Full length article

Race/ethnicity and marijuana use in the United States: Diminishing differences in the prevalence of use, 2006–2015

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ABSTRACT

Background: Marijuana use has been decreasing in the past several years among adolescents, though variation in the extent and rate of decrease across racial/ethnic groups is inadequately understood.
Methods: The present study utilized nationally-representative data in Monitoring the Future from 2006 to 2015 to examine trends over time in past 30-day marijuana use. We examine whether differences in trends over time by race and ethnicity also differ by individual-level, school-level, and state-level factors. Sample included 131,351 8th grade students, 137,249 10th grade students, and 123,293 12th grade students; multi-level models and difference-in-differences tests were used.
Results: In 10th grade, Black students had a positive linear increase in marijuana use (est = 0.04, SE = 0.01, p < 0.001), and the magnitude of the increase was significantly greater than among non-Hispanic White students (est = 0.38, SE = 0.009, p < 0.001). The increase trend among Black students was greater among those in large class sizes. In 12th grade, all racial ethnic groups except non-Hispanic Whites demonstrated a linear increase in prevalence across time. The magnitude of the increase among Hispanic students was greater among those in urban areas and large class sizes. The magnitude of the increase among Black students was greater in states with a medical marijuana law before 2006 (est = 0.06, SE = 0.03, p = 0.02), among other state-level covariates.
Conclusion: Together these results suggest that the next stage of public health approaches to reducing the harms associated with adolescent drug use should attend to shifting demographic patterns of use among adolescents and ensure that services and programmatic approaches to adolescent prevention are applied equitably.

1. Introduction

Overall, despite modest increases in marijuana use among adolescents in the earlier years of the 2000s, the prevalence of use has decreased for the past several years among adolescents (Center for Behavioral Health Statistics and Quality, 2016; Miech et al., 2015). However, the direction of the trend and its magnitude may be heterogeneous by race and ethnicity (Johnson et al., 2015; Miech et al., 2016). Past epidemiological studies of race/ethnicity and marijuana use have found that among adolescents, those who identify as White, American Indian or multi-racial are more or equally likely to use marijuana than adolescents identifying as Black, Hispanic, or Asian adolescents (Johnson et al., 2015; Pacek et al., 2012; Wu et al., 2015; Wu et al., 2011). Considerable theory has been developed and an evidence base underlying these patterns has been established (Compton et al., 2004; Wallace, 1999; Wallace et al., 2003). Yet, there may be a confluence of

reasons to investigate potential changes in these patterns. Studies of adults indicate that Black Americans surveyed in 2012–2013 had higher rates of cannabis use disorders than Whites (Hasin et al., 2017); previous surveys of the same sampling frame found that Whites has higher rates (Stinson et al., 2006). However, Whites in the US have evidenced increases in drug overdose and other substance-related mortality at higher rates than other racial/ethnic groups (Case and Deaton, 2015). While these morbidity and mortality trends have disproportionately been studied among adults, they could signal broader demographic changes in substance use that may extend to adolescents and be differential by race and ethnicity. Indeed, data from the National Youth Risk Behavior Survey indicates that despite historically lower rates of marijuana use among Black adolescents compared with White adolescents, marijuana use among Black youth exceeded that of White youth in 2013 (Johnson et al., 2015). Similar trends have been reported in Monitoring the Future, the data for the present report based on annual

cross-sectional surveys of high-school attending adolescents (Miech et al., 2016).

Racial/ethnic differences in trends over time may themselves be heterogeneous by individual, school, and state-level predictors, based on socio-ecological models of health behavior and drug use (Bronfenbrenner, 1977, 1994). At the individual level, boys exhibit higher prevalence of marijuana use than girls (Pacek et al., 2012; Wallace, 1999; Wu et al., 2015), and socio-economic status is often correlated with marijuana use, though studies are mixed on the direction of the association (Bachman et al., 2011; Patrick et al., 2012). Yet these relationships also differ by race (Bachman et al., 2010), and given shifts in race/ethnic differences in substance use across time, these relationships may differ over time (Keyes et al., 2015; Lemstra et al., 2008). At the school-level, marijuana use prevalence differs across schools even after accounting for individual-level risk factors (Ennett et al., 1997). Smaller class sizes, for example, are associated with higher achievement, less truancy and drop-out, and greater school connectedness (Leithwood and Jantzi, 2009), especially for disadvantaged students including racial/ethnic minorities, all of which may explain individual variance in drug use across schools. Further, marijuana use is more common in urban areas (Choi et al., 2005; Jiang et al., 2016; Warren et al., 2017), where Black and Latino adolescents are more heavily concentrated (U.S. Department of Health and Human Services, 2012), than in rural areas. While available evidence indicates that school context explains a portion of individual variance in marijuana use, and that the role of school context differs for minority studies, no studies to date have considered school context may also explain trends over time in racial/ethnic differences in drug use.

Finally, state-level factors need to be considered as well. The prevalence of adolescent marijuana use differs substantially by US state (Wall et al., 2011), and is correlated with state-level policies such as whether marijuana is allowed for medical purposes for adults (Cerda et al., 2012; Wall et al., 2011). While available evidence indicates little change in marijuana use overall among adolescents following these policy changes (Hasin et al., 2015; Keyes et al., 2016; Martins et al., 2016), examination of trends by race and ethnicity in the context of these policy changes is particularly important, given that racial/ethnic minorities including Black and Hispanic youth face more arrest and harsher punishment for marijuana-related offenses. For example, Blacks in the US are about four times more likely than non-Hispanic whites to be arrested for marijuana possession, especially in large metropolitan areas, despite comparable rates of marijuana use (American Civil Liberties Union, 2013; Wu et al., 2013). Such variation in arrest and punishment also varies by demographics across US states (e.g., racial/ethnic composition, average education), suggesting that variation by state-level demographics should also be considered. In summary, trends in racial/ethnic differences in marijuana use over time should be considered simultaneously with individual, school, and state level factors.

The present study utilized nationally-representative data from 2006 to 2015 to examine trends over time in marijuana use by race and ethnicity. Further, we examine whether differences in trends over time by race and ethnicity also differ by individual-level demographics such as parental education and gender, school-level factors such as class size and public/private status, and state-level factors such as medical marijuana policy (given that 15 states passed law authorizing medical use over this time period, and two states passed laws authorizing recreational use of marijuana in 2014) and state demographics.

2. Methods

2.1. Sample

MTF studies include yearly cross-sectional surveys of 8th, 10th and 12th grade students, sampled to be nationally representative (Miech et al., 2015). Approximately 400 schools are surveyed each year in the 48 coterminous U.S. states; students are assessed with self-administered questionnaires. We included data collected since 2006, as race options were changed in this year thus providing continuity in measurement for all included years. The study employs a multi-stage random sampling design with school replacement upon refusal. Up to 350 students per grade are included; only one grade (8, 10 or 12) is surveyed per school. Schools typically participate for two years. Non-participating schools are replaced with others closely matched on geographic location, size, and urbanicity. Of all selection sample units, 95%–99% obtained one or more participating school in all study years; lack of a time trend in school participation rates (Johnston et al., 2011b) suggests limited influence of school nonresponse on trend data. The total analyzed sample size was 131,351 8th grade students, 137,249 10th grade students, and 123,293 12th grade students, which include all those with non-missing outcome and covariate data.

2.2. Measures

2.2.1. Past 30-day marijuana use

Our main marijuana use variable was a dichotomous use variable, consistent with previous time-trend studies (Kepple and Freisthler, 2012; Keyes et al., 2011), consisting of any marijuana use (vs. no use) within the prior 30 days. The validity of MTF substance reports is supported by low question non-response; the high proportion of participants reporting illicit drug use; strong evidence of construct validity; and methodological studies using objective validation methods (Johnston et al., 2011b).

2.2.2. Race/ethnicity

Beginning in the 2006 questionnaire, students were asked to select all options that best described their race/ethnicity. Terminology and designations generally correspond to Office of Management and Budget guidelines used for the US census (U.S. Census Bureau, 2010), though one difference is that Hispanic ethnicity was not assessed in a separate question from self-identified race. In MTF, respondents were asked "How do you describe yourself? (Select one or more response)": Black or African American; Mexican American or Chicano; Cuban American; Puerto Rican; Other Hispanic or Latino; Asian American; White (Caucasian); American Indian or Alaska Native; Native Hawaiian or Other Pacific Islander. From these responses, we created five mutually exclusive groups: (1) Hispanic (Mexican American or Chicano; Cuban American; Puerto Rican; Other Hispanic or Latino 14.72%); (2) White (Caucasian) (59.00%); (3) Black or African American (11.59%); (4) Asian (4.07%); and (5) multi-racial (8.66%). A sixth group include those reporting American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander (1.96%) was too small and unstable for analysis and are thus excluded.

2.2.3. Individual-level covariates

Respondents were asked their gender (male [48.36%]) and the highest level of education for each parent. As a measure of socio-economic status, we used parental education (Goodman and Huang, 2002; Hanson and Chen, 2007; Miller and Miller, 1997). Following past epidemiological studies of adolescent substance use, we categorized the highest level of parental education based on college and high school completion: (1) at least one parent college educated or higher (44.32%); (2) at least one parent more than high school but no college degree (26.22%); (3) at least one high school graduate, but no college graduate (20.32%); and (4) no high school graduate (8.85%).

2.2.4. School-level covariates

MTF collects information on whether the school is public (89.81%) or private, on the total number in each grade (referred to as "class size"), and whether the school is located in a Metropolitan Statistical Area (MSA). We categorized class size into < 200 (33.64%), 200–499 (53.01%), and 500+ (13.36%).