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Racial differences and the role of neighborhood in the sequencing of marijuana and tobacco initiation among urban youth

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Abstract

Background—With patterns of Initiation of tobacco and marijuana changing, there is increasing evidence that marijuana use may serve as an antecedent to tobacco use among adolescents. However, studies have not fully characterized the prevalence of these patterns among vulnerable youth and have rarely examined the factors that predict the sequencing of onset of tobacco and marijuana use.

Methods—Utilizing longitudinal data from a sample of urban youth followed from age 6 to age 18, the authors identify the sequencing of initiation of tobacco and marijuana and test whether race and 5 neighborhood factors (i.e., perceived disorder, drug activity, drug access, exposure to violence, and exposure to violent victimization) predict onset sequencing.

Results—Various sequencing patterns were observed, with 12.4% of the sample initiating marijuana use before tobacco use was initiated. In adjusted logistic regression models, black youth were 2.66 times as likely as whites to initiate marijuana before tobacco compared with initiating tobacco before marijuana ($P = .032$). Youth with greater exposure to violent victimization were 3.89 times as likely to initiate marijuana first than initiate tobacco first ($P = .002$). Other neighborhood factors were not statistically significantly associated with sequencing.

Conclusions—Black youth and youth with greater exposure to victimization had an increased risk of initiating marijuana before tobacco, which suggests that this pattern may be rooted in

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Author contributions

Drs. Green and Reboussin conceptualized the manuscript. Dr. Ialongo was responsible for initiating the original study and collecting all the data. Drs. Green, Johnson, and Milam contributed to the literature review. Dr. Green conducted the statistical analysis and wrote the first draft of the manuscript. All authors contributed to the draft and approved the final version.

specific risk factors. Substance use prevention efforts should consider taking into account that marijuana use may put certain youth at risk of initiating tobacco. Future research needs to monitor sequencing, as well as risk factors for and consequences of the various patterns, particularly since marijuana use and the mixing of tobacco and marijuana use are gaining acceptability in general populations.

Keywords

Adolescents; African Americans; cannabis; cigarettes; longitudinal studies; ordering onset

Introduction

Historically, tobacco has been conceptualized as a “gateway” drug—i.e., an antecedent to use of illegal substances, such as marijuana.[1] However, patterns of initiation are changing, and for some youth, marijuana may precede cigarette smoking.[2,3] It is possible that this pattern will become more common as tobacco use continues to decrease and marijuana use gains acceptability.[4] US national data indicate that past-month prevalence of marijuana use has recently surpassed the prevalence of cigarette use among youth.[5]

There are reasons to think that patterning of initiation is important, as preliminary evidence suggests that marijuana use may put youth at risk of initiating tobacco. Amos and colleagues in a qualitative study of Scottish smokers reported that for several youth, smoking marijuana via joints served as an introduction to cigarettes.[2] Tullis and colleagues explained that some college students in their sample reported using marijuana first because they perceived it to be safer than cigarettes but later initiated cigarettes after becoming accustomed to inhaling drug vapors.[3]

The pattern of initiation of marijuana before tobacco may be more common among black youth than white youth. White and colleagues found that 28% of the black youth who were using both substances began regular use of marijuana before regular use of alcohol or tobacco compared with 2% of white youth who were using both substances.[6] Vaughn and colleagues found that among youth who used both marijuana and cigarettes, black youth were 3.5 times as likely as white youth to initiate marijuana before cigarettes in adjusted analyses.[7]

It is possible that racial differences in the drug sequencing are partially rooted in neighborhood context, yet these have rarely been studied. Tarter and colleagues offer evidence that boys who initiated marijuana before alcohol or tobacco tended to live in neighborhoods characterized by poverty and prominent illegal drug markets, and had lower parental supervision.[8] Neighborhood factors, such as drug availability and disorder, have been found generally to influence both marijuana use and smoking among urban youth.[9,10]

To better understand neighborhood influences, we focus on a predominantly black, urban sample followed longitudinally from childhood through adolescence. This study asked the following research questions: (1) What are the overall patterns of initiation of tobacco and marijuana among this sample of urban youth? (2) Are blacks more likely than whites to

initiate use of marijuana before tobacco? (3) Do specific neighborhood factors (e.g., disorder, drug activity, and violence exposure) predict onset sequencing?

Methods

Study sample

This study relies on prospectively gathered data from the Baltimore Prevention Research Center at Johns Hopkins Bloomberg School of Public Health from grades 1 to 12. The study began in 1993, with all the boys and girls who were in first grade in 9 Baltimore City public elementary schools (27 classrooms).[11] Data were originally part of a randomized prevention trial. Interventions were provided over the first-grade year in 2 of the 3 participating classrooms in each school, following child, teacher, and parent assessments in the early fall. Intervention and control groups were assessed in the spring of 1st (N = 798) through 12th grade. The sample is 85% black, relatively evenly split by gender (46% female). The institutional review board of the Johns Hopkins Bloomberg School of Public Health reviewed and approved this study. Signed consent was obtained from parents prior to age 18, along with youth assent. Signed consent was obtained from each participant at age 18 and thereafter at each interview (see Ialongo et al.[11]).

Measures

The dependent variable is the sequencing of onset of tobacco and marijuana use. This 4-category variable was based on annual assessments in grades 6 to 12 in which youth reported use of each substance, as well as their age of first use based on questions drawn from Monitoring the Future[12] and the National Survey on Drug Use and Health.[13] The first report of use established age of initiation. Individuals who used tobacco were categorized as using tobacco first if they reported a younger age of onset of tobacco than marijuana or reported tobacco use only (and considered to be at risk for marijuana initiation). Those who were categorized as using marijuana first either reported an earlier onset of marijuana than tobacco or reported using only marijuana (and considered to be at risk for tobacco initiation). Those who initiated marijuana and tobacco at the same age according to self-reported age of onset were classified as initiated both at the same age.

Six independent variables were considered. For race, students were categorized as black or white. Perceived neighborhood disorder was assessed with 10 items from the Neighborhood Environment Scale.[14] Youth rated their neighborhood on 10 aspects on a 4-point scale (1 = *not at all true to* 4 = *very true*), which included the use and selling of drugs, public drunkenness, drug dealing, violence against children, violence against adults, damaging and stealing property, respecting the law, and perceptions of safety. Higher scores indicate higher levels of perceived disorder. The single item measuring neighborhood drug activity was also examined separately, as well as being part of the 10-item scale. This item asked youth to indicate their agreement to the following statement: I have seen people using or selling drugs in my neighborhood.

For drug access, youth rated their ease of access to tobacco, alcohol, marijuana, cocaine, and crack on a 5-point scale (1 = *probably impossible*, 5 = *very easy*). These 5 items were

averaged to create the construct. Youth reported their exposure to violence in their neighborhood during the past year using the Children's Report of Exposure to Violence.[15] Youth were asked about their experiences witnessing or experiencing being beaten up, robbed, stabbed, or shot or being threatened with one of these violent acts. Specific wording of all questions is available at http://www.jhsph.edu/prevention.

Results

Attrition analyses

Race analysis is based on the 716 youth who had at least 1 adolescent assessment and therefore were assessed for substance use (90% of the original cohort). Attrition analyses comparing the 716 youth who were assessed in adolescence with the 82 youth not followed up in middle or high school show no differences on gender, race, free/reduced price meal status, intervention status, or first-grade teacher's rating of aggressive/disruptive behavior. Multivariate analyses utilized a reduced analytic sample and are restricted to the 582 youth (73% of cohort) who have the sixth-grade assessments of neighborhood. We focus on sixth-grade neighborhood to ensure time order, as substance use initiation before sixth grade is rare. Analyses comparing the 582 youth with a sixth-grade neighborhood assessment with the 216 without also show no statistically significant differences on those same background variables, nor on sequencing onset.

Descriptive statistics

Slightly more than 85% of participants were black, whereas 14.7% were white; 36.9% of participants witnessed violence, whereas 6.5% experienced violent victimization. The mean for perceived neighborhood disorder was 1.82, with an alpha of .81. The mean for neighborhood drug trafficking and activity was 1.98, whereas access to drugs had a mean equal to 1.98 and an alpha of .85.

Sequencing of marijuana and tobacco by race

As shown in Table 1, we found 44.4% of youth initiated tobacco first, 12.4% initiated marijuana first, 12.7% initiated both at the same age, and 30.4% reported no use of tobacco or marijuana by 12th grade. Of those who initiated tobacco first, 70% reported use of both substances by 12th grade. On average, there were 2.9 years between tobacco and marijuana initiation. Of those who initiated marijuana first, 51% reported use of both substances by 12th grade, with an average of 2.4 years between tobacco and marijuana initiation, whereas the other 49% had not yet initiated tobacco.

The most common sequencing among both black and white youth was the conventional pathway of tobacco initiation before marijuana initiation (see Table 1). Specifically, 57% of whites initiated tobacco before marijuana, whereas 42% of blacks initiated tobacco before marijuana. A substantial number of youth initiated marijuana first, with a higher percentage of black youth initiating marijuana before tobacco (13%) compared with white youth (7%). In terms of initiating tobacco and marijuana at the same time, this rate was similar for black and white youth (13% vs. 11%, respectively, among all youth). Finally, a quarter of white youth and almost a third of black youth did not initiate tobacco or marijuana by the end of

high school. The overall racial difference was statistically significant in this chi-square analysis ($\chi^2 = 9.24$, $P = .026$).

Multivariate analyses

Logistic regression compared youth who initiated marijuana first with youth who initiated tobacco first on race and neighborhood factors. Analyses adjusted for baseline measures, including free/reduced priced meals, gender, intervention status, and first-grade teacher's rating of aggressive/disruptive behavior as measured by the Teacher Observation of Classroom Adaptation Scale Revised (alpha = .94).[16] Aggressive/disruptive behavior was controlled, as previous studies show that urban children who behave aggressively are more likely to be exposed to drugs and violence.[17,18] Race by neighborhood variables and gender by neighborhood variables interactions were tested, as well as a race by gender interaction; however, no significant race or gender interactions were found.

As shown in Table 2, adjusted regression analyses showed that race significantly differentiates the 2 groups of interest: those who initiate marijuana first compared with those who initiate tobacco first. Black youth were 2.66 times as likely as whites to initiate marijuana before tobacco compared with initiating tobacco before marijuana ($P = .032$).

Neighborhood disorder, drug trafficking, drug access, and witnessing violent acts did not differentiate those who initiated tobacco before marijuana compared with those who initiated marijuana before tobacco (all Ps >.05; see Table 2). However, youth with greater exposure to violent victimization were 3.89 times as likely to initiate marijuana before tobacco ($P = .002$) than initiate tobacco first after adjustment. While race remained statistically significant in all neighborhood models; gender did not predict initiating marijuana first compared with initiating tobacco first in any model (results not shown).

Discussion

As the marijuana attitudes and policies in the United States are changing, the patterns by which youth initiate marijuana use first may become more common and should be monitored over time. Thus, despite accomplishments made in curbing cigarette smoking, an increase in marijuana use may put particular youth at risk of transitioning to tobacco use. There are a number of reasons why marijuana use may increase the risk of cigarette smoking, particularly among black youth, that needs to be explored in future research, including the belief that cigarettes may prolong or heighten the effects of marijuana,[3] blunt chasing,[19] the ease of acquiring cigarettes to smoke when marijuana is not available,[20] overcoming the unnatural hurdle of inhaling smoke into one's lungs,[3] increased exposure to cigarettes through deviant peer associations,[21,22] and drug-seeking behavior.[23] This study offers evidence of a potential alternate pathway to tobacco use in which marijuana is initiated first among certain youth. In this urban sample, this sequencing is particularly evident for black youth and youth with greater exposure to violent victimization.

It is possible that in these cases of victimization, marijuana is first used to self-medicate stressful experiences[24] and later cigarette smoking begins. Interestingly, the other neighborhood factors investigated, namely, neighborhood disorder, drug activity, and

violence, did not distinguish sequencing onset, suggesting that individual risk factors may be more salient predictors of sequencing, compared with structural factors. Alternatively, neighborhood factors may be more important among youth in environments with a different marijuana culture.

One limitation of this study is that we were unable to differentiate between tobacco products. Instead of assessing each tobacco product individually, the survey assessed the use of various tobacco products (i.e., cigarettes, cigars, pipes, cigarillos) together and did not assess blunt use, which is particularly common among black youth.[19,25] Other limitations worth noting are the potential underreporting of tobacco use among blacks who only smoke blunts, the focus on sixth-grade neighborhood factors when substance use may start years later, and the unclear generalizability to other urban samples. Finally, we used free/reduced priced meals as a proxy for family socioeconomic status; however, this measure may not fully capture family resources.[26,27]

Despite limitations, this study offers evidence of a distinct pathway to tobacco initiation among urban youth that begins with marijuana use. Prevention programs need to take into account diverse onset patterns as suggested by Golub and Johnson.[28] Among these urban youth, black youth were at particular risk of this unconventional sequencing, and this unique patterning was more common among youth with greater exposure to victimization. Future research is necessary to better understand risk factors and consequences of unconventional pathways among at-risk youth, as this sequencing may prove to be particularly detrimental, especially since this reverse pathway may increase the risk of tobacco dependence.[29,30]

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Table 1

Onset sequencing of tobacco and marijuana by race ($N = 716$).

Onset sequence	Blacks ($n = 611$)	Whites ($n = 105$)	Total ($N = 716$)
Marijuana initiated before tobacco	13.4%	6.7%	12.4%
Tobacco initiated before marijuana	42.2%	57.1%	44.4%
Marijuana and tobacco initiated at the same age	12.9%	11.4%	12.7%
No use of either tobacco or marijuana	31.4%	24.8%	30.4%

Table 2

Association between race and sixth-grade contextual factors and initiation of marijuana before tobacco as compared with tobacco before marijuana (n = 344).

Factor	Adjusted OR	*P* value	95% CI
Black vs. white	2.658	.032	1.086–6.502
Neighborhood disorder	1.080	.766	0.649–1.799
Neighborhood drug trafficking/activity	0.998	.984	0.812–1.226
Drug access	0.905	.465	0.692–1.183
Violence exposure	0.994	.832	0.553–1.611
Violent victimization	3.892	.002	1.648–9.195

Note. Analyses adjust for the following first-grade variables: race, gender, intervention status, free/reduced price meal status, and teacher's rating of aggressive/disruptive behavior.