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Short communication

# Changing perspectives on marijuana use during early adolescence and young adulthood: Evidence from a panel of cross-sectional surveys

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ABSTRACT

*Introduction:* Prior research has often overlooked potential cohort differences in marijuana views and use across adolescence and young adulthood. To begin to address this gap, we conduct an exploratory examination of marijuana views and use among American youth using a panel of cross-sectional surveys.
*Method:* Findings are based on repeated, cross-sectional data collected annually from adolescents (ages 12–17; n = 230,452) and young adults (ages 18–21; n = 120,588) surveyed as part of the National Survey on Drug Use and Health between 2002 and 2014. For each of the birth years between 1986 and 1996, we combined a series of nationally representative cross-sections to provide multi-year data strings designed to approximate nationally representative cohorts.
*Results:* Compared to youth born in the mid-to-late 1980s, youth born in the mid-1990s reported significantly *higher* levels of marijuana disapproval during the early adolescent years (Age 14: 1988 = 64.7%, 1994 = 70.4%) but *lower* levels of disapproval during the young adult years (Age 19: 1988 = 32.0%, 1994 = 25.0%; Age 20: 1988 = 27.9%, 1994 = 19.7%). Moreover, the prevalence of marijuana use among youth born in 1994 was significantly lower—compared to youth born in 1988—at age 14 (1988: 11.39%, 1994: 8.19%) and significantly higher at age 18 (1988: 29.67%, 1994: 34.83%). This pattern held even when adjusting for potential confounding by demographic changes in the population across the study period.
*Conclusions:* We see evidence of changes in the perceptions of marijuana use among youth born during the late twentieth century.



## 1. Introduction

Recent years have witnessed tremendous change with respect to the perception and distribution of marijuana in the United States (US). In 1996, California became the first state to legalize the use of medical marijuana and, shortly thereafter, calls were made by *The New England Journal of Medicine* and the National Institutes of Health for research to reassess the classification of marijuana as a Schedule I drug (Kassirer, 1997; Voelker, 1997). By 2008, more than a dozen states had legalized the use of marijuana for specific medical conditions and voters in Massachusetts approved an initiative to decriminalize the possession of small amounts of marijuana (Lee, 2012). At present, twenty-five states and the District of Columbia have medical marijuana laws, recreational marijuana use is legal in several states, and more than half of all American adults support legalization (Model, 2015).

A bevy of recent studies have examined changes in the use and perception of marijuana among youth in the US. Trend studies conducted using data from the National Youth Risk Behavior Survey (YRBS), National Survey on Drug Use and Health (NSDUH), and Monitoring the Future (MTF) point to noteworthy changes in marijuana use among adolescents and young adults over the past few decades (Hasin et al., 2015a,b; Johnson et al., 2015; Johnston et al., 2015; Salas-Wright et al., 2015; Substance Abuse And Mental Health Services Administration, 2014). For instance, evidence from the NSDUH and MTF point to decreases in marijuana use among

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adolescents along with modest but significant increases in use and substantial decreases in disapproval among young adults (Johnston et al., 2015; Salas-Wright et al., 2015).

One important shortcoming, however, faced by all the aforementioned trend studies is a failure to account for cohort differences. For instance, Salas-Wright et al. (2015) provide a fine-grained assessment of trends in marijuana use and disapproval among developmental subgroups (i.e., ages 12–14, 15–17, 18–25). While such an assessment provides insight into changes in prevalence among youth in particular developmental subsets, this approach overlooks the ways in which youth from particular cohorts may differ across the spectrum of adolescence and young adulthood (Keyes et al., 2011). Indeed, given the speed at which changes in marijuana policy have occurred—particularly during the latter half of the 2000s—it is reasonable to surmise that children who entered adolescence, for example, in the 1990s may be distinct from those who became teenagers in the mid-2000s.

### 1.1. The present study

Our objective is to extend findings from recent trend studies by examining the disapproval and use of marijuana using a panel of cross-sectional surveys. Specifically, we construct a series of analytic samples designed to approximate nationally representative cohorts of American youth from early adolescence to young adulthood. Notably, while our approach allows us examine marijuana-related trends using strings of data that are analogous to cohorts, we should be very clear that it is not possible to examine true cohorts using NSDUH data. Cognizant of this limitation, we conduct an exploratory study designed to examine changes in the prevalence of marijuana disapproval and use among American youth born between the mid-1980s and the mid-1990s.

## 2. Method

### 2.1. Sample and procedures

Study findings are based on repeated, cross-sectional data collected annually as part of the NSDUH between 2002 and 2014. Each year the NSDUH provides estimates of substance use in the civilian, non-institutionalized population of the US on the basis of a new, non-overlapping national sample. Since 2002, a total of 723,283 respondents (including 230,452 adolescents and 120,588 young adults) have completed the NSDUH survey. The NSDUH design/methods are summarized briefly here; however, a detailed description of the study procedures is available elsewhere (Substance Abuse And Mental Health Services Administration, 2014).

### 2.2. Repeated, cross-sectional data constructed as panels

In order to examine the changes from early adolescence to young adulthood among youth born in varying birth years (e.g., 1986, 1987, etc.,), we utilized the "mutoscope" approach to analyzing repeated, cross-sectional data constructed as a panel (Frost, 1939; Seedall and Anthony, 2014). Specifically, for each of the birth years between 1986 and 1996, we combined a series of population-based cross-sections of youth to provide multi-year strings of data that approximate nationally representative cohorts (based on respondent age/survey year). For instance, for the 1994 data string, we began with a nationally representative sample of 12-year-olds in 2002 and, with each subsequent year, selected a refreshed and non-overlapping subsample of youth that corresponded in age to the original nationally representative sample from 2002 (e.g., 13-year-olds in 2003, 14-year-olds in 2004, and so on up to 20-years-olds in 2014). This approach is similar to that used in producing instruments such as pediatric growth charts (which are also based on a series of cross-sectional snapshots; Grummer-Strawn et al., 2010).

### 2.3. Measures

*2.3.1. Marijuana use disapproval.* Adolescents (ages 12–17) and young adults (ages 18–21) were queried about their views on marijuana use using two similarly-phrased questions. Adolescents were asked: "How do you feel about *someone your age* trying marijuana or hashish once or twice?" and young adults were asked "How do you feel about *adults* trying marijuana or hashish once or twice?" Youth reporting that they "strongly disapprove" were coded as 1 while youth reporting more lenient views ("neither approve nor disapprove" or "somewhat disapprove") were coded as 0.

*2.3.2. Marijuana use.* Past 12-month marijuana use (0 = no, 1 = yes) was assessed by first asking participants, "Have you used marijuana or hashish during the past 12 months?"

*2.3.3. Sociodemographic factors.* Sociodemographic variables include: gender (female, male), race/ethnicity (non-Hispanic white, African-American, Hispanic, Other), and total annual family income (less than $20,000; $20,000 to $49,999; $50,000 to $74,999; $75,000 or more).

### 2.4. Statistical analyses

First, we analyze and report the prevalence estimates and corresponding 95% confidence intervals for marijuana disapproval and past year marijuana use among youth from varying birth years (i.e., 1986–1996) from early adolescence to young adulthood (i.e., ages 12–21). As is standard with NSDUH data, all prevalence estimates and 95% confidence intervals were adjusted for complex survey sampling design effects using Stata 14.1 MP software. However, in order to account for potential demographic shifts over the period of the study, we also computed prevalence estimates and confidence intervals that were adjusted for year-by-year data on gender, race/ethnicity, and family income among survey respondents. Although we present information for youth from all birth years between 1986 and 1996, we primarily emphasize the strings of data for youth born in 1988 and 1994. These birth years provided the optimal combination of spacing in years (i.e., a multi-year gap between each of the birth years) and inclusion of multiple ages (i.e., maximum coverage of ages 12–21).

## 3. Results

### 3.1. Marijuana disapproval and use

*3.1.1. Marijuana disapproval.* Among all birth years/strings of data, we observed a clear reduction in the proportion of youth reporting "strong disapproval" of marijuana use as youth progressed from the early adolescent to young adult stage (see Table 1). However, closer inspection reveals important differences between youth born in 1988 and those born in 1994 (see Fig. 1). Specifically, we see a pattern in which youth born in 1994 report significantly greater disapproval at age 14 (70.39, 95% CI = 67.9–72.8) as compared to youth born in 1988 at the same age (64.73, 95% CI = 62.4–66.3). Similar findings can be found by contrasting youth born in 1989 and 1995 during early adolescence (i.e., ages 13–14). However, during young adulthood we see that youth born in 1994 report significantly *lower* levels of disapproval at age 19 (1988: 32.00, 95% CI = 29.7–34.4; 1994: 24.99, 95% CI = 22.9–27.2) and 20 (1988: 27.93, 95% CI = 25.2–30.8; 1994: 19.69, 95% CI = 17.2–22.4) compared to youth born in 1988. We also observed non-overlapping