



## Perceived cannabis use norms and cannabis use among adolescents in the United States



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### ABSTRACT

Due to changes in cannabis policies, concerns about cannabis use (CU) in adolescents have increased. The population of nonwhite groups is growing quickly in the United States. We examined perceived CU norms and their association with CU and CU disorder (CUD) for White, Black, Hispanic, Native-American, Asian-American, Native Hawaiian/Pacific Islander (NH/PI), and mixed-race adolescents. Data were from adolescents (12–17 years) in the 2004–2012 National Surveys on Drug Use and Health (N = 163,837). Substance use and CUD were assessed by computer-assisted, self-interviewing methods. Blacks, Hispanics, Native-Americans, and mixed-race adolescents had greater odds of past-year CU and CUD than Whites. Among past-year cannabis users (CUs), Hispanics and Native-Americans had greater odds of having a CUD than Whites. Asian-Americans had the highest prevalence of perceived parental or close friends' CU disapproval. Native-Americans and mixed-race adolescents had lower odds than Whites of perceiving CU disapproval from parents or close friends. In adjusted analyses, adolescent's disapproval of CU, as well as perceived disapproval by parents or close friends, were associated with a decreased odds of CU in each racial/ethnic group, except for NHs/Pis. Adolescent's disapproval of CU was associated with a decreased odds of CUD among CUs for Whites (personal, parental, and close friends' disapproval), Hispanics (personal, parental, and close friends' disapproval), and mixed-race adolescents (personal, close friends' disapproval). Racial/ethnic differences in adolescent CU prevalence were somewhat consistent with adolescents' reports of CU norm patterns. Longitudinal research on CU health effects should oversample nonwhite adolescents to assure an adequate sample for analysis and reporting.

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### 1. Introduction

Concerns about cannabis use (CU) and its potential adverse health effects have increased (Volkow et al., 2014). Nationally, approximately 13% of adolescents aged 12–17 used cannabis in the past year (SAMHSA, 2014a). To date, 23 states and Washington DC have legalized marijuana for medical use, and four states allow recreational use. The direct impact of cannabis-related policies on

adolescent CU is a topic of current investigation (Choo et al., 2014; DuPont and Lieberman, 2014). The Monitoring the Future (MTF) study shows a pattern in recent years of a decline in perceived risk of CU and an increase in CU prevalence among 8th, 10th, and 12th graders, while the prevalence of cigarette and alcohol use has declined (Johnston et al., 2014). When considering the number of days of substance use in the past year, on average cannabis-using adolescents used cannabis more frequently than adolescent users of other substances that used alcohol or other drugs (Wu et al., 2011a). CUD is the primary substance use problem among adolescents in the clinic setting (Wu et al., 2011b); 89% of adolescent substance-related admissions reported by the national Treatment Episode Data Set (TEDS) involving CU (SAMHSA, 2014b).

CU among adolescents is a particular concern. CU may impair short-term memory, judgment and motor coordination, potentially

*Abbreviations:* CU, Cannabis use; MTF, Monitoring the Future Study; NSDUH, National Survey on Drug Use and Health; NH/PI, Native Hawaiians/Pacific Islanders.

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interfering with learning, relationships, or driving skills (increasing injuries or deaths) (Brady and Li, 2014; Volkow et al., 2014). Chronic CU among adolescent-onset CUs (e.g., earlier onset, longer duration of use) is associated with increases risk for addiction, altered brain development, low intelligence quotient, or poor educational outcomes (Gruber et al., 2014; Meier et al., 2012; Volkow et al., 2014). Although the mechanisms are inherently difficult to determine, interactions among early CU and substance-related problems (greater exposure to cannabis or other substances; co-existing mental or medical problems) may contribute to the likelihood of experiencing poor health or education outcomes (Gruber et al., 2014; Meier et al., 2012; Volkow et al., 2014). Preventing or reducing CU in adolescents is critical.

Changes in state laws on medical or recreational cannabis use may contribute to changes in adolescents' access to cannabis and CU norms (e.g., more tolerant of CU, less perceived disapproval of CU) (Friese and Grube, 2013; Thurstone et al., 2011). Messages about medical cannabis legalization or discrimination of CU may reflect liberal community norms regarding CU in general, and research data suggest that CU norms in the community (e.g., parents', peers' approval) are related to adolescent CU (Friese and Grube, 2013). Prior research on college students shows that perceived friends' approval of alcohol use (social norms) is associated with an increased likelihood of alcohol use (Larimer et al., 2004; Lee et al., 2007). Similarly, perceived parental or friends' approval of CU is associated with an elevated CU prevalence among college students (Neighbors et al., 2008; Labrie et al., 2011). While CU norms among adolescents are understudied, prior studies suggest that adolescents' perceptions of their parents' or peers substance use or norms may influence adolescents' substance use (Fisher and Bauman, 1988; Iannotti and Bush, 1992; Iannotti et al., 1996). CU norms may be influenced by community's drug use level or norms (e.g., family, peers'), adolescents' substance use, and cannabis availability (Bahr et al., 2005; Bandura, 1977; Donohew et al., 1999; Iannotti and Bush, 1992; Iannotti et al., 1996; Sieving et al., 2000). Drug use norms of a proximal reference group (e.g., close friends) is associated with adolescents' intention towards substance use (Olds et al., 2005). Additionally, self-reports of peers' drug use norms were found to be reliable and correlated with youth's own drug use behaviors (Flom et al., 2001). In a study of 180 heavy CUs who participated in a treatment trial, perceived close friends' approval of CU was positively associated with CU (Walker et al., 2011). Taken together, adolescent's perceived CU norms appear to be an important correlate of CU.

The population of minority groups is growing quickly in the United States (Humes et al., 2011). Partly due to immigration-related increases in racial/ethnic diversity and inter-racial marriage, the population of nonwhites and mixed-race individuals has risen substantially (Lee and Bean, 2004; Wang, 2012). The population of foreign-born individuals rose from 14 million in 1980 to 40 million in 2010 (Grieco et al., 2012). Between 2000 and 2010, the total United States population increased by 9.7% (a 5.7% increase among single-race Whites), compared with an increase of 43.3% among Asian-Americans, 35.4% among NHs/PIs, 32.0% among mixed-race individuals ( $\geq 2$  races), 18.4% among Native-Americans, and 12.3% among Blacks (Humes et al., 2011). The overall Hispanic population size increased by 43.0% (Humes et al., 2011). The growth in the population size indicates a mounting burden in behavioral healthcare needs. Minority groups on average have poorer access to behavioral healthcare than Whites, due to culture-related stigma or attitudes towards behavioral health treatment, language or financial barriers, immigration-related concerns, and lack of culturally or linguistically congruent providers and interventions (Edwards et al., 2010; Grieco et al., 2012; Ida et al., 2012; Masson et al.,

2013; National Center for Health Statistics, 2012; Novins et al., 2011).

In conjunction with changes in cannabis policies, the increase in the CU prevalence among students in the MTF study indicates the need to examine CU norms and CU for nonwhite adolescents. The MTF reports have not tracked CU and related measures for Native-Americans (American Indians, Alaska Natives), Asian-Americans, NHs/PIs, and mixed-race adolescents (Johnston et al., 2014). Findings from United States high school seniors in 2001–2011 MTF datasets reveal a disturbing trend in vehicle driving after CU: in 2011, more high school seniors reported driving after CU in the past 2 weeks (12.4%) than after using alcohol (8.7%) or drugs other than marijuana (3.0%) (O'Malley and Johnston, 2013). Blacks had greater odds than Whites of driving after CU (O'Malley and Johnston, 2013). Another study of individuals aged  $\geq 12$  years suggest that CU problems are more prevalent in nonwhites than whites (Wu et al., 2014). The TEDS reports combine Asian-Americans and NHs/PIs as a group and omit mixed-race individuals (SAMHSA, 2014b). In the 2014 TEDS report, cannabis generally accounts for greater treatment admissions for nonwhite groups (Black 28.2%, Hispanic, 22.8%, Asian-American/NH/PI 21.2%, Native-American 13.2%) than Whites (12.7%) (SAMHSA, 2014b), indicating a pattern of CU problems among nonwhite groups.

To address the limitation of sample size for these groups, we analyzed public-use datasets from 2004 to 2012 National Surveys on Drug Use and Health (NSDUH). These survey years use the same questions to assess adolescents' CU norms and CU, permitting the analysis of the pooled sample to generate population-based estimates for CU norms and CU. We examined whether adolescents' perceived CU norms (adolescent's, close friends', and parental disapproval of CU) differed by racial/ethnic group, and determined whether CU norms were associated with CU in the sample and with CUD among past-year CUs. Due to a lack of research on comparing CU norms for various racial/ethnic groups, we stratified the analysis by race/ethnicity to provide CU norms and CU estimates for each group.

## 2. Methods

### 2.1. Data source

The NSDUH is a national survey designed to provide ongoing estimates of drug use and disorders in the United States (SAMHSA, 2013). The survey uses multistage area probability sampling methods to select a representative sample of the civilian, non-institutionalized population aged  $\geq 12$  years. Target populations include residents of households from all 50 states (including shelters, rooming houses, and group homes) and civilians residing on military bases. The design oversamples people aged 12–25. Due to a large sample size in recent surveys, there was no need to oversample racial/ethnic groups, as was done before 1999. The NSDUH's annual sample of respondents was considered representative of the United States general population aged  $\geq 12$  years. NSDUH is the only ongoing national survey that includes consistent CUD assessments to allow analysis of CUD for understudied minority groups.

NSDUH respondents were interviewed in their home for about an hour. They were assured that their names would not be recorded and their responses would be kept strictly confidential, and all study procedures and protections were carefully explained. Respondents' demographics were assessed by computer-assisted personal interviews. Other survey questions were assessed using an audio computer-assisted self-interviewing method to increase respondents' reports of substance use and sensitive behaviors (Turner et al., 1998). The latter was designed to increase honest reports of substance use by allowing respondents to either read the

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