the focus of the original study: US-born Hispanics, foreign-born Hispanics, African Americans, and non-Hispanic Whites. The groups excluded from the sampling frame were Haitians and other non-Hispanic Caribbean Blacks, because their numbers were too small for follow-up. Overall, 76.4% of those we searched for were successfully interviewed. We compared them with the total sample drawn from the original study population (waves 1–3) on 28 early-adolescent risk behaviors and family characteristics and found no statistically significant differences. We also compared school dropout rates. Among those interviewed, 20.5% had dropped out of high school, and this rate corresponded closely with rates reported by the school board for males (21.1%) in the same student cohort.[4] Details about the sampling and study procedures have been published elsewhere.[4,5,6] The sample for our study (mean age=20.1 years) comprised African American (n=240), foreign-born Hispanic (n=192), US-born Hispanic (n=251), and non-Hispanic White (n=259) males who were longitudinally followed from 1990 through 2000.

Measures

Substance use during early adolescence. Substance use was measured at each of the 3 waves of middle school data collection with a survey derived from Monitoring the Future and National Household Studies. Students responded to questions about lifetime, past-year, and past-month use of alcohol, marijuana, cocaine, crack cocaine, hallucinogens, barbiturates, amphetamines, tranquilizers, and inhalants. For our study, a composite typology that represented 3 levels of substance use involvement during the middle school years was created. *Abstinence* was defined as no lifetime drinks of alcohol or other substance use. *Experimentation* was defined as 1 to 9 lifetime drinks of alcohol, no more than 1 lifetime use of marijuana, and no more than 1 lifetime use of any other illicit drugs. Additionally, any participant who reported use of any other illicit drug only once, except alcohol or marijuana, also was categorized as an experimenter. *Regular use* was defined as lifetime alcohol use on 10 or more occasions and lifetime illicit drug use, including marijuana, on more than 6 occasions.

Substance use disorders and psychiatric disorders during early adulthood. Data for lifetime and 1-year prevalence of *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV),*[18] substance use disorders and psychiatric disorders were obtained through computer-assisted personal interviews conducted when participants were aged 19 to 21 years via the Composite International Diagnostic Interview (CIDI). The CIDI is a structured interview originally developed by the World Health Organization (WHO) for administration by lay interviewers, and it has been updated to yield *DSM-IV* diagnoses.[19] The CIDI has been shown to be a reliable and valid tool for assessing *DSM-IV* substance use disorders[20,21] across different cultural groups[20,22,23] and among adolescents.[24]

For our study, substance use disorders included alcohol abuse, alcohol dependence, marijuana abuse, marijuana dependence, and any substance abuse of/dependence on other illicit drugs (i.e., inhalants, cocaine, hallucinogens, heroin, sedatives, tranquilizers, stimulants, and analgesics). Other *DSM-IV* diagnoses that we assessed included major depression, dysthymia, generalized anxiety disorder, social phobia, panic disorder, posttraumatic stress disorder, attention-deficit disorder, hyperactivity disorder, combined attention-deficit/hyperactivity disorder, childhood conduct disorder, and antisocial personality disorder.

RESULTS

Early-Adolescent and Young-Adult Prevalence of Substance Use

Table 1 shows the distribution of early-adolescent substance use and young-adult *DSM-IV* substance use disorders. As expected, there were significant racial/ethnic differences in substance use levels during early adolescence. African Americans reported significantly less substance use during middle school than did any other racial/ethnic group. More than one third of African Americans were classified as abstainers, and fewer than 15% were classified as regular users. Also noteworthy were the low rates of substance use among foreign-born Hispanics, who reported significantly less substance use than either US-born Hispanics or non-Hispanic Whites.

With the exception of marijuana dependence, African Americans also were significantly less likely than the other racial/ethnic groups to have substance use disorders during early adulthood. While less likely to be dependent on marijuana than the other 3 racial/ethnic groups, African Americans differed significantly only from US-born Hispanics (11.1% vs 17.1%). African Americans also were significantly less likely than the other racial/ethnic groups to have any substance use disorder. While middle school substance use was lower among foreign born-Hispanics than among US-born Hispanics, by early adulthood, there were very few significant differences between the 2 groups regarding substance abuse/dependence disorders. In fact, alcohol dependence was higher among the foreign-born Hispanics. Such longitudinal increases in substance use and its negative consequences among foreign-born Hispanics have been documented in other studies and

TABLE 1—Prevalences of Early-Adolescent Substance Use Types and Young-Adult *DSM-IV* Substance Use Disorders, by Race and Nativity

	All (n = 942)	Non-Hispanic Whites (n = 259)	African Americans (n = 240)	US-Born Hispanics (n = 251)	Foreign-Born Hispanics (n = 192)
	% (SE)	% (SE)	% (SE)	% (SE)	% (SE)
Drug use type—early adolescence					
Abstainer	25.8 (1.5)	19.1_x (2.6)	35.4_y (3.4)	18.3_x (2.6)	33.7_z (3.7)
Experimenter	46.5 (1.8)	44.7 (3.3)	50.0 (3.6)	49.1 (3.4)	41.6 (3.9)
Regular user	27.7 (1.6)	36.2 (3.1)	14.6 (2.5)	32.6 (3.2)	24.7 (3.4)
DSM-IV disorders—young adulthood					
Alcohol abuse	21.6 (1.4)	26.1_x (3.0)	9.2_y (2.1)	26.7_x (3.0)	24.9_x (3.3)
Alcohol dependence	9.4 (1.0)	15.2_x (2.3)	4.6_y (1.4)	5.6_y (1.5)	12.6_x (2.6)
Marijuana abuse	15.1 (1.3)	19.8_x (2.7)	10.1_y (2.1)	17.9_x (2.5)	11.2_y (2.4)
Marijuana dependence	14.4 (1.2)	14.4_x (2.3)	11.1_x (2.3)	17.1_x (2.5)	14.7_x (2.6)
Any substance use disorder[a]	43.5 (1.8)	52.8_x (3.3)	28.6_y (3.2)	47.3_x (3.4)	44.9_x (4.0)

Note. DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition.[18] Percentages followed by the same subscript (x, y, or z) were not significantly different from each other. Significance level for all comparisons was $P < .01$, except for drug use type between African Americans and foreign-born Hispanics ($P < .05$).
[a]Any substance use disorder consisted of at least 1 of the following: alcohol, marijuana, inhalants, cocaine, hallucinogens, heroin, sedatives, tranquilizers, stimulants, and analgesics. For marijuana dependence, African Americans differ from US-born Hispanics ($P < .05$).

are typically interpreted as being a function of acculturation to US society.[6,25] More recent studies of adolescent substance use have documented the persistence of these lower rates of substance use among African American and foreign-born Hispanic youths.[2,26,27]

Relationship Between Early-Adolescent Substance Use and Young-Adult Substance Use Disorders and Psychiatric Disorders

Table 2 shows another distribution of early-adolescent substance use and young-adult *DSM-IV* substance use disorders. The first 5 columns show the associations between early levels of substance use and specific substance use disorders, and the last 4 columns show numbers of substance use disorder diagnoses. The results show that early-adolescent substance users are more likely than abstainers to develop substance abuse or dependence by early adulthood. Nearly 60% of adolescent regular users developed at least 1 young-adult substance abuse or dependence disorder. Regular users were more likely than the other types of substance users to qualify for all the young-adult substance use disorders. There also were statistically significant differences between abstainers and experimenters for marijuana abuse and dependence and for the outcome of any substance disorder. The increase between abstainers and regular users in the probability of developing a young-adult substance use disorder diagnosis ranges from 2- to 4-fold. The nearly 5-fold difference in rates for marijuana dependence also is noteworthy. Addi-

TABLE 2—Prevalence of Early-Adolescent and Young-Adulthood *DSM-IV* Substance Use Disorders

	Alcohol Abuse	Alcohol Dependence	Marijuana Abuse	Marijuana Dependence	Any Substance Use Disorder	Multiple Substance Disorders			
	% (SE)	% (SE)	% (SE)	% (SE)	% (SE)	0	1	2	≥3
Abstainers	13.3 (2.3)	4.3 (1.3)	8.1 (1.9)	5.7 (1.6)	26.1 (3.0)	73.9	19.0	4.7	2.4
Experimenters	20.8 (2.1)	9.3 (1.5)	13.7 (1.8)	14.3 (1.8)	42.7 (2.6)	56.8	23.9	11.3	7.9
Regular users	27.9 (3.1)	14.2 (2.4)	22.8 (2.9)	22.2 (2.8)	59.3 (3.4)	38.9	27.0	21.2	12.8
Abstainers different from experimenters				*	***				
Abstainers different from regular users	***	**	***	***	***				
Experimenters different from regular users			**	*	***				

Note. DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition.[18]
*$P < .05$; **$P < .01$; ***$P < .001$.

TABLE 3—Young-Adult *DSM-IV* Substance Use Disorders Predicted by Early-Adolescent Substance Use

	Alcohol Abuse	Alcohol Dependence	Marijuana Abuse	Marijuana Dependence	Any Substance Use Disorder
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
All					
Abstainer/experimenter	1.7* (1.1, 2.7)	2.3* (1.1, 4.8)	1.8* (1.0, 3.2)	2.8** (1.4, 5.3)	2.1*** (1.5, 3.1)
Abstainer/regular user	2.5*** (1.5, 4.1)	3.7*** (1.7, 8.0)	3.4*** (1.9, 6.0)	4.7*** (2.4, 9.2)	4.1*** (4.1, 6.2)
Experimenter/regular user	1.5* (1.0, 2.2)	1.6 (1.0, 2.7)	2.0*** (1.2, 2.9)	1.7** (1.1, 2.6)	2.0*** (1.4, 2.7)
Non-Hispanic Whites					
Abstainer/experimenter	3.0* (1.2, 7.8)	1.8 (0.5, 6.8)	1.3 (0.5, 3.5)	2.0 (0.5, 7.4)	2.3* (1.9, 4.9)
Abstainer/regular user	2.3* (0.9, 6.2)	3.8* (1.1, 13.8)	2.6* (1.0, 7.0)	3.6* (1.0, 12.9)	4.3*** (2.0, 9.3)
Experimenter/regular user	.8 (0.4, 1.4)	2.1* (0.9, 4.6)	2.0* (1.0, 4.2)	1.8 (0.8, 3.9)	1.8* (1.0, 3.3)
African Americans					
Abstainer/experimenter	1.1 (0.4, 3.7)	3.7* (0.4, 10.1)	10.8** (1.4, 24.7)	2.0 (0.6, 6.7)	2.4* (1.0, 4.9)
Abstainer/regular user	3.4* (1.0, 12.2)	7.9** (0.8, 14.5)	14.4** (1.6, 29.3)	7.4*** (2.0, 26.7)	6.6*** (2.5, 17.5)
Experimenter/regular user	3.0* (1.0, 9.4)	2.2 (0.5, 9.7)	1.3 (0.4, 4.1)	3.6** (1.3, 9.8)	2.9** (1.2, 6.8)
US-born Hispanics					
Abstainer/experimenter	1.6 (0.7, 4.2)	.6 (0.1, 1.7)	1.3 (0.5, 3.9)	1.9 (0.6, 6.1)	2.0* (0.9, 4.4)
Abstainer/regular user	3.1* (1.1, 8.4)	.8 (0.2, 1.2)	1.8 (0.6, 5.6)	2.4 (0.7, 7.8)	2.8** (1.2, 6.4)
Experimenter/regular user	2.0* (1.0, 3.9)	.7 (0.2, 2.2)	1.4 (0.6, 3.0)	1.2 (0.6, 2.6)	1.4 (0.8, 2.5)
Foreign-born Hispanics					
Abstainer/experimenter	1.1 (0.4, 2.6)	1.5 (0.5, 4.8)	.6 (0.2, 2.4)	10.8** (1.3, 36.2)	1.6 (0.7, 3.2)
Abstainer/regular user	1.2 (0.5, 3.3)	2.0 (0.6, 7.0)	2.2 (0.6, 7.4)	15.5*** (1.9, 47.2)	2.8* (1.2, 6.5)
Experimenter/regular user	1.2 (0.4, 3.0)	1.3 (0.5, 3.9)	3.4* (0.9, 12.6)	1.4 (0.5, 3.8)	1.8 (0.8, 4.0)

Note. *DSM-IV* = *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*.[18] OR = odds ratio; CI = confidence interval.
*P < .05; **P < .01; ***P < .001.

tionally, there were statistically significant differences between adolescent experimenters and regular users for all young-adult substance use disorders except alcohol abuse and dependence. Finally, Table 2 shows linear associations between adolescent substance use and the development of multiple substance disorders during early adulthood, with higher percentages of adolescent regular and experimental substance users receiving multiple diagnoses. The percentage of regular users who had 3 or more substance use disorders was more than 4 times greater than the percentage of abstainers (12.8% vs 2.4%), and the difference between abstainers and experimenters (7.9%) was more than 3-fold.

Table 3 shows race/ethnicity–specific analyses of associations between early-adolescent substance use and young-adult substance use disorders. For the sample, regular users were much more likely to have substance use disorders than abstainers, e.g., for marijuana dependence (odds ratio [OR] = 4.7, P < .001) or any substance disorder (OR = 4.1, P < .001). Experimenters also were significantly more likely than abstainers to have a marijuana dependence diagnosis (OR = 2.8, P < .01) or any substance disorder (OR = 2.1, P < .001).

Table 3 also shows the general and the unique impact of adolescent substance use by race/ethnicity. Within-group analyses show no statistically significant effects of early substance use for some groups but significant effects for other groups. For example, while African American adolescents reported the lowest levels of early-adolescent substance use, comparisons between abstainers and experimenters or regular users revealed very high odds for marijuana abuse and marijuana dependence diagnoses. By contrast, US-born Hispanics, who had some of the highest levels of early-adolescent substance use, showed relatively weak associations between early substance use and each of the substance use disorders. However, among foreign-born Hispanics, the odds for developing marijuana dependence were particularly high for regular users and experimenters compared with abstainers. Finally, among non-Hispanic Whites, relatively high odds ratios were found for all disorders when regular users were compared with abstainers. To assess differences between racial/ethnic groups, we tested interactions in instances where there were significant effects of early substance use across groups. There were several significant interactions when we compared regular users with abstainers between African Americans and non-Hispanic Whites. The effects were significantly stronger among African Americans for marijuana abuse ($\beta = 1.60$, P < .001), any substance disorder ($\beta = 1.50$, P < .001), and alcohol dependence ($\beta = 1.7$, P < .001). There also were several significant interactions when we compared African Americans with foreign-born Hispanics for marijuana dependence ($\beta = 1.4$, P < .01) and any substance disorder ($\beta = 1.0$, P < .05). Finally, there was a significant interaction between foreign-born Hispan-

TABLE 4—Young-Adulthood *DSM-IV* Disorders Predicted by Early-Adolescence Substance Use

	Any Affective Disorder	Any Anxiety Disorder	Antisocial Personality Disorder	Any Psychiatric Disorder
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
All				
Abstainer/experimenter	1.4 (0.7, 2.5)	1.7 (0.7, 1.8)	2.6*** (1.5, 4.3)	1.8** (1.2, 2.8)
Abstainer/regular user	1.2 (0.6, 2.4)	1.2 (0.5, 3.0)	3.0*** (1.7, 5.2)	1.9** (1.2, 2.9)
Experimenter/regular user	0.9 (0.5, 1.5)	0.7 (0.3, 1.4)	1.2 (0.8, 1.7)	1.0 (0.7, 1.4)
Non-Hispanic Whites				
Abstainer/experimenter	6.1** (0.8, 28.1)	0.4 (0.1, 2.0)	1.2 (0.4, 4.0)	1.3 (0.5, 3.1)
Abstainer/regular user	4.8* (0.5, 19.8)	0.7 (0.1, 3.0)	3.4* (1.0, 10.6)	2.2* (0.9, 5.2)
Experimenter/regular user	0.8 (0.3, 2.0)	1.7 (0.4, 7.0)	2.8** (1.3, 6.3)	1.7 (0.9, 3.2)
African Americans				
Abstainer/experimenter	1.2 (0.3, 5.2)	4.2* (1.0, 19.0)	3.7*** (1.4, 8.3)	3.1** (1.5, 6.6)
Abstainer/regular user	1.7 (0.3, 10.7)	1.3 (0.9, 4.6)	4.4** (1.6, 12.3)	3.4** (1.3, 8.9)
Experimenter/regular user	1.4 (0.3, 7.5)	0.8 (0.1, 2.0)	1.2 (0.5, 2.8)	1.1 (0.5, 2.5)
US-born Hispanics				
Abstainer/experimenter	0.5 (0.2, 1.5)	1.7 (0.3, 3.1)	4.9** (1.1, 11.3)	1.4 (0.6, 3.2)
Abstainer/regular user	0.6 (0.2, 1.7)	0.9 (0.1, 2.1)	6.0** (1.3, 14.7)	1.8 (0.7, 4.2)
Experimenter/regular user	1.1 (0.4, 1.8)	1.3 (0.4, 4.4)	1.2 (0.6, 2.4)	1.3 (0.7, 2.4)
Foreign-born Hispanics				
Abstainer/experimenter	1.6 (0.5, 5.1)	1.1 (0.2, 5.2)	2.5* (1.0, 6.9)	1.9 (0.9, 4.3)
Abstainer/regular user	0.7 (0.1, 3.0)	0.4 (0.1, 2.4)	1.6 (0.5, 4.4)	0.8 (0.3, 2.1)
Experimenter/regular user	0.4 (0.1, 1.7)	0.3 (0.02, 1.8)	0.7 (0.2, 1.8)	0.4 (0.1, 1.0)

Note. *DSM-IV* = *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*.[18] OR = odds ratio; CI = confidence interval.
*P < .05; **P < .01; ***P < .001.

ics and non-Hispanic Whites for marijuana dependence (β=.97, P<.05).

An additional goal of our study was to examine whether adolescent substance use patterns were associated with young-adult psychiatric disorders. Table 4 shows the associations between early-adolescent substance use and young-adult *DSM-IV* psychiatric disorders. The onset of psychiatric disorders was controlled so that disorder onset among participants occurred after the onset of substance use, which resulted in the exclusion of 53 participants for whom the onset of psychiatric disorders occurred before the onset of substance use. For the entire sample, levels of substance use were associated only with the probability of antisocial personality disorder and developing at least 1 psychiatric disorder. However, significant racial/ethnic variations were documented in associations between early-adolescent substance use and young-adult psychiatric diagnoses. There are 2 examples of these differences: (1) adolescent substance use is associated with young-adult affective disorders only among non-Hispanic Whites, and (2) adolescent substance use is virtually unrelated to young-adult psychiatric status (including antisocial personality disorder) among foreign-born Hispanics. Moreover, the types of early-adolescent substance use that are most predictive of young-adult psychiatric diagnoses vary by race/ethnicity. For example, the elevated risk for antisocial personality disorder among non-Hispanic Whites was not found for the experimenter versus abstainer contrast (OR=1.2) but was found for the regular user versus abstainer contrast (OR=3.4) and the regular user versus experimenter contrast (OR=2.8). Among African Americans, the elevated risk for antisocial personality disorder was not found for the regular user versus experimenter contrast (OR=1.2) but was found for the experimenter versus abstainer contrast (OR=3.7) and the regular user versus abstainer contrast (OR=4.4). Finally, among foreign-born Hispanics, there were virtually no associations, with the exception that antisocial personality disorder was significantly more likely to appear among experimenters than among abstainers (OR=2.5, P<.05).

DISCUSSION

Our findings should be interpreted within the context of several limitations to this study. Whereas our study examined a longitudinal sample and had the advantage of examining the impact of substance use during early adolescence on substance use disorders during early adulthood, such an impact may not occur with current adolescent populations. Also, results based on heterogeneous populations in South Florida may not generalize to other regions.

Our results indicate that, among males, there are racial/ethnic differences in rates of early adolescent substance use, and early-adolescent substance use is associated with

young-adult substance abuse disorders. Moreover, there are significant racial/ethnic differences in young-adult substance use disorder and psychiatric disorder sequelae of early-adolescent substance use. Specifically, the 2 groups with the lowest rates of early-adolescent substance use—African Americans and foreign-born Hispanics—had negative young-adult outcomes among those who had the greatest early-adolescent substance use. There are important gender differences in rates of substance use and substance use disorders,[4] and we plan subsequent studies that will focus on females. Furthermore, with regard to the Hispanic population, our findings may not be generalizable to locations in which the percentage of immigrants is lower than that of South Florida.

Understanding the factors associated with racial/ethnic variations in substance use disorder and psychiatric disorder trajectories is essential to prevention efforts. For example, it is well documented that adult African Americans are particularly likely to suffer from specific health problems related to alcohol and drug use, including personal injury and drug-related deaths,[28–30] liver cirrhosis, tuberculosis, hepatitis B and C, domestic violence,[31–34] HIV/AIDS and other sexually transmitted diseases,[35] comorbid psychiatric disorders,[36] and emergency room visits.[37] However, African American adolescents, despite public perceptions to the contrary, have lower average rates of alcohol and other substance use than other racial/ethnic groups.[2,5,38] Our study sheds some light on these superficially paradoxical findings. Results indicate that while male African American youths on average are less involved with substance use than are youths from other racial/ethnic groups, African American adolescents who do use substances are at a heightened risk for young-adult substance use disorders and psychiatric disorders. One reason may be that the potential for long-term negative consequences of substance use are particularly pronounced for African Americans because of the specific racial/ethnic social context of use. Especially in low-income African American communities—where social problems are concentrated, resources are scarce, and social networks are fractured—the long-term implications of adolescent substance use may be exaggerated through interaction with social and economic risk factors. Moreover, there is evidence that being African American and poor, in addition to psychosocial distress, contributes to higher mortality.[39]

Studies have reported relatively weak effects of the "traditional" risk factors measured in early adolescence on substance use outcomes for African Americans. Because African Americans have a later onset of substance use and have accelerated trajectories toward problems once use begins, the interactions between substance use and contemporaneous social and economic risk factors may better account for young-adult substance use problems than any early-adolescent risk factors. Some examples of social and economic risk factors previously identified as relevant to African Americans include community cohesion, neighborhood crime exposure, and economic distress.[40,41]

Consistent with our findings, the effects of early-adolescent substance use on adult outcomes may be structured by personal, familial, economic, or social-context risk factors, or all 4, that vary by race/ethnicity. Similarly, the effects of early-adolescent substance use may be attenuated by personal, familial, economic, or social-context protective factors, or all 4, that also vary by race/ethnicity. There are multiple possible causal processes underlying the emergence of substance use disorders and psychiatric disorders during early adulthood, which reflects the fact that individuals are embedded in multiple social-interaction systems.[42] Thus, it is possible that African American youths and foreign-born Hispanic youths have less access to social and economic resources, live in more adverse social contexts, and have less access to compensatory resources that attenuate the impact of early-adolescent substance use on later substance use problem and mental health problem outcomes. In other words, we are hypothesizing that the "riskiness" of a risk factor, such as early-adolescent substance use, is not inherent in the risk factor itself but is conditioned by the context in which the risk occurs.

Similar to African Americans, foreign-born Hispanics who experiment or regularly use drugs during early adolescence appear to be at a higher risk than US-born Hispanics for developing substance use disorders during early adulthood. Studies have demonstrated lower rates of substance use among Hispanic youths born outside the United States.[4–6] The greater vulnerability among the foreign-born Hispanics in our study is somewhat surprising because of findings in the literature of better mental health among foreign-born Hispanics, despite more stressful social conditions.[43] This has been referred to in the literature as the "Hispanic paradox."[44] Our findings may be associated with the fact that the foreign-born participants in our study entered the United States at an early age and were socialized into new environments during critical adolescent transitions. The impact and the interaction of acculturation processes with key developmental transitions of adolescence have not been studied widely. Future research may produce important insights into these intriguing results.

CONCLUSIONS

Our findings indicate that public health efforts aimed at the prevention of substance use disorders need to focus on the contexts in which substance use occurs. It would be an error to assume that because African American and foreign-born Hispanic male youths tend to report later initiation and lower levels of drug use, there is less need for prevention and treatment efforts aimed at these groups. Rather, our findings indicate that even experimental use during early adolescence dramatically increases the risk for development of substance use disorders and psychiatric disorders during adulthood. This underscores the need for a combined effort to increase our understanding of the factors associated with the initiation, progression, and sequelae of substance use among African American, Hispanic, and other minority populations. We also need to develop culturally sensitive and competent treatment and services that target young substance users. ■

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