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Trends in the Disapproval and Use of Marijuana among Adolescents and Young Adults in the United States: 2002–2013

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Abstract

Background—Despite policy changes related to the use and distribution of marijuana in cities and states across the country, few studies have examined changes in disapproval and use of marijuana among American youth.

Objectives—To examine trends in disapproval and use of marijuana among adolescents and young adults in the United States.

Method—We employ nationally representative data spanning the period of 2002–2013. Analyses are based on self-reported measurements from 105,903 younger adolescents (ages 12–14); 110,949 older adolescents (age 15–17); and 221,976 young adults (ages 18–25).

Results—Between 2002–2013 the proportion of adolescents ages 12–14 reporting "strong disapproval" of marijuana use initiation increased significantly from 74.4% to 78.9%. Concurrently, a significant decrease in past 12-month marijuana use (OR = 0.98, 95% CI = 0.97–0.99) was observed among younger adolescents. No significant trend was observed for marijuana use disapproval among adolescents ages 15–17 between 2002 and 2013. Yet a significant (OR = 0.99, 95% CI = 0.98–0.99) decrease in past 12-month marijuana use was observed (2002 = 26.2%, 2013 = 21.9%) among this group. Among young adults (ages 18–25), a substantial decrease—from 40.5% in 2002 to 22.6% in 2013—was observed in the proportion reporting “strong disapproval” of marijuana use initiation; however, increases in young adult past 12-month use were relatively small (Δ = 2.21) but statistically significant (OR = 1.02, 95% = 1.01–1.02).

Conclusions—Changes are underway in the perception and use of marijuana among American youth. However, changes differ in important ways among youth from distinct developmental subgroups.

Keywords

Marijuana; Adolescent; Trend; Young Adult

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Introduction

Recent policy changes related to the decriminalization, medicalization, and legalization of marijuana use in cities and states across the country suggests that important shifts are underway in the United States. A 2013 Gallup poll found, for the first time on record, that a majority of Americans believe that the use of marijuana should be legal (Swift, 2013). Similarly, a Pew Research Center (2013) poll found that, while half of American adults viewed marijuana use as “morally wrong” in 2006, the majority of American adults now view marijuana use as either “morally acceptable” (12%) or a “non-moral issue” (50%). Simply, America and American adults appear to be changing with respect to how we perceive the use and distribution of the most commonly used illicit substance in the United States (National Institute on Drug Abuse, 2012).

Despite the observed changes among American adults, less is understood in terms of the changes in the perception and use of marijuana among American youth. An understanding of the changes in marijuana use disapproval—as well as concurrent patterns of use—among youth is important for a number of reasons. First, it has been well-established that substance use disapproval and other critical drug use attitudes serve as protective factors for adolescent and young adult drug use (Bachman, Johnston, & O’Malley, 1990, 1998; Keyes et al., 2011, 2012; Palamar, Halkitis, & Kiang, 2013; Palamar, Kiang, & Halkitis, 2011). Additionally, evidence also points to a bi-directional link between drug use and protective anti-drug attitudes (Best et al., 2000; de Leeuw, Engels, Vermulst, & Scholte, 2008; Palamar, 2014; Palamar, Kiang, & Halkitis, 2012). That is, findings from recent studies suggests that, not only does marijuana use disapproval predict marijuana use, but the use of marijuana may have implications for how young people feel about use of other drugs as well. Given the importance of these interrelated factors, an accurate understanding of the prevalence of youth marijuana use disapproval and use is essential to inform public policy and prevention efforts.

Two of the leading sources of data on the subject of the perception and use of marijuana among American youth are *Monitoring the Future* (MTF; Johnston, O’Malley, Bachman, Schulenberg, & Miech, 2014; Johnston, O’Malley, Miech, Bachman, & Schulenberg, 2015) and the *National Survey on Drug use and Health* (NSDUH; SAHMSA, 2014). Both studies annually collect nationally representative data and gather information on youth disapproval of marijuana use initiation as well as past year and lifetime marijuana use. Extant studies conducted with MTF and NSDUH data have made notable contributions to our understanding of these topics, but face important shortcomings as well. For instance, recent MTF reports have provided information about trends in disapproval of marijuana use initiation (Johnston et al., 2014, 2015); however, the aforementioned reports combine various gradations of disapproval (i.e., "disapprove" and "strongly disapprove") into a singular measure, thereby limiting our capacity to fully assess the complexity of changes in youth perceptions of marijuana use. Similarly, while recent NSDUH reports provide critical information about trends in youth perceptions of the risk of marijuana use (SAMHSA, 2013, 2014), prior reports have not systematically examined trend data related to disapproval of marijuana use. Moreover, NSDUH reports examining trends in adolescent marijuana use have relied on analyses conducted with all adolescents ages 12–17, thereby obviating the

assessment of developmental differences between younger (i.e., ages 12–14) and older (i.e., ages 15–17) adolescents. Given evidence that substantial variation exists with respect to drug use initiation during the period of adolescence, the importance of such a nuanced, developmental approach cannot be overstated (Vaughn, Salas-Wright, & Maynard, 2014).

In light of recent trends among adults and policy changes regarding the legal status of marijuana, several important questions have emerged. In particular, there is a need for a fine-grained, developmental assessment of the changes in the disapproval and use of marijuana among American youth. We know that important neurological changes of relevance to the perception and initiation of drug use take place during adolescence and young adulthood (Chambers, Taylor, & Potenza, 2003). As such, we ask: *Are changes in public policy and public opinion equally impacting the views and behaviors younger adolescents, older adolescents, and young adults?* Additionally, we have witnessed incremental changes in the perception of the moral acceptability of marijuana use among the nation's adults (Pew Research Center, 2013). It seems reasonable that incremental changes —beyond either approval or disapproval of marijuana use—might also be observed among the nation's youth. As such, we ask: *Are changes underway with respect to the various gradations of youth disapproval (i.e., "somewhat" and "strongly disapprove") of marijuana use in the United States? More precisely, are both forms of disapproval increasing or decreasing, or do we see divergent results with respect to the more tepid and unequivocal forms of disapproval?* A systematic exploration of the aforementioned questions promises to address an important gap in the youth drug abuse research and, potentially, inform the ongoing development of public policy and prevention efforts related to marijuana use among the nation's youth.

The Present Study

The present study employs trend data from a population-based study (i.e. NSDUH) that gathered data from more than 440,000 American adolescents and young adults between 2002–2013 (SAHMSA, 2014). The NSDUH is well-suited for this study given its far-reaching scope and representativeness as well as its assessment of marijuana disapproval and use. Specifically, we examine trends in disapproval and past year and lifetime use of marijuana among adolescents and young adults in the United States over the last twelve years. We examine recent trends in the gradation of marijuana use disapproval among the nation's youth as well. In all, evidence suggests that the views of American adults have changed tremendously in recent years with respect to the use and distribution of marijuana; in light of these changes, our aim is to examine the trends in the disapproval and use of marijuana among American youth.

Method

Sample and Procedures

This study examines public-use data collected between 2002 and 2013 as part of the NSDUH. The NSDUH provides population estimates of drug use and health-related behaviors in the U.S. general population. The NSDUH study utilizes multistage area probability sampling methods to select a representative sample of the U.S. civilian, non-

institutionalized population aged 12 years or older for participation. Participants include household residents; civilians residing on military bases; and residents of shelters and group homes. The design and methods are summarized briefly here; however, detailed descriptions of NSDUH procedures are available elsewhere (SAHMSA, 2014). The current study restricted analyses to adolescents (ages 12–17; n = 216,852) and young adults (ages 18–25; n = 221,976) so as to provide an in-depth analysis of trends among young people in the United States.

Measures

Marijuana use disapproval—Adolescents and young adults were queried about their views on marijuana use initiation by means of 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?” Response options include: “neither approve nor disapprove", "somewhat disapprove", and "strongly disapprove".

Marijuana use—We examined both lifetime and past 12 month marijuana use. Lifetime marijuana use (0 = no, 1 = yes) was assessed by asking participants, “Have you ever, even once, used marijuana or hashish?” Those who responded affirmatively were also asked about when they last used marijuana; individuals reporting use within the previous 12 months were coded as 1 and all other individuals (those reporting no past 12 month or lifetime use) were coded as 0.

Sociodemographic Factors—The following sociodemographic variables were used: age (continuous), gender (0 = female, 1 = male), race/ethnicity (1 = non-Hispanic white, 2 = African-American, 3 = Native American/Alaska native, 4 = Asian/Pacific Islander, 5 = multiracial, 6 = Hispanic), and total annual family income (1 = less than $20,000; 2 = $20,000 to $49,999; 3 = $50,000 to $74,999; and 4 = $75,000 or more). Additionally, adolescent participants were asked about the presence of their father in the household (0 = no, 1 = yes).

Statistical Analyses

The statistical analyses are carried out in several stages. First, we summarize the sociodemographic and marijuana use-related characteristics of the sample across developmental subgroups (i.e., younger adolescents [ages 12–14], older adolescents [ages 15–17], and young adults [ages 18–25]). Second, in order to assess the importance of distinguishing between gradations of marijuana use disapproval, we examine the association between varying degrees disapproval and past 12-month marijuana use across the developmental subgroups. Finally, we examine trend data for marijuana use disapproval and lifetime/past 12-month use across the developmental subgroups between 2002 and 2013. Consistent with the approach outlined by the Centers for Disease Control and Prevention (2014) and utilized in highly-cited epidemiological trend studies (Ogden et al., 2006), logistic regression analyses were conducted to examine the significance of trend changes. Specifically, survey year was included—along with age, gender, race/ethnicity, family income, father in household—as a continuous independent variable in logistic regression

models predicting marijuana-related outcomes (i.e., disapproval, lifetime and past 12 month use). Prevalence estimates and regression analyses were computed using Stata 13.1 SE (StataCorp, 2013) survey data functions. This system implements a Taylor series linearization to adjust standard errors of estimates for complex survey sampling design effects including clustered multistage data.

Results

Sociodemographic and Marijuana Use-Related Characteristics

Table 1 displays the sociodemographic and marijuana use-related characteristics of the sample across developmental subgroups. The distribution of gender and race/ethnicity was highly consistent across all three groups; however, compared to the two adolescent subgroups, a larger proportion of young adults were found to reside in households earning less than $20,000 per year. Noteworthy differences were also identified with respect to marijuana use-related characteristics. Specifically, large differences were observed in the proportion of younger adolescents (10.08%), older adolescents (27.87%), and young adults (57.52%) reporting that they "neither approve nor disapprove" of marijuana use initiation. A similar pattern of differences was observed with respect to the decrease in the proportion of youth reporting that they "strongly disapprove" of marijuana use. The proportion of youth who report they "somewhat disapprove" follows a distinct pattern as the proportion is lowest among younger adolescents (11.79%), increases among older adolescents (19.77%), and drops among young adults (13.97%). With respect to marijuana use, the prevalence of past 12-month and lifetime use is low among younger adolescents (4.79% and 6.04%, respectively) and increases markedly among the older adolescent and young adult subgroups.

Marijuana Use Disapproval and Use by Developmental Subgroup

Table 2 presents the association between varying degrees of disapproval of marijuana use and the use of marijuana over the past 12 months. Controlling for age, gender, race/ethnicity, household income, and father in household (adolescents only), youth of all the developmental subgroups who report that they "somewhat disapprove" or “strongly disapprove" of marijuana use are significantly less likely to report past 12 month use. Notably, although the odds ratios for both gradations of disapproval were statistically significant ($p < .001$), important effect size differences were identified. Specifically, the odds ratios for “somewhat disapprove" suggest medium-sized effects, while the effects for “strongly disapprove” represent large to very large effects (Chen, Cohen, & Chen, 2010).

Trends among Younger Adolescents (Ages 12–14)

Figure 1 and Table 3 display the prevalence estimates and significance tests for trend data on "strong disapproval" of marijuana use initiation as well as lifetime/past 12-month self-reported marijuana use among the younger adolescent (ages 12–14) subgroup. Between 2002 and 2013, the proportion of younger adolescents reporting "strong disapproval" increased from 74.38% to 78.92%. Logistic regression analyses indicate that this increase is statistically significant (OR = 1.03, 95% CI = 1.02–1.03) such that each additional year is associated with a 2.7% increase in the likelihood of younger adolescents reporting “strong

disapproval" of marijuana use initiation. Supplementary analyses (see Table 4) suggest that the upward trend was stable among early adolescents ages 12 (AOR = 1.03, 95% CI = 1.02–1.05), 13 (AOR = 1.02, 95% CI = 1.01–1.03), and 14 (AOR = 1.02, 95% CI = 1.02–1.03).

Figure 2 displays additional information about the trends in early adolescent disapproval of marijuana use initiation. Specifically, while the proportion of younger adolescents reporting "strong disapproval" increased, a small (Δ = 2.80%) but statistically significant (OR = 0.98, 95% CI = 0.97–0.98) decrease was observed between 2002 and 2013 in the proportion of younger adolescents reporting that they “somewhat disapprove" of marijuana use initiation. With respect to marijuana use, we see a significant decrease in lifetime (OR = 0.97, 95% CI = 0.96–0.98) and past 12-month marijuana use (OR = 0.98, 95% CI = 0.97–0.99) among younger adolescents. While the change between 2002 and 2013 for lifetime/past 12-month prevalence may appear slight (Δ = 2.45% and 1.50%, respectively), the relative importance of these changes should not be underestimated. Indeed, due to the low base rates for marijuana use among younger adolescents, the changes between 2002 and 2013 represent a 31% decrease in lifetime use and a 25% decrease in past 12 month use. Supplementary analyses (see Table 4) suggest that these decreases may be driven primarily by use in the latter stages of early adolescence. Specifically, the decreases in lifetime and past year use were not significant among 12 year olds, but significant changes in trend were identified for 13-year-olds (Lifetime: 0.97, 95% CI = 0.95–0.99) and 14-year-olds (AOR = 0.97, 95% CI = 0.96–0.99; Lifetime: AOR = 0.97, 95% CI = 0.95–0.98).

Trends among Older Adolescents (Ages 15–17)

Figure 3 displays the prevalence estimates and 95% confidence intervals for trend data among older adolescents (ages 15–17). Overall, the proportion of youth reporting "strong disapproval" of marijuana use initiation did not significantly change between 2002 and 2013; however, supplementary analyses (not shown) revealed a significant upward trend between 2002 and 2008 (OR = 1.04, 95% CI = 1.03–1.06) as a 6.19% increase in older adolescents reporting "strong disapproval" was observed. Supplementary analyses (not shown) also revealed a significant decrease in “strong disapproval” between 2009 and 2013 (OR = 0.96, 95% CI = 0.95–0.98) as the prevalence of disapproval returned to levels similar to those of 2002. As shown in Table 4, we also looked at 2002–2013 trends in disapproval among 15, 16, and 17-year-old older adolescents. These analyses suggest year-by-year differences. Specifically, analyses revealed a small but statistically significant increase in disapproval among 15-year-olds (AOR = 1.01, 95% CI = 1.00–1.02), no change among 16-year-olds, and a small but statistically significant decrease in disapproval among 17-year-olds (AOR = 0.99, 95% CI = 0.98–1.00).

With respect to youth who "somewhat disapprove" of marijuana use initiation (see Figure 4), a slight but not statistically significant decrease was observed between 2002 and 2013 (Δ = 1.43%). During the same time period, significant decreases in marijuana use were observed among older adolescents. Specifically, lifetime use decreased from 34.29% in 2002 to 26.62% in 2013 (OR = 0.97, 95% CI = 0.97–0.98). In relative terms, this represents a 22% decrease in lifetime use among older adolescents over the period of the study. A slightly smaller but still statistically significant (OR = 0.99, 95% CI = 0.98–0.99) decrease was

observed with respect to past 12 month use of marijuana (2002 = 26.19%, 2013 = 21.87%). This represents an overall relative decrease of 16% between 2002 and 2013 and points to a 1.2% yearly decrease in the likelihood of past 12-month use during the same time period. Supplementary analyses (shown in Table 4) suggest that the downward trend in past 12-month use among older adolescents may be driven primarily by those ages 15 (AOR = 0.98, 95% CI = 0.97–0.99) and 16 (AOR = 0.98, 95% CI = 0.97–0.99) as no significant trend was identified for 17-year-old older adolescents. The downward trend in lifetime use was stable among older adolescents ages 15 (AOR = 0.97, 95% CI = 0.96–0.98), 16 (AOR = 0.97, 95% CI = 0.96–0.98), and 17 (AOR = 0.98, 95% CI = 0.97–0.99).

Trends among Young Adults (Ages 18–25)

Figure 5 displays the prevalence estimates and 95% confidence intervals for the trend data among young adults (ages 18–25). Between 2002 and 2013 we see a substantial decrease—from 40.54% in 2002 to 22.65% in 2013—in the proportion of young adults reporting they "strongly disapprove" of marijuana use initiation. Logistic regression analyses revealed that this is a statistically significant downward trend (OR = 0.94, 95% CI = 0.94–0.95) and that the likelihood of young adults reporting "strong disapproval" decreased by 5.5% annually over the time period of the study. Figure 6 also reveals a significant downward trend in the proportion of young adults who "somewhat disapprove" of marijuana use initiation (OR = 0.97, 95% CI = 0.97–0.98). Combining these two forms of disapproval reveals a 25.26% decrease in the proportion of young adults who disapprove, to a greater or lesser degree, of marijuana use initiation. Supplementary analyses (shown in Table 4) suggest that the downward trend observed among young adults was stable for each of the individual ages (e.g. 18, 19, etc.) examined.

Despite these substantial changes in disapproval, no significant increase was observed with respect to lifetime marijuana use among this developmental subgroup. However, a more fine-grained analysis revealed that a small but significant downward trend was observed among 18-year-olds (AOR = 0.99, 95% CI = 0.98–1.00), 19-year-olds (0.98, 95% CI = 0.98–0.99), and 21-year-olds (AOR = 0.98, 95% CI = 0.97–0.99). In contrast, a small but statistically significant increase in lifetime marijuana use was observed among 24/25-year-olds (AOR = 1.01, 95% CI = 1.00–1.02) between 2002 and 2013. Additionally, a relatively small ($\Delta = 2.21$) but statistically significant (OR = 1.02, 95% = 1.01–1.02) increase in past 12-month marijuana use was identified between 2002 and 2013. This represents a 7% relative increase in the proportion of young adults who report past year marijuana use during this time period. Supplementary analyses (see Table 4) revealed that similarly sized trends for past 12-month use were observed among 18-year-olds (AOR = 1.01, 95% CI = 1.00–1.02), 20-year-olds (AOR = 1.02, 95% CI = 1.01–1.03), 21-year-olds (AOR = 1.01, 95% CI = 1.00–1.02), 22/23-year-olds (AOR = 1.02, 95% CI = 1.01–1.02), and 24/25-year-olds (AOR = 1.03, 95% CI = 1.02–1.04).

Discussion

In the present study we examined trend data on the disapproval and use of marijuana among younger adolescents (ages 12–14), older adolescents (ages 15–17), and young adults (ages

18–25) in the United States between 2002 and 2013. Results suggest that important changes have taken place with respect to the perception and use of marijuana among American youth, but that these changes are markedly different among youth from distinct developmental subgroups. Below we detail a number of key findings that emerged from our analyses.

Trends in Perception and Use of Marijuana by Developmental Subgroup

Younger Adolescents—With respect to younger adolescents (ages 12–14), we observed a significant increase in the proportion of youth reporting "strong disapproval" of marijuana use initiation over the last decade. Specifically, the prevalence of youth reporting “strong disapproval” increased by 4.5% between 2002 (74.4%) and 2013 (78.9%) with large increases observed between 2002 and 2007 and a stable prevalence observed between 2008 and 2013. The change in disapproval was slightly smaller when examining both "somewhat disapprove" and "strongly disapprove" as we only observed a 1.74% increase over the same time period. It should be noted that these findings do not necessarily converge with evidence from the MTF which indicate slight decreases in disapproval in recent years (Johnston et al., 2015). Specifically, Johnston and colleagues identified a 1.3% decrease among 8th graders in the prevalence of either “disapproval” or “strong disapproval” of marijuana use initiation between 2002 and 2013.

During the same period of time we saw a corresponding drop in marijuana use among younger adolescents. More precisely, we identified a 25% decrease in the relative proportion of early adolescent marijuana users as the prevalence of younger adolescents reporting past year marijuana use decreased from 6% in 2002 to 4.5% in 2013. While prior NSDUH studies have not examined trends in marijuana use among this particular developmental subgroup (SAMHSA, 2014), the findings from the present study are consistent with MTF trend studies which suggest similar decreases in past year (1.9%) and lifetime (2.7%) use between 2002 and 2013 (Johnston et al., 2015). Put together, our results seem to suggest that the perceptions and practices of younger adolescents with respect to marijuana have not been negatively impacted by recent marijuana-related changes in public policy and perception. In fact, we observed significant increases in disapproval and decreases in both past year and lifetime marijuana use among this important developmental subgroup.

Older Adolescents—We saw a distinct pattern among older adolescents (ages 15–17) between 2002 and 2013. Among this subgroup, no overall trend differences were observed with respect to "strong disapproval" of marijuana use initiation between 2002 (49.4%) and 2013 (49.9%). However, closer inspection suggests that merely examining the overall trend data may mask shorter-term upward and downward trends among older adolescents over the last decade. Specifically, we found that the overall proportion of older adolescents reporting "strong disapproval" of marijuana use initiation increased significantly between 2002 (49.4%) and 2008 (55.6%) before decreasing significantly between 2008 (55.6%) and 2013 (49.9%). Evidence from the MTF study seems to tell a somewhat different story in terms of disapproval of marijuana use initiation. Specifically, Johnston and colleagues (2015) identified a 4.6% decrease in disapproval among 10th-graders and a 2.5% decrease among 12th-graders over the same time period. However, closer inspection of the MTF data also

points to evidence of an uptick in marijuana use initiation disapproval between 2002–2007/2008 followed by a steep decline between 2008 and 2013 among youth from both the 10th and 12th grade samples.

With respect to trends in marijuana use, a significant decrease in lifetime and past year use was observed between 2002 and 2013. Indeed, reported past year use decreased by 4.3% between 2002 (26.2%) and 2013 (21.9%) which represents a 16% relative decrease in use among older adolescents. Notably, the observed decrease among the older adolescent (ages 15–17) subgroup is substantially larger than that which has been observed in prior NSDUH studies (2.4%) that have relied exclusively upon data for all adolescents between the ages of 12 and 17 (SAMHSA, 2014). Additionally, we should note that the downward trend in use observed in the present study is distinct from MTF studies examining past year and lifetime use over the same time period (Johnston et al., 2015). Between 2002 and 2013, past year use was stable among the 10th and 12th grade MTF samples and comparatively smaller decreases were observed in lifetime use among these samples (10^{th} grade = 2.9% decrease, 12^{th} grade = 2.3% decrease). In sum, the findings from the present study suggest that—despite an increased acceptance of marijuana use among American adults—older adolescents have not become more permissive in their views on marijuana and have progressively decreased their use over the past decade.

Young Adults—Among young adults (ages 18–25) the proportion of individuals reporting "strong disapproval" of marijuana use initiation decreased markedly from 40.5% in 2002 to 22.6% in 2013. In relative terms, this represents a 44% drop in proportion of young adults expressing unequivocally critical views on the use of marijuana. This trend stands in clear contrast to the results identified among the younger and older adolescent subsamples and suggests that important changes in perception are underway among young adults. The steep downward trend is also generally in keeping with findings from the MTF (Johnston et al., 2014). Specifically, between 2002 and 2013, noteworthy drops in disapproval were observed among young adults between the ages of 19 and 20 (4.5%) and 23 and 26 years of age (14.3%).

Despite the clear downward trend in disapproval, however, we did not observe a corresponding spike in marijuana use. Indeed, no significant increase was observed in terms of lifetime marijuana use and the increase in past year use, although significant, was relatively diminutive in magnitude. Specifically, last year use among this population increased by only 2.2% between 2002 (29.7%) and 2013 (31.9%). In relative terms, this represents only a 7% increase in the proportion of adults reporting marijuana use over the last decade. Very similar increases were observed among young adults in the MTF study between 2002 and 2013 (Johnston et al., 2014).

These findings are potentially quite important. Prior studies have consistently found substance use disapproval and other critical drug use attitudes to be protective against substance use (e.g., Bachman et al., 1990, 1998; Keyes et al., 2011, 2012; Palamar et al., 2011, 2013). We also found that—pooling data for all years—the link between disapproval and use was quite robust for young adults; however, we found a noteworthy pattern in which the proportion of young adults reporting disapproval of marijuana use initiation dropped

markedly in recent years, but very little change was observed with respect to marijuana use. Although our data cannot disentangle the underlying reasons for these ostensibly paradoxical findings, we can identify some possibilities. First, the measure of disapproval used in this study asks young adults about their perceptions with regard to “adults trying marijuana or hashish once or twice”. Given the rather general phrasing of this question, it may be that young adults have grown increasingly open to marijuana use in general without changing much with respect to how they feel about their personal use. In other words, the rise of medical marijuana, the relaxing of marijuana use laws, and increased exposure of marijuana as perhaps normative (as well as no longer immoral) may be influencing how young adults feel about *others using marijuana*, but not impacting beliefs about *one's own use of marijuana*. Another possibility is that, among young adults, there are simply other psychosocial factors that play a far more important role than disapproval in influencing marijuana use. It may be that, among individuals between the ages of 18 and 25, factors such as access to marijuana and perceived school or work-related consequences may be the driving force that determines whether or not young people use. The third possibility is that there may be some cohort effects in play such that, while young adults have become less disapproving of use over time, their perceptions of use at younger ages may have nevertheless made a lasting impact on their marijuana use behaviors (even during young adulthood). Regretfully, our data only allow us to speculate as to such possibilities. We encourage future trend studies to delve more deeply into the changes in disapproval and use, particularly among young adults.[1]

Gradations of Marijuana Use Disapproval and Marijuana Use

In addition to trends in “strong disapproval” we also examined the links between various degrees of disapproval and marijuana use as well as the degree to which the various gradations of disapproval changed over time. Consistent with prior research, we identified a robust link between disapproval and marijuana use among younger and older adolescents, as well as among young adults (Bachman et a., 1990, 1998; Keyes et al., 2011, 2012). Notably, our results clearly indicate that—although disapproval in general is protective for marijuana use—the prevalence of use among youth reporting they "strongly disapprove" of marijuana use initiation was between three (older adolescents, young adults) and seven (younger adolescents) times lower than that of youth reporting that they "somewhat disapprove". This finding underlines the importance of examining gradations in disapproval and suggests that “strong disapproval” is of primary importance to efforts designed to prevent marijuana use initiation.

Examining the trends in various gradations of disapproval (i.e., [1] "somewhat disapprove", [2] "strongly disapprove", and [3] “somewhat” or “strongly disapprove") yielded several important findings. First, while an increase in "strong disapproval" was observed for younger adolescents, a 2.8% decrease in the proportion of younger adolescents reporting they "somewhat disapprove" of marijuana use initiation was observed between 2002 and 2013. This suggests that lumping together various forms of disapproval may serve to mask important trend changes. On the other hand, we found that—in addition to the 17.9%

[1]We wish to thank an anonymous reviewer for pointing out the importance of our findings among young adults.

decrease in "strong disapproval"—the percentage of young adults who "somewhat disapprove" of marijuana use initiation also dropped by 7.4%. This finding also seems to suggest that an assessment of changes in various gradations of disapproval is important in understanding broad changes in the perception of illicit drug use.

Study Limitations

Findings should be interpreted in light of several limitations. First, all variables used in this analysis—including the measures of perceptions and use of marijuana—are derived from self-report data. As such, adolescents may have under- or over-reported their disapproval and use of marijuana. Second, use of the publicly available NSDUH data did not allow for an analysis of state level differences. Recent evidence suggests that, due to state-level variation in decriminalization and legalization, such an approach may yield important information (Miech et al., 2015). Finally, while we examine the relationship between disapproval and use, it should be noted that these data are cross-sectional and, consequently, we cannot draw causal conclusions from the associations observed between these variables. Future research would benefit from the incorporation of such factors into study designs.

Conclusions

Despite recent changes in public perception and policy relating to the use and distribution of marijuana, relatively little research has accrued on the longer-term trends relating to adolescent and young adult perceptions and lifetime use of marijuana. Findings from the present study suggest that changes are certainly underway in terms of the perception and use of marijuana among American youth. Importantly, however, these changes differ in important ways among youth from distinct developmental subgroups. Study findings point to the importance of examining changes in the perception and use of marijuana with an appreciation for developmental differences.

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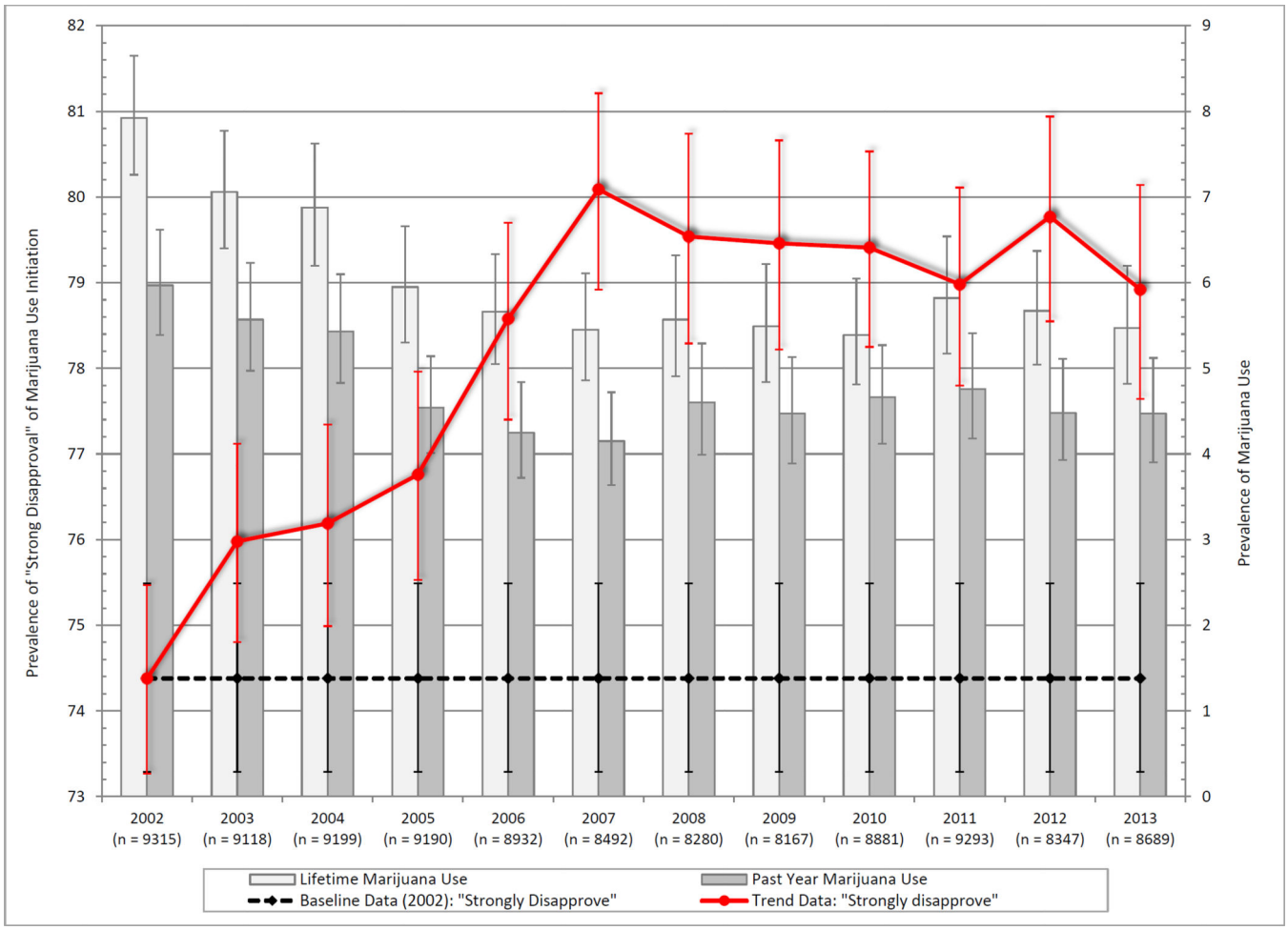

Figure 1.

Prevalence estimates and 95% confidence intervals for younger adolescent (ages 12–14) marijuana disapproval and use

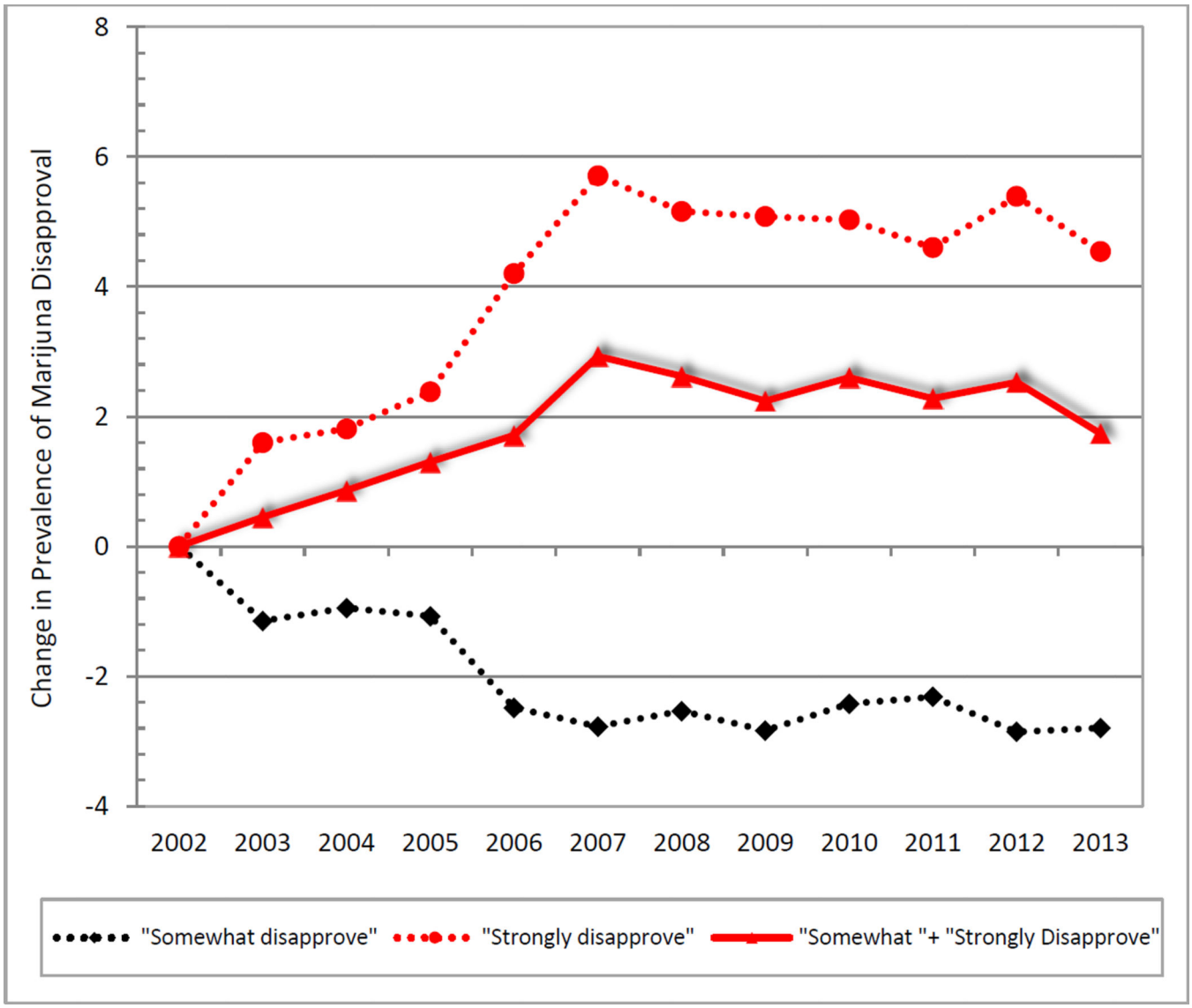

Figure 2.
Disapproval of marijuana use among for younger adolescents (ages 12–14) in the United States

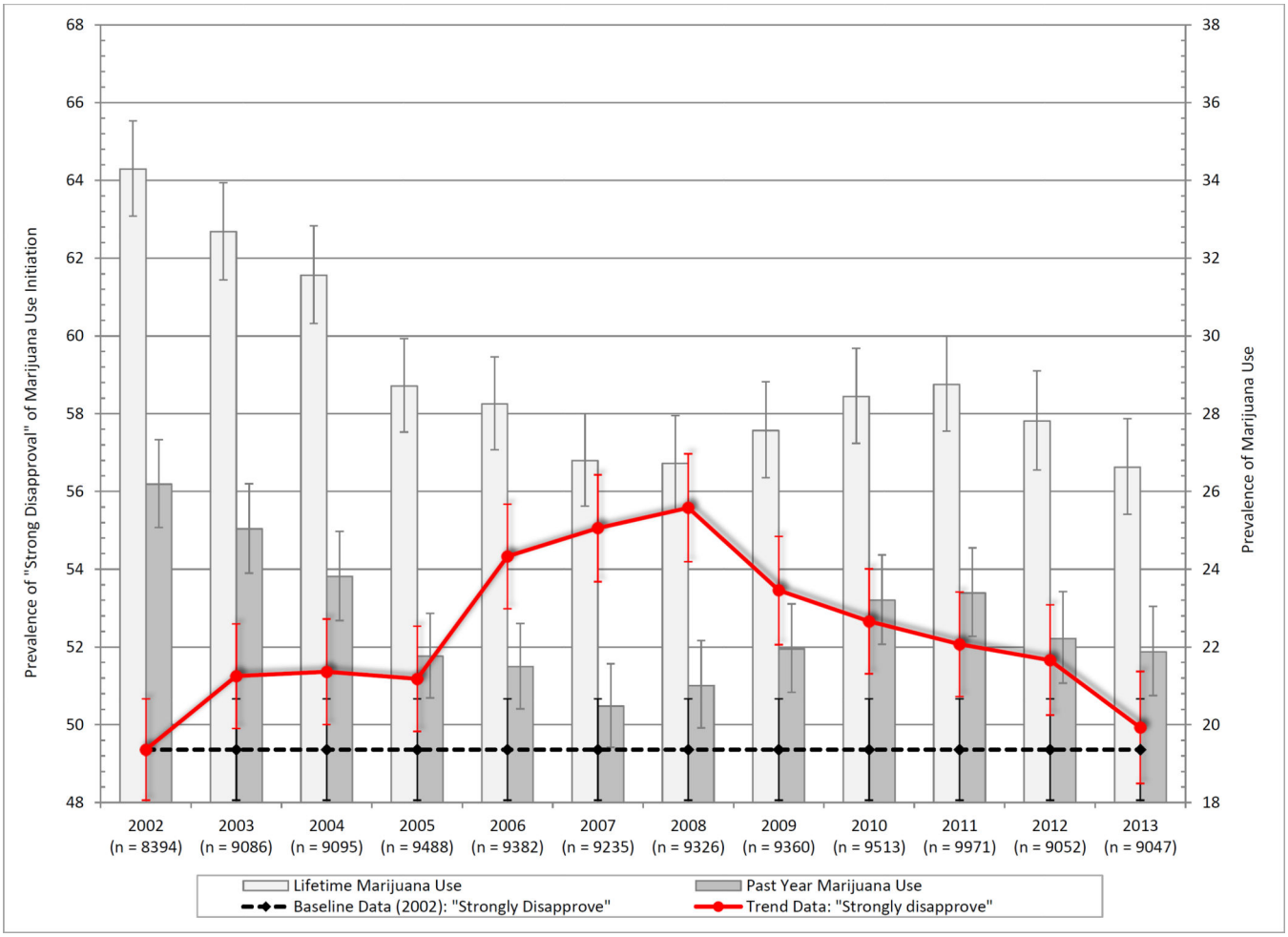

Figure 3.

Prevalence estimates and 95% confidence intervals for older adolescent (ages 15–17) marijuana disapproval and use

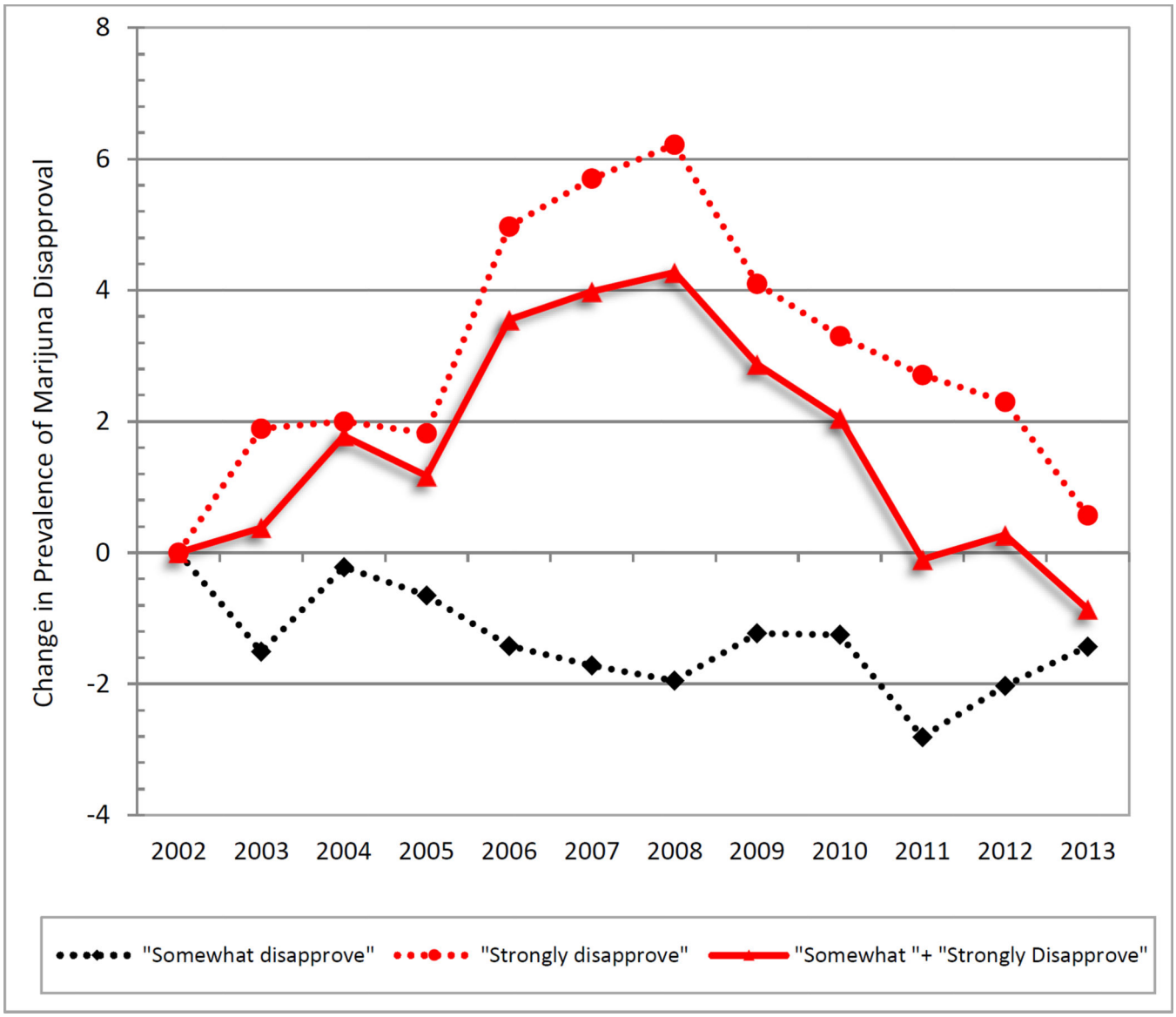

Figure 4.
Disapproval of marijuana use among for older adolescents (ages 15–17) in the United States

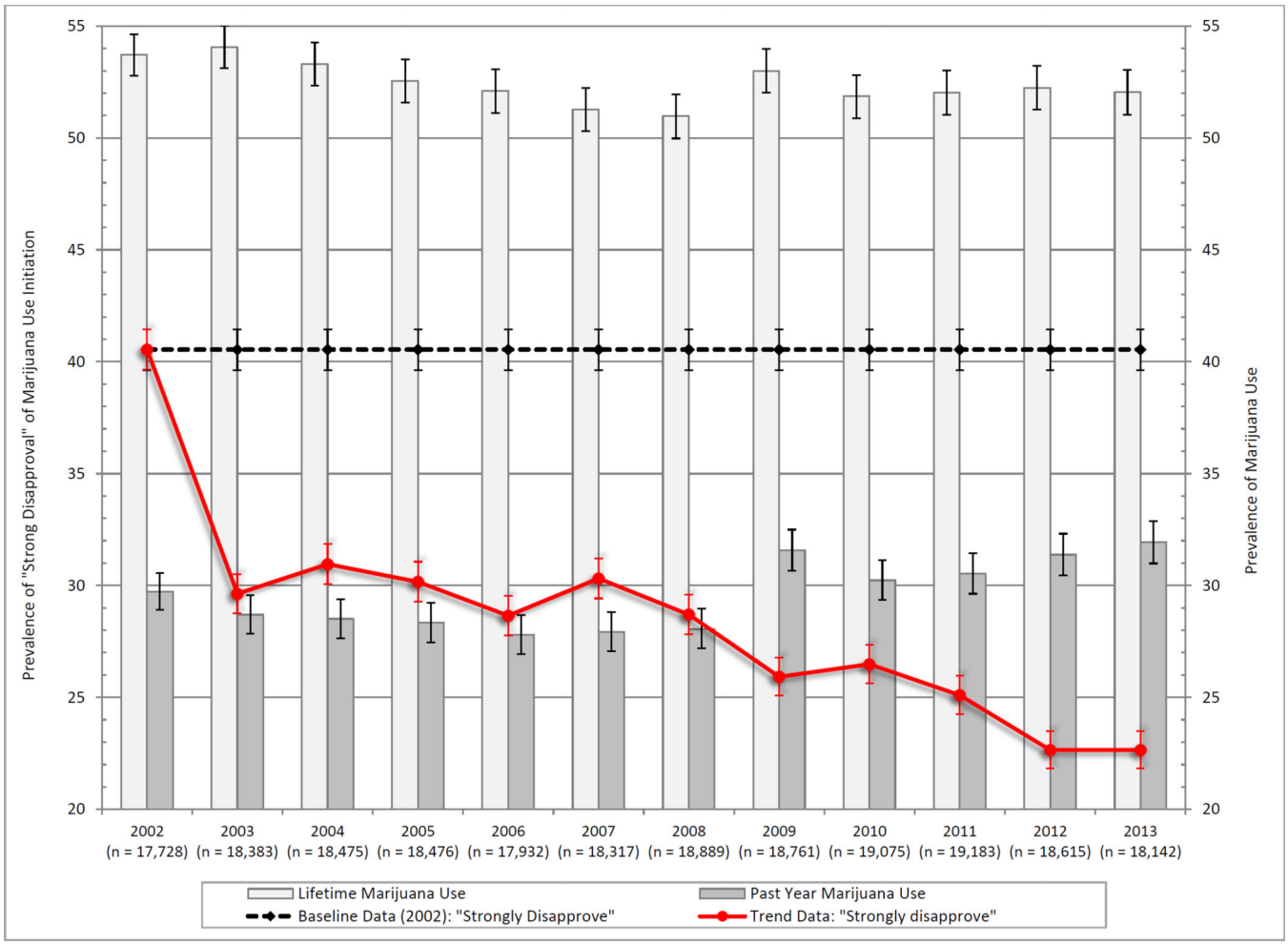

Figure 5.

Prevalence estimates and 95% confidence intervals for young adult (ages 18–25) marijuana disapproval and use

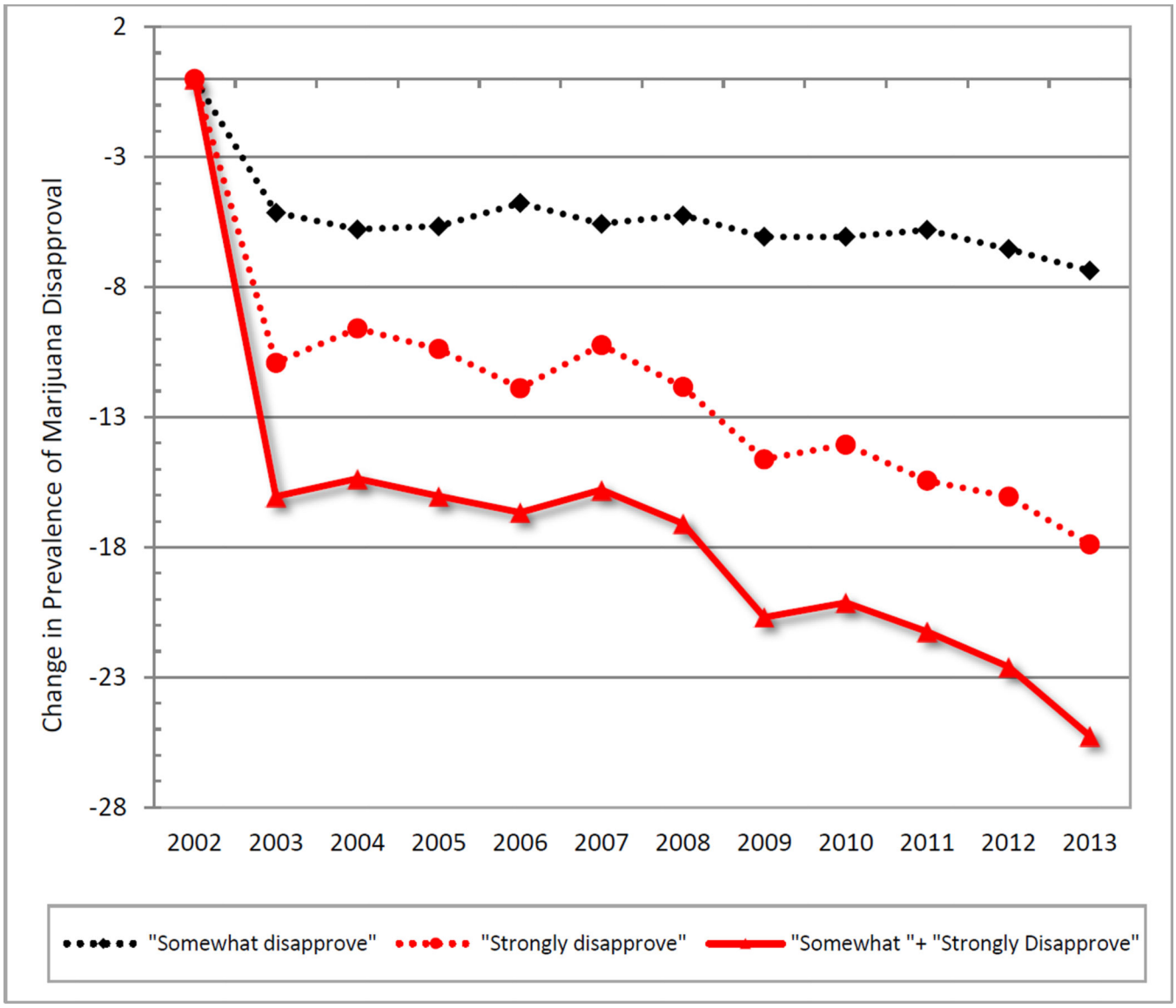

Figure 6.
Disapproval of marijuana use among for young adults (ages 18–25) in the United States

Table 1

Sociodemographic and marijuana use-related characteristics of adolescents and young adults in the USA: 2002–2013

	Younger Adolescents (ages 12–14)		Older Adolescents (ages 15–17)		Young Adults (ages 18–25)	
	(*n* = 105,903)		(*n* = 110,949)		(*n* = 221,976)	
	% / M	(95% CI)	%	(95% CI)	%	(95% CI)
Sociodemographic Characteristics						
Gender						
Female	48.89	(48.5–49.3)	48.94	(48.5–49.3)	49.73	(49.4–50.0)
Male	51.11	(50.7–51.5)	51.06	(50.7–51.5)	50.27	(50.0–50.5)
Race/Ethnicity						
White	58.21	(57.8–58.6)	59.74	(59.3–60.1)	60.19	(59.9–60.5)
African American	14.81	(14.5–15.1)	14.77	(14.5–15.0)	13.86	(13.7–14.0)
Native American/Alaska Native	0.64	(0.59–0.69)	0.59	(.54–.65)	0.62	(0.59–0.66)
Asian/Pacific Islander	4.49	(4.3–4.7)	4.72	(4.5–4.9)	5.18	(5.0–5.3)
Multiracial	2.19	(2.1–2.3)	1.91	(1.8–2.0)	1.47	(1.4–1.5)
Hispanic	19.66	(19.3–20.0)	18.26	(17.9–18.6)	18.67	(18.4–18.9)
Household Income						
< $20,000	17.91	(17.6–18.2)	16.83	(16.5–17.1)	31.94	(31.7–32.2)
$20,000–$34,999	32.29	(31.9–32.7)	31.98	(31.6–32.3)	34.98	(34.7–35.2)
$35,000–69,999	18.00	(17.7–18.3)	18.23	(17.9–18.5)	13.80	(13.6–14.0)
> $70,000	31.79	(31.4–32.2)	32.96	(32.6–33.3)	19.29	(19.1–19.5)
Father in Household						
No	25.25	(24.9–25.6)	27.00	(26.7–27.3)	—	—
Yes	74.75	(74.4–75.1)	73.00	(72.6–73.3)	—	—
Marijuana Use-Related Characteristics						
Feel about someone trying marijuana/hashish						
“Neither approve nor disapprove”	10.08	(9.8–10.3)	27.87	(27.5–28.2)	57.52	(57.2–57.8)
“Somewhat disapprove”	11.79	(11.5–12.1)	19.77	(19.4–20.1)	13.97	(13.8–14.2)
“Strongly disapprove”	78.13	(77.8–78.5)	52.36	(51.9–52.8)	28.50	(28.2–28.8)

	Younger Adolescents (ages 12–14)		Older Adolescents (ages 15–17)		Young Adults (ages 18–25)	
	(*n* = 105,903)		(*n* = 110,949)		(*n* = 221,976)	
	% / M	(95% CI)	%	(95% CI)	%	(95% CI)
Past 12 Month Use						
No	95.21	(95.0–95.4)	77.33	(77.0–77.7)	70.41	(70.1–70.7)
Yes	4.79	(4.6–5.0)	22.67	(22.3–23.0)	29.59	(29.3–29.8)
Lifetime Use						
No	93.96	(93.8–94.1)	71.03	(70.7–71.4)	47.59	(47.3–47.9)
Yes	6.04	(5.8–6.2)	28.97	(28.6–29.3)	52.41	(52.1–52.7)

Table 2

Association between marijuana disapproval and use among adolescents and young adults in the United States: 2002–2013

	Used Marijuana in Past 12 Months					
	No		**Yes**		**Odds Ratios**	
	%	**95% CI**	**%**	**95% CI**	**OR**	**(95% CI)**
Younger Adolescents (ages 12–14)						
“Neither approve nor disapprove”	74.37	(73.2–75.5)	25.63	(24.5–26.8)	1.00	
“Somewhat disapprove”	90.38	(89.6–91.1)	9.62	(8.9–10.4)	**0.31**	**(0.28–0.35)**
“Strongly disapprove”	98.69	(98.6–98.8)	1.31	(1.2–1.4)	**0.05**	**(0.04–0.05)**
Older Adolescents (ages 15–17)						
“Neither approve nor disapprove”	47.26	(46.5–48.0)	52.74	(52.0–53.5)	1.00	
“Somewhat disapprove”	77.69	(76.9–78.4)	22.31	(21.6–23.0)	**0.26**	**(0.25–0.27)**
“Strongly disapprove”	93.27	(93.0–93.5)	6.73	(6.5–7.0)	**0.07**	**(0.06–0.07)**
Young Adults (ages 18–25)						
“Neither approve nor disapprove”	55.66	(55.3–56.0)	44.34	(43.9–44.7)	1.00	
“Somewhat disapprove”	82.07	(81.5–82.6)	17.93	(17.4–18.5)	**0.27**	**(0.25–0.28)**
“Strongly disapprove”	94.57	(94.3–94.8)	5.43	(5.2–5.7)	**0.07**	**(0.07–0.07)**

Note: Odds ratios adjusted for adjusted for age, gender, race/ethnicity, household income, and father in household (adolescent respondents only). Odds ratios and confidence intervals in bold are statistically significant at $p < .001$.

Table 3

Tests of Significance for Trends in Disapproval and Use of Marijuana: 2002–2013

	How do you feel about someone your age trying marijuana or hashish once or twice?						*Marijuana Use (Self-Report)*			
	Somewhat Disapprove		**Somewhat + Strongly Disapprove**		**Strongly Disapprove**		**Lifetime Use**		**Past 12 Months**	
	OR	**(95% CI)**	**OR**	**(95% CI)**	**OR**	**(95% CI)**	**OR**	**(95% CI)**	**OR**	**(95% CI)**
Adolescents										
Young Adolescents (age 12–14)	**0.98**	**(0.97–0.98)**	**1.02**	**(1.01–1.03)**	**1.03**	**(1.02–1.03)**	**0.97**	**(0.96–0.98)**	**0.98**	**(0.97–0.99)**
Older Adolescents (ages 15–17)	0.99	(0.98–1.00)	0.99	0.99–1.00)	1.00	(0.99–1.01)	**0.97**	**(0.97–0.98)**	**0.99**	**(0.98–0.99)**
Young Adults										
Young Adults (ages 18–25)	**0.97**	**(0.97–0.98)**	**0.94**	**(0.93–0.94)**	**0.94**	**(0.94–0.95)**	1.00	(0.99–1.00)	**1.02**	**(1.01–1.02)**

Note: Odds ratios (OR) adjusted for race/ethnicity, age, gender, household income, and father in household (adolescent respondents only). ORs and 95% CIs in bold are statistically significant ($p < .001$)

Table 4

Prevalence estimates and 95% confidence intervals for adolescent marijuana disapproval and use, by age

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Strong Disapproval												
* 12 years (n = 33,843)	83.91 (82.2–85.5)	85.35 (83.6–86.9)	85.48 (83.7–87.1)	86.72 (84.9–88.3)	86.85 (85.1–88.5)	86.63 (84.8–88.3)	87.18 (85.2–88.9)	87.36 (85.5–89.0)	88.75 (87.0–90.2)	88.30 (86.6–89.8)	89.52 (87.9–90.9)	86.59 (84.5–88.4)
* 13 years (n = 35,918)	75.49 (73.6–77.3)	77.21 (75.2–79.1)	78.12 (77.2–79.9)	77.47 (75.3–79.5)	78.77 (76.7–80.7)	82.34 (80.4–84.1)	81.72 (79.5–83.7)	80.68 (78.5–82.7)	79.48 (77.4–81.4)	78.77 (76.6–80.8)	80.01 (77.9–81.9)	81.67 (79.6–83.6)
* 14 years (n = 36,142)	63.37 (62.3–66.4)	65.58 (63.3–67.8)	65.62 (63.3–67.9)	67.11 (64.7–69.4)	71.19 (69.0–73.2)	71.52 (69.2–73.7)	70.39 (68.1–72.6)	71.33 (69.0–73.5)	70.07 (67.8–72.2)	70.93 (68.7–73.0)	70.21 (67.8–72.5)	69.87 (67.5–72.2)
*15 years (n = 37,010)	53.38 (51.1–55.6)	56.42 (54.1–58.7)	57.16 (54.8–59.5)	55.64 (53.3–57.9)	59.30 (57.0–61.5)	61.39 (59.0–63.7)	61.80 (59.4–64.1)	59.67 (57.3–62.0)	57.99 (55.7–60.3)	58.54 (56.1–60.9)	58.83 (56.4–61.2)	57.23 (54.8–59.7)
16 years (n = 37,284)	49.00 (46.7–51.2)	49.28 (46.9–51.6)	50.79 (48.4–53.1)	51.59 (49.3–53.9)	53.54 (51.2–55.9)	54.50 (52.1–56.8)	56.68 (54.3–59.0)	51.33 (48.9–53.7)	52.48 (50.1–54.8)	50.15 (47.9–52.4)	51.57 (49.1–53.9)	50.09 (47.6–52.5)
* 17 years (n = 36,655)	45.56 (43.3–47.8)	47.89 (45.6–50.2)	45.82 (43.4–48.2)	46.05 (43.7–48.4)	49.81 (47.5–52.2)	48.92 (46.6–51.3)	48.26 (45.8–50.7)	49.25 (46.8–51.7)	47.61 (45.3–49.9)	47.57 (45.3–49.9)	44.90 (42.4–47.4)	42.45 (39.9–44.9)
Past Year Use												
12 years (n = 33,843)	1.29 (0.9–1.9)	1.13 (0.7–1.8)	1.03 (0.7–1.6)	1.01 (0.6–1.6)	1.15 (0.6–2.1)	1.01 (0.7–1.6)	1.17 (0.7–1.9)	1.01 (0.6–1.8)	0.98 (0.6–1.6)	1.17 (0.7–2.0)	1.12 (0.7–1.8)	1.38 (0.9–2.1)
13 years (n = 35,918)	4.49 (3.6–5.5)	4.06 (3.3–5.0)	4.31 (3.5–5.3)	4.12 (3.2–5.3)	3.29 (2.5–4.3)	3.12 (2.4–4.0)	3.87 (2.9–5.2)	3.48 (2.6–4.6)	3.83 (3.0–4.8)	4.09 (3.2–5.2)	3.70 (2.9–4.7)	3.12 (2.4–4.0)
* 14 years (n = 36,142)	11.83 (10.5–13.3)	11.49 (10.0–13.1)	10.70 (9.2–12.3)	8.18 (7.0–9.5)	7.90 (6.8–9.2)	8.26 (7.0–9.7)	8.49 (7.2–10.0)	8.48 (7.2–10.0)	9.22 (7.9–10.6)	8.64 (7.4–10.1)	8.53 (7.2–10.0)	8.38 (7.1–9.9)
*15 years (n = 37,010)	20.21 (18.5–22.0)	18.84 (17.1–20.7)	16.89 (15.2–18.7)	15.59 (14.0–17.3)	16.01 (14.4–17.7)	13.98 (12.5–15.6)	14.43 (12.8–16.2)	15.87 (14.2–17.6)	17.70 (16.0–20.0)	17.65 (15.8–19.6)	13.87 (12.3–15.6)	14.52 (12.9–16.3)
*16 years (n = 37,284)	26.22 (24.3–28.2)	27.04 (25.0–29.2)	25.00 (23.0–27.1)	22.78 (20.9–24.8)	22.31 (20.4–24.3)	21.77 (19.9–23.7)	21.04 (19.2–22.9)	22.65 (20.7–24.7)	22.11 (20.2–24.1)	23.63 (21.7–25.6)	22.74 (20.8–24.8)	22.45 (20.5–24.5)
17 years (n = 36,655)	32.31 (30.3–34.4)	29.40 (27.4–31.5)	29.90 (27.8–32.1)	27.20 (25.2–29.3)	26.50 (24.5–28.6)	26.05 (24.1–28.1)	27.63 (25.5–29.9)	27.42 (25.3–29.6)	29.66 (27.5–31.9)	28.91 (26.9–31.0)	29.67 (27.5–32.0)	28.68 (26.5–30.9)
Lifetime Use												

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
12 years (n = 33,843)	1.92 (1.4–2.6)	1.51 (1.0–2.2)	1.66 (1.1–2.4)	1.39 (1.0–2.0)	1.50 (0.9–2.5)	1.22 (0.8–1.8)	1.50 (1.0–2.2)	1.53 (1.0–2.4)	1.04 (0.6–1.7)	1.49 (0.9–2.4)	1.32 (0.9–2.0)	1.62 (1.1–2.4)
* 13 years (n = 35,918)	6.30 (5.3–7.5)	5.59 (4.6–6.7)	5.45 (4.5–6.5)	5.54 (4.5–6.8)	4.63 (3.7–5.7)	4.25 (3.4–5.3)	4.95 (3.8–6.4)	4.39 (3.4–5.7)	4.56 (3.6–5.7)	5.24 (4.2–6.5)	4.74 (3.8–5.9)	3.91 (3.1–4.9)
* 14 years (n = 36,142)	15.17 (13.7–16.8)	14.04 (12.5–15.7)	13.23 (11.6–15.0)	10.49 (9.1–12.1)	10.34 (9.0–11.8)	10.84 (9.4–12.4)	9.97 (8.6–11.5)	10.04 (8.7–11.6)	10.62 (9.3–12.1)	10.26 (8.9–11.8)	10.83 (9.4–12.5)	10.24 (8.7–12.0)
* 15 years (n = 37,010)	24.88 (23.0–26.8)	23.67 (21.8–25.7)	22.68 (20.8–24.7)	20.11 (18.3–22.0)	20.80 (19.0–22.7)	17.58 (15.9–19.4)	18.71 (16.9–20.7)	18.97 (17.2–20.9)	21.25 (19.4–23.2)	20.93 (19.0–23.0)	18.17 (16.4–20.1)	17.88 (16.1–19.8)
* 16 years (n = 37,284)	34.90 (32.8–37.1)	34.77 (32.6–37.0)	33.01 (30.9–35.2)	29.08 (27.0–31.2)	28.69 (26.6–30.8)	27.65 (25.6–29.8)	26.62 (24.6–28.7)	27.79 (25.7–30.0)	27.14 (25.1–29.2)	28.85 (26.8–30.9)	27.62 (25.5–29.8)	27.11 (25.0–29.3)
* 17 years (n = 36,655)	43.36 (41.1–45.6)	39.85 (37.6–42.1)	39.47 (37.2–41.8)	37.44 (35.2–39.7)	35.78 (33.6–38.0)	35.73 (33.5–38.0)	34.89 (32.6–37.2)	36.04 (33.8–38.4)	36.77 (34.5–39.1)	36.51 (34.3–38.7)	37.22 (34.8–39.7)	34.92 (32.6–37.3)

Note:

* Signifies that 2002–2013 trend significant at $p < .05$

Table 5

Prevalence estimates and 95% confidence intervals for young adult marijuana disapproval and use, by age

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Strong Disapproval												
* 18 years (n = 30,976)	46.57 (44.1–49.1)	34.60 (32.2–37.1)	34.60 (32.1–37.1)	36.30 (33.8–38.8)	32.98 (30.6–35.4)	34.15 (31.7–36.6)	34.28 (31.9–36.8)	31.18 (28.8–33.6)	29.24 (27.0–31.6)	30.48 (28.1–32.9)	28.29 (25.9–30.8)	27.44 (25.1–29.9)
* 19 years (n = 28,168)	40.30 (37.9–42.8)	32.76 (30.2–35.4)	31.74 (29.3–34.3)	30.38 (28.0–32.9)	32.36 (29.9–34.9)	32.00 (29.6–34.5)	30.11 (27.7–32.6)	27.71 (25.4–30.1)	30.29 (27.9–32.8)	27.69 (25.3–30.2)	25.99 (23.5–28.6)	24.99 (22.6–27.6)
* 20 years (n = 27,334)	40.93 (38.4–43.5)	28.58 (26.2–31.1)	32.40 (29.8–35.1)	28.67 (26.3–31.2)	29.87 (27.3–32.5)	31.38 (28.9–34.0)	27.93 (25.5–30.5)	27.78 (25.4–30.3)	26.55 (24.2–29.0)	25.48 (23.2–27.9)	24.17 (21.9–26.6)	22.21 (20.0–24.6)
* 21 years (n = 27,653)	36.94 (34.5–39.4)	28.77 (26.4–31.3)	28.19 (25.8–30.7)	30.15 (27.6–32.8)	27.05 (24.7–29.6)	28.27 (25.8–30.8)	29.25 (26.7–31.9)	25.02 (22.7–27.5)	26.37 (23.9–29.0)	24.06 (21.7–26.5)	25.94 (23.5–28.5)	22.54 (20.2–25.0)
* 22/23 years (n = 54,520)	38.81 (37.0–40.6)	26.76 (25.1–28.5)	29.69 (27.9–31.5)	28.38 (26.6–30.2)	26.37 (24.7–28.1)	28.73 (26.9–30.6)	26.54 (24.8–28.3)	22.74 (21.1–24.4)	24.81 (23.2–26.5)	22.90 (21.3–24.6)	22.14 (20.6–23.7)	20.38 (18.9–22.0)
* 24/25 years (n = 53,325)	40.74 (38.9–42.6)	29.02 (27.3–30.8)	30.41 (28.6–32.3)	29.07 (27.2–30.9)	26.71 (25.0–28.5)	29.05 (27.3–30.9)	26.73 (24.9–28.6)	24.37 (22.7–26.1)	24.56 (22.9–26.3)	23.22 (21.5–25.0)	23.38 (21.8–25.1)	21.46 (19.9–23.2)
Past Year Use												
* 18 years (n = 30,976)	32.61 (30.4–34.9)	32.15 (29.8–34.5)	31.79 (29.4–34.3)	31.33 (29.0–33.8)	30.53 (28.2–32.9)	29.44 (27.1–31.9)	30.33 (28.0–32.7)	33.47 (31.1–35.9)	33.81 (31.4–36.3)	33.19 (30.7–35.7)	35.11 (32.6–37.7)	33.55 (31.0–36.2)
19 years (n = 28,168)	34.35 (31.5–36.8)	34.07 (31.5–36.8)	34.08 (31.5–36.7)	33.08 (30.6–35.6)	29.98 (27.6–32.5)	31.91 (29.5–34.4)	32.41 (29.9–35.0)	34.68 (32.2–37.2)	34.18 (31.7–36.7)	35.34 (32.7–38.0)	34.16 (31.4–36.9)	34.79 (32.0–37.6)
* 20 years (n = 27,334)	32.34 (30.0–34.8)	34.94 (32.5–37.5)	32.68 (30.2–35.3)	32.78 (30.3–35.4)	31.87 (29.2–34.7)	31.72 (29.2–34.4)	31.74 (29.2–34.4)	35.49 (32.8–38.2)	32.09 (29.6–34.6)	35.66 (33.0–38.4)	37.01 (34.3–39.8)	35.48 (32.8–38.3)
* 21 years (n = 27,653)	34.53 (32.1–37.0)	29.94 (27.5–32.5)	30.89 (28.4–33.5)	28.56 (26.1–31.2)	30.32 (27.8–32.9)	30.88 (28.3–33.6)	30.08 (27.6–32.7)	34.36 (31.7–37.1)	32.39 (29.9–34.9)	30.02 (27.6–32.5)	32.81 (30.3–35.5)	36.41 (33.7–39.3)
* 22/23 years (n = 54,520)	28.20 (26.6–29.9)	26.23 (24.6–27.9)	26.13 (24.5–27.8)	27.41 (25.7–29.2)	26.79 (25.1–28.6)	26.72 (25.0–28.5)	26.27 (24.5–28.1)	31.01 (29.2–32.9)	29.05 (27.3–30.9)	30.01 (28.2–31.9)	29.74 (27.9–31.6)	29.15 (27.4–31.0)
* 24/25 years (n = 53,325)	22.37 (20.8–24.0)	22.28 (20.7–23.9)	22.70 (21.0–24.4)	22.18 (20.5–23.9)	22.54 (20.9–24.2)	22.28 (20.6–24.0)	23.13 (21.4–24.9)	25.65 (23.8–27.6)	25.07 (23.4–26.9)	24.51 (22.8–26.3)	25.83 (24.1–27.6)	28.51 (36.7–30.4)
Lifetime Use												

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
* 18 years (n = 30,976)	46.49 (44.0–49.0)	46.39 (43.8–48.9)	45.28 (42.7–47.9)	44.82 (42.2–47.4)	42.13 (39.6–44.7)	40.86 (38.3–43.4)	40.99 (38.5–43.5)	43.43 (40.9–46.0)	43.73 (41.2–46.3)	42.57 (40.0–45.2)	44.37 (41.7–47.1)	42.34 (39.7–45.1)
* 19 years (n = 28,168)	51.65 (49.2–54.1)	51.18 (48.4–53.9)	50.72 (48.0–53.4)	50.53 (47.9–53.2)	45.89 (43.2–48.6)	47.35 (44.7–50.0)	46.77 (44.1–49.5)	48.05 (45.4–50.7)	48.02 (45.4–50.7)	48.46 (45.7–51.2)	46.38 (43.5–49.3)	45.87 (43.0–48.8)
20 years (n = 27,334)	53.55 (50.9–56.1)	57.06 (54.4–59.7)	53.13 (50.4–55.8)	51.14 (48.4–53.8)	53.16 (50.3–56.0)	51.33 (48.6–54.1)	50.38 (47.6–53.2)	53.90 (51.1–56.6)	50.00 (47.3–52.7)	53.37 (50.6–56.1)	53.41 (50.6–56.2)	52.08 (49.3–54.9)
* 21 years (n = 27,653)	62.39 (59.9–64.8)	55.47 (52.8–58.1)	56.93 (54.2–59.6)	52.75 (50.0–55.5)	55.43 (52.7–58.1)	54.01 (51.2–56.8)	53.04 (50.2–55.8)	56.08 (53.3–58.8)	53.80 (51.0–56.6)	51.12 (48.4–53.8)	52.88 (50.1–55.6)	54.69 (51.8–57.5)
22/23 years (n = 54,520)	54.68 (52.8–56.5)	57.39 (55.5–59.3)	55.29 (53.4–57.2)	56.26 (54.3–58.2)	55.79 (53.8–57.7)	55.30 (53.3–57.3)	54.63 (52.6–56.7)	56.78 (54.8–58.7)	54.73 (52.8–56.7)	55.39 (53.4–57.3)	55.77 (53.8–57.7)	55.11 (53.1–57.1)
* 24/25 years (n = 53,325)	53.34 (51.4–55.2)	54.37 (52.4–56.3)	55.56 (53.6–57.5)	55.15 (53.1–57.1)	55.07 (53.1–57.0)	54.49 (52.5–56.4)	55.14 (53.1–57.1)	55.84 (53.8–57.9)	55.70 (53.7–57.7)	55.65 (53.6–57.7)	55.04 (53.1–57.0)	55.97 (53.9–57.9)

Note:

* Signifies that 2002–2013 trend significant at $p < .05$