# Increasing Marijuana Use for Black Adolescents in the United States: A Test of Competing Explanations

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## Abstract

**Aims—**In the last decade the relatively lower levels of marijuana use for black relative to non-black high school seniors has grown smaller and disappeared, drawing to a close a unique disparity that actually favored a disadvantaged group for at least thirty years. In this study we test trends in cigarette smoking and religiosity as possible explanations for this closing disparity. The study also examines whether increasing marijuana levels for black adolescents is better characterized as a cohort effect or an historical period effect.

**Design—**Analyses use relative risk regression and focus on data from yearly, cross-sectional surveys from the time period 2008-2017.

**Setting and Participants—**Data comes from the nationally-representative Monitoring the Future survey, which conducts in-school surveys of secondary school students. The analysis uses data from 114,552 high school seniors (in 12th grade), 123,594 in 10th grade, and 136,741 in 8th grade.

**Findings—**Past 12-month marijuana prevalence significantly increased for black as compared to non-black adolescents from 2008-2017 in 12th grade, 10th grade, and 8th grade. The increase attenuated by more than half and was not statistically significant after cigarette smoking. In contrast, the increase was little changed after adjusting adolescent levels of religiosity. The increase is better characterized as a cohort effect than a period effect.

**Conclusions—**These results support the increase in marijuana use for black relative to non-black adolescents as an unexpected consequence of the great decline in adolescent cigarette smoking, which has occurred slower for black adolescents.

## Introduction

In the last decade the lower level of marijuana use among black as compared to non-black high school seniors has grown smaller and disappeared, drawing to a close a unique disparity that actually favored a disadvantaged group for almost thirty years (Johnston, O'Malley, Miech, Bachman, & Schulenberg, 2017; Keyes, Wall, Feng, Cerdá, & Hasin,

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2017; Lanza, Vasilenko, Dziak, & Butera, 2015; Miech, Johnston, O'Malley, Bachman, & Schulenberg, 2017). We consider and empirically test two potential explanations why this disparity recently converged. The first explanation points to adolescent cigarette smoking. Cigarette use is a strong predictor of marijuana use, and any narrowing of the gap in cigarette use across black and non-black adolescents would be reflected, in part, in marijuana use. The second potential explanation points to religiosity (Wallace, et al., 2007). The higher levels of religiosity among black as compared to non-black adolescents partly explain their lower level of marijuana use, and if the relative difference in religiosity has narrowed then so too would the relative difference in marijuana use.

We test these hypotheses both for high school seniors (12th grade) and also for younger adolescents in 10th and 8th grade. Analysis of three grades allows us to examine the robustness of the study results because each grade was sampled independently. It also allows us to consider whether the changing disparity is more consistent with a "cohort" effect that started in younger grades and worked its way to older ages as the younger group aged or, instead, a "historical period" effect that affected adolescents of all ages at the same time.

## Background

Until recent years black 12th grade students stood out as having distinctly low levels of marijuana use. Dating back to at least 1975 past-year marijuana use levels were lower for black as compared to non-black 12th grade students in each and every year for three decades. Throughout this period white adolescents had the highest level of marijuana use and black adolescents the lowest, with Hispanics in between. This relative ordering remained the same as overall levels of marijuana use waxed and waned from highs in the late 1970s, lows in the early 1990s, and a gradual rebound thereafter. During the 30-year streak, prevalence of past-year marijuana use was about ten percentage points lower for black as compared to white 12th graders, the groups with the widest difference (Johnston, O'Malley, et al., 2018). This difference has gradually narrowed over the past decade, and by 2014 past-year marijuana use was actually slightly higher for black as compared to white 12th graders at 35.9% v. 35.1% (this difference was not statistically significant). In the following years marijuana prevalence levels for black and white 12th graders have been similar, with the highest level periodically alternating between the two groups. In 2017 marijuana prevalence across the two groups differed by only 1% (36% and 37% for blacks and whites, respectively, and the difference was not statistically significant). This narrowing difference over the past decade appears in multiple, nationally-representative studies including Monitoring the Future (Johnston, et al., 2017), the National Youth Risk Behavior Survey (Johnson, et al., 2015), as well as the National Survey on Drug Use and Health (Center for Behavioral Health Statistics and Quality, 2017; Wu, Woody, Yang, Pan, & Blazer, 2011).

One possible hypothesis for why this disparity narrowed and disappeared points to a role for adolescent cigarette smoking. Youth who smoke cigarettes are substantially more likely to smoke marijuana (Miech, Johnston, & O'Malley, 2017). According to the "gateway" hypothesis cigarette use can lead to marijuana use through processes such as exposure to drug-using peer networks (Kosterman, Hawkins, Guo, Catalano, & Abbott, 2000) and the "priming" of the brain's reward system for substance use (Kandel & Kandel, 2014).

According to the "liability" hypothesis, cigarette smoking can be a marker for an individual's heightened proclivity for substance use in general, including marijuana use. Both of these hypotheses predict that population changes in cigarette use would lead to direct, concomitant changes in marijuana use. Consequently, any narrowing in levels of cigarette smoking across black and non-black adolescents in recent years would be expected to narrow their relative levels of marijuana use, be it through either "gateway" or "liability" processes.

Consistent with this hypothesis, the gap in adolescent cigarette smoking across black and non-black adolescents has narrowed considerably in recent years. Smoking levels have traditionally been lowest for black adolescents, and relatively steeper falls in smoking levels among whites and Hispanics have narrowed this gap. For example, among 12th grade students the gap reduced in size by half from 2006 to 2017 for black-white and black-Hispanic cigarette smoking in the past 30 days (Johnston, O'Malley, et al., 2018). Similar declines were also present in 10th and 8th grade (Johnston, O'Malley, et al., 2018). To the extent that cigarette use is tightly linked with marijuana use this narrowing in the cigarette use gap across black and non-black students will reduce the gap in marijuana use, although whether the reduction in the marijuana gap is small or large requires empirical investigation.

A second possible hypothesis for why this disparity narrowed and then disappeared points to a role for religiosity, a factor commonly used to explain lower levels of substance use across for black adolescents (Wallace Jr, et al., 2007). Religiosity is higher for black as compared to non-black adolescents, as indicated by higher levels of attendance at religious services and higher levels of self-reported importance of religion in their lives (Wallace Jr, et al., 2007). These factors strongly predict lower levels of adolescent substance use (Cotton, Zebracki, Rosenthal, Tsevat, & Drotar, 2006; Dew, et al., 2008; Hill, Burdette, Weiss, & Chitwood, 2009), through mechanisms such as social and institutional ties (Regnerus, 2003; Smith, 2003; Wallace Jr, et al., 2007). Any decline in the higher levels of religiosity for black as compared to non-black adolescents would be expected to narrow the black/non-black gap in marijuana use.

Trends in religiosity are consistent with this hypothesis. The relatively higher levels of both religious attendance as well as self-reported importance of religion for black v. non-black 12th graders have grown smaller in recent years, at least for black as compared to white adolescents. Specifically, the percentage of black as compared to white 12th graders who attended religious services at least once a week and who consider religion to be very important in their lives was about 20% smaller in 2012 as compared to 2006 (2012 was the last year reported, trend data not available for Hispanics) (Child Trends, 2014). This relative reduction in the protective effect of religiosity for black as compared to white adolescents, which is the largest U.S. racial/ethnic group, could potentially account for the convergence in the black/non-black gap in adolescent marijuana use.

We test these two hypotheses both for high school seniors and also for younger adolescents in 10th and 8th grade. The analyses of the younger adolescents provide an opportunity to test the robustness of the study findings by examining if they replicate on the independently-drawn random sample of 10th grade students, as well as the independently-drawn sample of

8th grade students. In addition, analyses of the younger adolescents provide the opportunity to consider if the narrowing disparity is more consistent with a "cohort" effect that started in younger grades and then worked its way to older ages as the affected youth aged, or, instead, a "historical period" effect that affected adolescents of all ages simultaneously. We *a priori* expect a cohort effect, to the extent that population changes in adolescent cigarette smoking and religious beliefs/behaviors often start with younger cohorts and then work their way to older ages over time (Miech, Johnston, O'Malley, et al., 2017; Schwadel, 2010).

In sum:

> **Hypothesis 1**: The recent convergence in the black/non-black gap in adolescent marijuana use resulted from a parallel convergence in cigarette smoking. Taking into account trends in cigarette smoking will account for the black/non-black gap in marijuana use.

> **Hypothesis 2**: The recent convergence in the black/non-black gap in adolescent marijuana use resulted from a parallel convergence in religiosity. Taking into account trends in religious attendance and trends in self-reported importance of religion will account for the black/non-black gap in marijuana use.

> **Hypothesis 3**: Changes in the black/non-black differences in adolescent marijuana use will also be apparent in 10th and 8th grade. Consistent with a cohort process, these changes will precede changes amongst high school seniors by two to four years in 10th and 8th grade, respectively.

Analyses control for sex and socioeconomic status, as measured by parental education, to isolate the effect of race from associated demographic factors.

## METHODS

### Data

Data come from the annual Monitoring the Future study, which uses self-administered questionnaires in school classrooms to survey U.S. students. The project has been approved by the University of Michigan Institutional Review Board. Independent nationally-representative, cross-sectional samples of 8th, 10th, and 12th grade students were surveyed each year from 1991 to 2017. Student response rates averaged 90%, 87%, and 83% in 8th, 10th, and 12th grades, respectively. The great majority of non-response is due to student absence. For a detailed description of the survey methodology see Bachman et al. (Bachman, Johnston, O'Malley, Schulenberg, & Miech, 2015).

The sample size of this study's analytic sample that focuses on the years 2008 to 2017 is 114,552 in 12th grade, 123,594 in 10th grade, and 136,741 in 8th grade. In order to make the study models directly comparable to each other all results in this study exclude responses from the state of California, where MTF did not ask questions about religion due to California state policy.

Tables 1 and 2 list all variables used in the analysis, their definitions, response categories, and their proportions/means.

## Analysis

The analyses use serial, cross-sectional data to examine changes in marijuana prevalence for black as compared to non-black adolescents from 2008 to 2017, the time period when prevalence levels of these two groups converged among 12th grade students. The analyses center on relative risk ratios. To estimate the risk ratio the study's initial model uses a generalized linear model with a binomial distribution for the residuals and a log link function in the analysis of the black/non-black trends. This initial model estimates the size of the overall increase in marijuana use for black as compared to white adolescents from 2008 to 2017 and does not control any of the potential explanatory factors. Subsequent models examine how the size of this overall increase changes when taking into account the explanatory factors of cigarette smoking and religiosity. These analyses are estimated using Cox proportional hazards regression with a follow-up time set to one and the Breslow method to break ties. This Cox method produces results almost exactly the same as a general linearized model with a binomial distribution and log link (Barros & Hirakata, 2003); an advantage of the Cox method is that we find it more likely to converge to an identified solution than the algorithm for the generalized linear model.

The analysis uses multiple imputation to handle missing data and uses the chained equations algorithm (Raghunathan, Lepkowski, Van Hoewyk, & Solenberger, 2001) with 20 imputed data sets in Stata MP 12 (StataCorp, 2011). The multiple imputation uses all data, and the final analyses exclude cases with imputed values for the main variable of marijuana use in the last 12 months (4% or less in all grades). All variables in the analysis have item-specific missing values of 5% or less, except for parental education which has missing value of 13% or less. All analyses use STATA "svy:" commands to take into account sample weights, as well as clustering of respondents in primary sampling units.

## Results

Figure 1 shows trends in the use of marijuana from 1991 to 2017 for 12th, 10th, and 8th grade students. A central finding across all three grades is an increase in marijuana prevalence for black relative to non-black adolescents over the past ten years. The top panel for 12th grade students shows that as a result of the relative increase by 2012 there was no consistent difference in marijuana use between the two groups. The convergence is indicated in the observed data by lower levels of marijuana prevalence levels for black as compared to non-black 12th graders in every year from 1991 to the late 2000s, and then levels that are similar in the following years.

The middle panel for 10th grade students shows that as a result of the relative increase black adolescents began for the first time to have higher levels of marijuana use than non-black adolescents in 2011 and afterwards. The higher levels for black as compared to non-black adolescents are a reversal of the relative difference in the earlier years. The bottom panel for 8th grade students shows that as a result of the relative increase marijuana prevalence has consistently been higher for black as compared to non-black adolescents since about 2009. In all previous years there was little difference in levels of marijuana use in 8th grade.

Table 3 presents formal models of the trends highlighted in Figure 3 over the last decade, separately by grade. Model 1 tests whether past-year marijuana prevalence increased for black relative to non-black adolescents from 2008 to 2017 net of the study controls. The relative increase is statistically significant, as indicated by the statistically significant interaction term of black and Year of Survey for all three grades in the first row of estimates. Model 2 tests the extent to which the relative increase attenuates when taking into account cigarette smoking. In all grades the relative increase attenuates by at least half and is no longer statistically significant when cigarette smoking is included in the model. Model 3 tests the extent to which the relative increase attenuates when taking into account attendance at religious services and religious importance. In all three grades the relative increase remained virtually unchanged, and remained statistically significant.

The analysis also considered models that included more detailed controls for race and ethnicity (models not shown). They included indicator variables for Hispanic and "other" race (consisting of Asian American, American Indian, Alaska Native, Native Hawaiian, and other Pacific Islander), as well as multiplicative interactions of these indicator variables with year of survey. In these models the interactions of black with year of survey acted in the same way as they did in the Table 3 models: The interactions were statistically significant in the baseline model, reduced by at least 50% and were not statistically significant in the model that controlled cigarette smoking, and remained statistically significant and little changed in models that controlled religious attendance and importance.

Analysis of three grades allows consideration of whether a cohort or historical period effect best describes the relative increase in marijuana use for black as compared to non-black adolescents (the topic of Hypothesis 3). As indicated in Figure 1, the first year that marijuana prevalence was higher for black as compared to non-black 12th graders appeared two years after it did for 10th graders, which in turn occurred two years after it did for 8th graders in 2009. This follows the classic pattern of a cohort effect that arrived at the upper grades after first starting years earlier in the younger ones.

## Discussion

In the past decade marijuana use increased faster for black as compared to non-black students in 12th, 10th, and 8th grade, and this study set out to test two potential explanations for this trend. The results support cigarette smoking as a major factor in this relative increase, as predicted in hypothesis 1, because the increase diminished by more than half and was not statistically significant when cigarette smoking was taken into account in the model. In contrast, the results do not support religiosity as a major factor in this relative increase, as predicted in hypothesis 2, because including religious attendance and religious importance in the model had little influence on the increase. These findings are robust across all three grades, which were each sampled independently.

The study results support the recent increase in black as compared to non-black adolescent marijuana use as an unexpected consequence of the great decline in adolescent cigarette smoking. Starting in the mid-1990s adolescent cigarette smoking began a long, precipitous decline that has resulted today in a reduction of past 30-day smoking from peak levels by

74%, 84%, and 91% in grades 12, 10, and 8, respectively. (Johnston, Miech, et al., 2018) This decline occurred slower for black adolescents, thereby reducing a disparity that had advantaged black youth. In all three grades black youth were about four times less likely to smoke than non-black youth in the mid-1990s, and by 2017 this advantage had halved (Johnston, et al., 2017). As a consequence, the study results indicate, marijuana use increased for black as compared to non-black adolescents.

When interpreting the results it is important to keep in mind that marijuana use has increased substantially over the past decade among adolescents who both do and do not smoke cigarettes (Miech, Johnston, & O'Malley, 2017). Consequently, levels of adolescent marijuana use have not declined to the same degree seen for cigarettes, masking somewhat the connection between population-level changes in cigarette and marijuana prevalence for black and non-black adolescents.

We expect that marijuana use is just one of many health outcomes affected by the narrowing of the black/non-black difference in adolescent cigarette smoking. Smoking harms nearly every organ of the body and increases the chances of cardiovascular disease, as well as cancer of the lung, bladder, blood, cervix, colon, rectum, esophagus, kidney, ureter, larynx, liver, oropharynx, pancreas, stomach, trachea, and bronchus (US Department of Health and Human Services, 2004). Some of these health outcomes have a long dormancy period, and the influence of the relative increase in smoking for black as compared to non-black adolescents on these outcomes may take decades to become apparent. This study serves notice for these changing disparities yet to come.

The results point to a cohort effect, as predicted in Hypothesis 3. Per the pattern of a cohort process, the relative increase first appears in 8th grade, and then two years later in 10th grade, and then another two years later in 12th grade in 2013. In the upper two grades the increase is somewhat smaller than the increase among the 8th grade students. We suspect that elevated levels of dropout among high school students who smoke cigarettes (McCaffrey, Liccardo Pacula, Han, & Ellickson, 2010) attenuated the magnitude of the increase in the upper grades. Taken as whole, these results point to the importance of the early grades as a formative time when lasting health behaviors develop, and consequently a key target period for interventions and policies aimed at improving population health.

Religiosity remains a strong and important predictor of marijuana use for all adolescents, even though it did not explain the increase in marijuana use for black as compared to non-black adolescents over the past decade. Youth who regularly attended religious services and considered religion very important in their lives were less than half as likely to use marijuana as their peers, in all grades.

These results contribute in two ways to the general literature that focuses on changes in health disparities across all outcomes over historical time. First, to our knowledge this is the first study to draw explicit attention to the emergence of the racial disparity in cigarette smoking in 8th grade. This study thereby contributes a new case study to test hypotheses about the general factors that cause disparities to emerge. Second, this study provides additional evidence to support the meta-hypothesis that a major source of disparities is,

ironically, public health advances: disparities can and do emerge as a result of an advantaged group adopting a health-related behavior faster than a disadvantaged group (Link, 2008). Specifically, the results indicate that the relatively quicker decline of cigarette smoking among non-black as compared to black adolescents was a major cause of the shifting disparity in marijuana prevalence to the disadvantage of black adolescents. This meta-hypothesis conceptualizes health disparities as a statue, to the extent that both are defined by a process in which the end product is defined and shaped more by the pieces that have been removed than by the pieces remaining. This conceptualization highlights the importance of obstacles that prevent health advances from reaching disadvantaged groups at the same rate as they do for advantaged ones.

We note one caveat and two limitations. An important caveat is that the specific year that marks the start of changes in the distribution of marijuana use for black and non-black adolescents may vary by grade level. The study evidence for a cohort effect suggests that the starting year for the changing distribution is staggered by grade. It may be strategic for future analyses focusing on a specific grade to use an analysis pool that begins a few years later than the 2008 used in this study, which was a common cutoff to make results comparable across grades and likely led to conservative estimates.

One study limitation is that California schools are not included in the analyses. Monitoring the Future did not ask questions about religion in California per the state's policy, and we therefore excluded California so that the analysis pool was the same for all models and the results directly comparable. We believe these results are likely generalizable to California as well, but if not they are still generalizable to the great majority of the United States.

A second study limitation is that high school dropouts are not included in the data. Different levels of dropout for black and non-black student could potentially influence the study results in the upper grades where dropout occurs. Dropouts are unlikely to affect the substantive conclusions of this study because the results identify a trend that began in 8th grade, well before youth are allowed to drop out of school and therefore before high school dropout could potentially confound the emergence of the cohort effect.

## Conclusion

These results support the increase in marijuana use for black relative to non-black adolescents in the past decade as an unexpected consequence of the great decline in adolescent cigarette smoking. Black as compared to non-black adolescents developed relatively higher levels of marijuana use in large part because of their relatively slower decline in cigarette smoking. These results highlight the importance of continuing efforts to reduce cigarette smoking among youth, particularly among younger cohorts, which carry with them lasting changes in health behaviors as they age. Concerted efforts are needed to identify and address the obstacles that have slowed progress in the reduction of cigarette use for black adolescents.

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This paper asks why the marijuana use among black adolescents has increased and reached the levels of marijuana use among white adolescents in the past decade. Building on the existing literature is posits as two explanations (a) trends in black-white levels of cigarette smoking over the past decade, and (b) trends in black-white levels of religiosity over the past decade. The empirical analysis strongly supports the first potential explanation and shows that (1) cigarette smoking has declined slower for black as compared to white adolescents, and (2) this differential rate of decline in cigarette smoking explains a substantial portion of black-white trends in marijuana use.
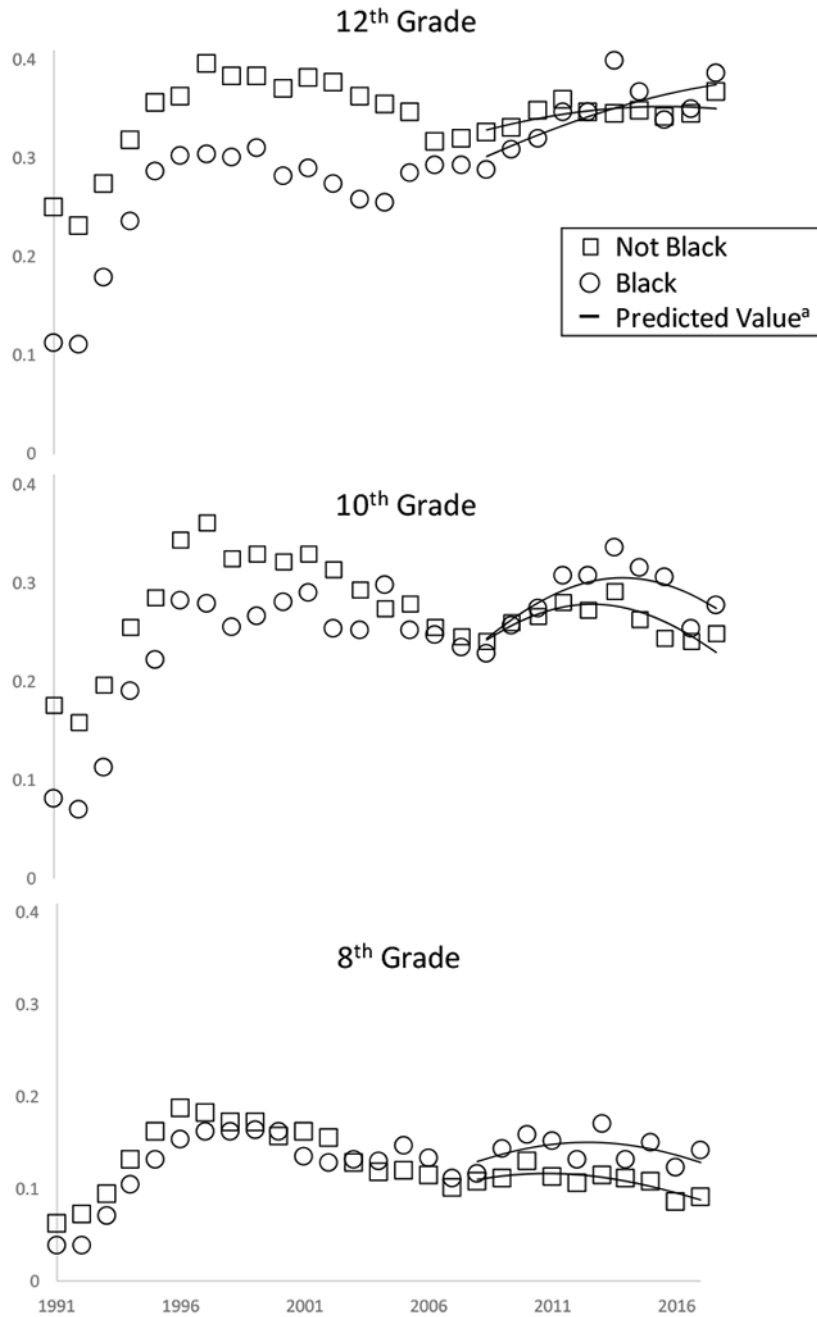
**Figure 1: Annual Marijuana Prevalence for Black and Non-Black Adolescents, by Grade and Year; Observed and Predicted Values**

[a]Predicted value line for black respondents is the one with the highest values in 2017 and other line is for non-black respondents, in all grades. Predicted values calculated for analysis pool of years 2008-2017 from a generalized linear model using a binomial distribution and a log link, with the predictors of Black, Year of Survey, the multiplicative interaction of these two variables and year of survey squared (to take into account in curvature in the trend lines).

**Table 1:**

Text of Questions Used in the Analysis

| Question Topic | Question Text and Coding |
|---|---|
| Used marijuana in past 12 months | Coded 1 for students who checked a response of one or more to the question "On how many occasions (if any) have you used marijuana (weed, pot) or hashish (hash, hash oil) during the last 12 months?" |
| Smoked cigarette in past 30 days | Coded 1 for students who checked a response of "less than one cigarette a day" or more to the question "How frequently have you smoked cigarettes in the past 30 days? |
| Smoke cigarette in lifetime, more than once or twice | Coded 1 for students who checked a response of "Occasionally but not regularly," "Regularly in the past," or "Regularly now," and coded 0 for responses of "Never" or "Once or twice." |
| Regularly attends religious services | Coded 1 for students who checked the response "About once a week or more" to the question "How often do you attend religious services?" and coded 0 for responses of "Once or twice a month," "rarely," or "never." |
| Religion very important | Coded 1 for students who checked the response "Very important" to the question "How important is religion in your life" and coded 0 for responses of "Pretty important," "A little important," and "Not important." |
| Black | Coded 1 for students who checked the response "Black or African American" in response to the question "How do you describe yourself? (Select one or more responses)" and 0 otherwise |
| Not Black | Coded 1 for respondents who did not mark the response "Black or African American" in response to the question "How do you describe yourself? (Select one or more responses)" and 0 for students who did. |
| Year of survey | Year of survey, centered at 2008 |
| (Year of survey)$^2$ | Square of (Year of survey)$^a$ |
| At least one parent has college degree | Coded 1 for students who checked the responses of "completed college" or "graduate or professional school after college" to the question "What is the highest level of schooling your father completed?" or to the question "What is the highest level of schooling your mother completed?" |
| Female | Coded 1 for students who checked the response "Female" to the question "What is your sex?" |

[a] Included in the model to take into account any curvature in the trend lines.

**Table 2:**

Proportions and Means for Analytic Sample by Grade, 2008-2017 (Standard Errors in Parentheses)

| | 12th grade | 10th grade | 8th grade |
|---|---|---|---|
| **Sample Size** | **114,552** | **123,594** | **136,741** |
| Used marijuana in past 12 months | 0.345 (0.004) | 0.264 (0.004) | 0.114 (0.003) |
| Smoked cigarette in past 30 days | 0.164 (0.003) | 0.100 (0.003) | 0.049 (0.002) |
| Smoked cigarette in lifetime more than once or twice | 0.206 (0.004) | 0.125 (0.003) | 0.057 (0.002) |
| Regularly attends religious services | 0.294 (0.006) | 0.330 (0.005) | 0.392 (0.005) |
| Religion very important | 0.274 (0.005) | 0.260 (0.004) | 0.307 (0.005) |
| Black | 0.167 (0.008) | 0.168 (0.009) | 0.188 (0.009) |
| Not black | 0.833 (0.008) | 0.832 (0.009) | 0.812 (0.009) |
| Year of survey (centered at 2008) | 4.308 (0.125) | 4.448 (0.131) | 4.477 (0.121) |
| (Year of survey)$^2$ | 26.766 (1.155) | 28.087 (1.213) | 28.375 (1.145) |
| At least one parent has college degree | 0.526 (0.007) | 0.588 (0.008) | 0.590 (0.007) |
| Female | 0.512 (0.004) | 0.509 (0.003) | 0.510 (0.003) |

Note: See Table 1 for definition and coding of variables.

**Table 3:**

Marijuana in the Past Year as a Measure of Race, Year, and Potential Explanatory Factors, 2008-2017; Risk Ratios from Multivariable Regressions (Standard Errors in Parentheses)

| | 12th grade | | | 10th grade | | | 8th grade | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sample size** | n=114,552 | | | n=123,594 | | | n=136,741 | | |
| **Variables** | Model 1 | Model 2 | Model 3 | Model 1 | Model 2 | Model 3 | Model 1 | Model 2 | Model 3 |
| **Measure of Increase For Black v. Non-Black Adolescents** | | | | | | | | | |
| (Black) *(Year of Survey) | 1.0165 *(0.007) | 1.0060 (0.007) | 1.0143 *(0.006) | 1.0191 *(0.008) | 1.0091 (0.007) | 1.0189 *(0.008) | 1.0264 *(0.011) | 1.0123 (0.011) | 1.0226 *(0.011) |
| **Candidate Explanatory Factors** | | | | | | | | | |
| *Cigarette Smoking* | | | | | | | | | |
| Smoked cigarette in past 30 days | | 1.468 **(0.015) | | | 1.627 **(0.017) | | | 2.802 **(0.037) | |
| Smoked cigarette in lifetime | | 2.231 **(0.018) | | | 2.750 **(0.021) | | | 3.675 **(0.04) | |
| *Religiosity* | | | | | | | | | |
| Regularly attends religious services | | | 0.629 **(0.019) | | | 0.699 **(0.017) | | | 0.679 **(0.023) |
| Religion very important | | | 0.673 **(0.02) | | | 0.633 **(0.021) | | | 0.628 **(0.03) |
| **Controls** | | | | | | | | | |
| *Race/Ethnicity* | | | | | | | | | |
| Black | 0.923 *(0.037) | 1.152 **(0.036) | 1.034 (0.033) | 0.991 (0.045) | 1.201 **(0.04) | 1.081 (0.042) | 1.138 *(0.054) | 1.372 **(0.047) | 1.244 **(0.054) |
| Not Black | reference category | | | | | | | | |
| Year of survey (centered at 2008) | 1.020 (0.015) | 1.030 *(0.014) | 1.022 (0.012) | 1.069 **(0.017) | 1.075 **(0.016) | 1.061 **(0.016) | 1.049 *(0.024) | 1.069 **(0.022) | 1.050 *(0.023) |
| (Year of survey)$^2$ | 0.999 (0.002) | 1.000 (0.002) | 0.998 (0.001) | 0.992 **(0.002) | 0.995 **(0.002) | 0.993 **(0.002) | 0.992 **(0.003) | 0.994 *(0.002) | 0.992 **(0.003) |
| At least one parent has college degree | 0.936 **(0.014) | 0.993 (0.013) | 0.987 (0.013) | 0.788 **(0.017) | 0.900 **(0.014) | 0.824 **(0.016) | 0.565 **(0.024) | 0.685 **(0.022) | 0.599 **(0.024) |
| Female | 0.844 **(0.012) | 0.899 **(0.011) | 0.876 **(0.012) | 0.876 **(0.014) | 0.907 **(0.013) | 0.906 **(0.014) | 0.852 **(0.022) | 0.859 **(0.019) | 0.878 **(0.022) |

*
$p < .05$;

**
$p < .01$