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Forecasting Disparities with Early Substance-Use Milestones

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Abstract

Substance use contributes to health disparities across race/ethnicity, gender, and socioeconomic status (SES). Although adolescent research indicates group-based differences in regular use, few studies have examined patterns when initiation is just beginning. Using a sample of 917 Rhode Island middle schools students (54% female, 26% non-Hispanic White), we collected demographic information at baseline (M age 12.2); we then examined ever-puff (cigarettes), ever-sip (alcohol), and ever-use (marijuana) behaviors three years later. For cigarette use, we found differences based on SES and race/ethnicity (prevalence was particularly high among Native American youths). Marijuana use was associated with lower SES, and alcohol use was higher among females than males. Overall, findings indicate racial/ethnic-, gender- and SES-based differences in early substance-use milestones. From a prevention standpoint, it is important to evaluate differences not only in heavy substance use, but in early milestones, as they may set the course for health disparities across the lifespan.

Keywords

Health disparities; race and ethnicity; SES; gender; tobacco; alcohol; marijuana

Within the U.S., major disparities in health exist across race/ethnicity, gender, and socioeconomic status (SES; USDHHS, 2015). Although many factors contribute to these disparities (e.g., discrimination, access/availability of health care and insurance), research indicates that differences in the amount and frequency of substance use play a large role (Galea, Nandi, & Vlahov, 2005). For substances such as tobacco, alcohol, and marijuana, use generally begins during adolescence (Widome et al., 2013). There is also evidence that group-based differences in the prevalence of regular use begin to emerge prior to adulthood (Bachman et al., 2011, Chen & Jacobson, 2012).

Group-based differences in early use (e.g., first cigarette puff), when initiation is just beginning and is often experimental in nature, could set the course for health disparities across the lifespan. Therefore, more work needs to clarify what the differences look like and

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when they occur, to ensure that preventative measures target appropriate populations at the appropriate time. Research particularly needs to monitor disparities involving multiethnic/multiracial adolescents—an understudied population that is growing in prevalence in the US (Hud-Aleem & Countryman, 2008) and among whom physical and mental health disparities have been reported (Flores & Tomany-Korman, 2008; Wong, Sugimoto-Matsuda, Chang, & Hishinuma, 2012). This paper uses data from a prospective adolescent study to begin addressing these issues.

METHODS

Participants and Procedures

Procedures were approved by the Brown University IRB. Data came from a project that at baseline comprised 1,023 students in six Rhode Island middle schools (selected to ensure representation of rural, suburban, and urban schools) enrolled six months apart. Baseline information was collected via a computer-administered survey at school. Subsequent data collection used semi-annual online surveys, with each cohort participating for three full years. Baseline data were also collected from one parent of the adolescent (929 “responding parents” contributed data).

Of the 1,023 adolescents, 935 (91%) completed a survey in their third year. Adolescents with missing data for race/ethnicity ($n = 15$) were excluded from analyses, as were adolescents who indicated their race/ethnicity as Native Hawaiian/Other Pacific Islander ($n = 3$), due to small cell size; these exclusions yielded a final sample of 917 (54% female; 33% qualified for free/reduced school lunch). Mean age was 12.2 (Mode = 12, $SD = .97$, range: 10–15) at baseline and 15.2 (Mode = 15, $SD = .94$; range: 13–18) by Year 3. Racial/ethnic composition was as follows: 679 (74%) White, 31 (3%) African American, 97 (11%) Hispanic, 17 (2%) Native American, 25 (3% Asian), and 68 (7%) Multiethnic/multiracial.

Measures

Demographic Factors (assessed at Baseline)—Students indicated their gender and answered two questions about race/ethnicity: “Are you Hispanic or Latino?” and “What is your race?” (American Indian/Alaskan Native, Asian, Black or African American, Native Hawaiian/Other Pacific Islander, White, or Other). Responses were used to create a single race/ethnicity item, coded as: non-Hispanic White, African American, Hispanic, Native American, Asian, and Multiethnic/Multiracial.¹

Responding parents reported annual *household income* (from 1 = <\$5,000 to 9 = \$150,000+) and whether their child qualified for a federally-sponsored *free or reduced lunch* at school. Parents reported the highest level of *education* they received (from 1 = <high school to 5 = postgraduate degree). These three variables were standardized and aggregated into a single SES scale ($\alpha = .78$).

¹Coding was intended to distinguish single vs. mixed cultural background. Adolescents who reported Hispanic, no race ($n = 53$) and adolescents who reported Black Hispanic or White Hispanic ($n = 44$) were coded as Hispanic; adolescents who reported Hispanic and another race (e.g., Asian) and adolescents who reported two or more races were coded as multiethnic/multiracial.

Substance Use (assessed Year 3)—For smoking, we asked: “Have you ever tried or experimented with cigarette smoking, even a few puffs/drags?” For drinking, we asked participants whether they had ever had a sip of alcohol, not including consumption that was part of a religious service. For marijuana use, we asked: “Have you ever used marijuana (pot, hash, hash oil, etc.)?” Youth reporting use at any wave of data collection were coded as ever-users at Year 3.

RESULTS

Table 1 presents the prevalence of early substance use milestones for the overall sample, and broken-down by group. The table also presents results of chi-square analyses conducted using Fisher’s Exact Test, which is robust against small sample sizes. The prevalence of ever sipping alcohol (66%) was over twice as high as ever trying marijuana (25%) and over three times as high as ever puffing a cigarette (20%). Chi-square analyses indicated the only group-based difference for sipping was higher prevalence among females [$\chi^2(1, N = 917) = 4.35, p = .04$]. For puffing, there was a significant difference by race/ethnicity [$\chi^2(5, N = 917) = 14.0, p = .02$] and SES (logistic regression was used for the latter analysis because SES was a continuous variable; OR = .42, 95% CI, 0.33–0.54, $p < .001$);² Native American youths had the highest puffing rates (52.9%) followed by the Multiethnic/Multiracial (26.5%) and other groups (Hispanic youths had the lowest rate, at 18.6%). For trying marijuana, there was a significant difference by SES (OR = .63, 95% CI, 0.51–0.79, $p < .001$).

DISCUSSION

Findings showed racial/ethnic-, gender-, and SES-based differences in puffing, sipping, and trying marijuana for this adolescent sample. For all substances, the trend was higher prevalence among females; although this pattern stands in contrast to what is found for adults, it is consistent with other research on gender differences during adolescence (Higgins et al., 2015). For example, Chen and Jacobson (2012) showed that females had greater alcohol use than males during early adolescence but that males began drinking at higher levels during later adolescence and young adulthood. For puffing cigarettes and trying marijuana, we found greater use among low-SES youths—a trend that parallels those for heavier adolescent use (Widome et al., 2013). Patterns across substances were less consistent for race/ethnicity; but generally, trends were in line with those reported for heavier adolescent use (e.g., greater use among Native American and Multiethnic/Multiracial youth; Clark, Doyle, & Clincy, 2013) although there were exceptions (e.g., high sipping among Asian youth).

Results also illustrate how higher prevalence does not necessarily translate into more pronounced group-based differences. For example, we observed more group-based

²Participants also reported age-at-first-full-cigarette, and age-at-first-full-drink, which allowed us to run Cox proportional hazards models (survival analyses) with age as the time scale. These analyses revealed that: The hazard of low-SES youths for full-cigarette initiation was 2.6 times that of high-SES youths (see Table 1 for information on dichotomizing SES); the hazard of low-SES youths for full-drink initiation was 1.4 times that of high-SES youths; and the hazard of females for full-drink initiation was 1.6 times that of males.

differences for puffing cigarettes than sipping alcohol, despite the greater prevalence of alcohol use. Although cigarette use in our sample may seem less concerning because of its relatively lower prevalence, its group-based differences are problematic, as they may set the stage for both differences in use and health disparities during adulthood.

Beyond providing current information on differentials in very early substance-use milestones, a strength of this paper is its inclusion of a multiethnic/multiracial group—a population frequently relegated into an “other” category or left unanalyzed. Limitations include the low base rates, which may not provide ample power to assess interactions. Further, the sample is currently too young to examine use trajectories, and how these early milestones progress to regular use. These findings need to be replicated with larger and more diverse samples in order to more vigorously demonstrate how differences in very early substance use milestones can forecast later-life racial and SES-based health disparities. Future work should also investigate how differences such as those obtained in the present paper occur, and whether certain risk/protective factors for initiation and early use may affect substance use more strongly for certain groups of youth. Overall, these present findings suggest opportunities for early prevention/intervention, with targeted efforts to reduce the continuation and escalation of substance use.

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Table 1

Prevalence of early substance use milestones (ever puff, ever sip, and ever used marijuana) for the full sample and by race/ethnicity, gender, and SES.

SUBSTANCE	GROUPING	GROUP DIFFERENCES			
		Pearson's Chi-square p-value	Fisher's Exact Test p-value	Effect Size**	
Puffing Sipping Trying Marijuana	FULL SAMPLE				
	20.2%				
	65.9%				
	24.8%				
Puffing Sipping Trying Marijuana	RACIAL/ETHNIC GROUP	White	Asian	Multi	
		18.9% ^a	20.0% ^a	26.5% ^a	.12
		65.5%	72.0%	73.5%	.06
		23.4%	28.0%	30.9%	.09
		Afr Am	Nat Am		
		22.6% ^a	52.9% ^b		
	63.9%	64.7%			
	22.7%	41.2%			
Puffing Sipping Trying Marijuana	GENDER	Female	Male		
		22.0%	18.1%	.15	.16
		68.9% ^a	62.4% ^b	.04	.04
		26.4%	22.8%	.21	.22
Puffing Sipping Trying Marijuana	SES**	Low SES	High SES		
		28.3% ^a	11.1% ^b	<.001	<.001
		68.6%	63.0%	.09	.09
		31.2% ^a	19.2% ^b	<.001	<.001

Where chi-squares indicated significant differences, subscript letters indicate grouping categories that do not differ significantly from each other.

* Effect size is assessed with Cramer's V. Generally, values under 0.30 indicate small-medium effects. However, the threshold becomes lower with increasing degrees of freedom (such as in the race/ethnicity analyses).

** SES was a continuous variable in main analyses; however, for this table, SES was dichotomized based on a median split and chi-square analyses were used for ease of interpretation.

White = Non-White Hispanic; Afr Am = African American; Nat Am = Native American; Multi = Multiethnic/Multiracial.