Person-Context Congruence, Drug Attitudes, and Early Adolescent Substance Use

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Abstract

Background: Adolescent substance use is a national health concern. While the literature is clear on the prevalence of substance use during the adolescent developmental period, a dearth of literature is available on the developmental contexts, particularly the influence of school factors, in which substance use occurs.

Objectives: The current study examined the intermediary role of substance use attitudes on the relationship between school racial composition and alcohol and marijuana use in a sample of 6th–8th graders.

Methods: The sample consisted of 4,228 middle school students (89% White; 53% female) in the Midwest. A moderated mediation analysis was conducted on the relationship between school racial composition, substance use attitudes, and substance use, with race as the moderator.

Results: Results indicated a significant relationship between the percentage of White or Black students in a school and alcohol or marijuana use and that this relationship was mediated by substance use attitudes. These relationships did not differ significantly by student race.

Conclusions/Importance: Preliminary findings indicate the importance of considering school racial composition as a systems level risk or promotive factor for attitudes towards substance use as well as substance use outcomes.

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Keywords

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Person-Environment Fit, Substance Use Attitudes, and Early Adolescent Substance Use

Adolescent substance use is associated with numerous social and behavioral health consequences across development (Johnston, O'Malley, Bachman, & Schulenberg, 2012). Although rates of substance use among adolescents have declined in recent years, use still remains high despite prevention efforts. Alcohol, for example, is consistently one of the most frequently abused substances by teens (Levy et al., 2014) with approximately 26% of adolescents reporting ever having consumed alcohol by 8th grade, increasing to 64% by twelfth grade (Johnston et al., 2015). Marijuana use is also a concern with national data indicating that by 8th grade 15.5% of youth have tried marijuana, rising to 45%, by twelfth grade (Johnston et al., 2015).

While the literature is clear on the prevalence of substance use during the adolescent developmental period, a dearth of literature is available on the developmental contexts in which substance use occurs. There is evidence to support the negative impact an adolescent's social environment can have on substance use vulnerability. For example, interactions with peers who engage in delinquent or substance-using behaviors (Dishion & Skagg, 2000) and peer approval of substance use (Donovan & Molina, 2011) are associated with increases in adolescent substance use. Given that a majority of adolescent social interactions occur within the school context, examining the impact of the school context may also provide important information on antecedents to substance use among early adolescents. Yet, much of the current literature examining the impact of schooling on substance use outcomes focuses more on academic performance and school bonding (Birckmayer et al, 2004), with far less attention examining contextual factors such as person-environment fit.

One factor that contributes to person-environment fit is school racial composition. Broadly speaking, research indicates that school racial composition influences adolescent substance use (Hill & Mrug, 2015; O'Malley, Johnston, Bachman, Schulenberg, & Kumar, 2006), but has not examined how school racial composition impacts students of different racial backgrounds and the mechanisms through which school racial composition impacts substance use. One potential mechanism is through the influence on substance use attitudes. The purpose of the present study is to examine the indirect relationship of person-environment fit on substance use through substance use attitudes.

School Racial Composition, Race, and Substance Use

Substance use can be influenced by a myriad of factors. According to Bronfenbrenner (1979), individuals are situated within various levels of context. The bioecological theory, which focuses on person-environment interactions (Bronfenbrenner, 1979) posits that the match, or lack thereof, between an individual and their environment, has an impact on

development (Shinn & Rapkin, 2000). Furthermore, research indicates that schools in which the majority of the student body is Black have the lowest substance use rates, while schools in which White students are the majority have the highest drinking rates (O'Malley et al., 2006). Other researchers have found that higher proportions of ethnic minority students in a school were related to alcohol, marijuana and combined substance use, particularly for students in middle school (Hill & Mrug, 2015). While these findings provide insight on the impact of racial composition by examining the impact of percentages of majority racial groups in schools on substance use outcomes, they fail to provide insight as to how the racial composition of the school context could influence individuals within that context differently given their personal characteristics. Literature in other areas of adolescent development has proven that it is imperative to examine the interaction between school racial composition and student characteristics, as significant differences have been found on outcomes of student achievement, socioemotional adjustment, and problem behaviors (O'Malley et al., 2006). These findings suggest that the ethnic match between an individual and their school context is an important variable to consider when investigating adolescent outcomes.

Race, Substance Use, and Attitudes

One mechanism through which school racial composition can inform substance use is through the transmission of ideals, values, and attitudes. It is well documented in the literature, that one's attitudes towards the harmfulness of a substance is significantly related to their amount of use (Johnston, O'Malley, Bachman, & Schulenberg, 2011). Furthermore, primary socialization theory posits that:

> Normative and deviant behavior are learned social behaviors, products of the interaction of social, psychological, and cultural characteristics, and that norms for social behaviors, including substance use are learned predominately in the context of interactions with the primary socialization sources" (Oetting & Donnermeyer, 1998, p.995)

Researchers have long documented differences in both substance use and substance use attitudes between Black and White adolescents; finding higher rates and earlier initiation of marijuana use, and use at school among minority youth (Kosterman, Hawkins, Guo, Catalano, & Abbott, 2000; Goncy & Mrug, 2013; Johnston et al., 2015; Wu, Swartz, Brady, & Hoyle, 2015) and significantly higher levels of alcohol use among White youth (Johnston, O'Malley, Bachman, & Schulenberg, 2010; SAMHSA, 2014).

The reasons behind these racial differences in alcohol use have been attributed to social norms and attitudes regarding use within the larger cultural community, such as more conservative norms regarding the "wrongness" of alcohol use and greater punishment for alcohol use found among Black communities in comparison to White communities (Stern & Wiens, 2009; Zapolski, Pedersen, McCarthy, & Smith, 2014). It has also been suggested for alcohol use, that the more conservative norms and attitudes are a byproduct of historical trauma regarding alcohol use among Blacks post-slavery in the United States, as well as greater religiosity found among Black communities (Wallace, Brown, Bachman, & Laveist, 2003; Zapolski, Pedersen, McCarthy, & Smith, 2014). However, these norms do not appear to extend to marijuana use, as stronger peer disapproval for marijuana use have been found

for White youth in comparison to Black youth (Wu et al., 2015). It is currently unclear why Black communities may have different norms or attitudes regarding marijuana use compared to alcohol use, although it may be influenced by neighborhood variables (e.g., Green et al., 2016), suggesting that there may be contextual factors within Black communities that result in more permissive marijuana attitudes and norms in comparison to White communities. Moreover, we believe these drug attitudes regarding both alcohol and marijuana use extend within the school context and warrants empirical investigation.

Current Study

Given that early initiation of substance use is associated with a myriad of negative consequences (Johnston et al., 2012), understanding mechanisms of substance use for early adolescents is critical for prevention efforts. While there is much literature on person-environment interactions on academic or other mental health outcomes (Eccles et al., 1993; Roeser, Eccles, & Sameroff, 2000), there is a gap in the literature investigating the impact of the school racial composition on substance use (Benner & Wang, 2015), mechanisms underlying this relationship, and whether this relationship differs based on student characteristics. The purpose of the present study was to fill these important gaps by investigating the indirect relationship between person-environment fit, substance use attitudes, and substance use.

Using primary socialization theory as a framework, we conceptualized school racial composition in two ways: the percentage of Black students in a school and percentage of White students in a school, as the percentage of each racial group, can differentially impact substance use risk. Given evidence of differing rates of both substance use attitudes and use based on race, and the impact social settings can have on the development of substance use attitudes (Oetting & Donnermeyer, 1998), we hypothesize that school racial composition (i.e., percentage of Black or White students in a school) would be directly related to alcohol and marijuana use, and this relationship would work indirectly through substance use attitudes. Specifically, we hypothesize that the greater the percentage of White students would be associated with higher alcohol use and the higher percentage of Black students would be associated with higher marijuana use. Moreover, this relationship would work indirectly through substance use attitudes, such that percent White and percent Black would be associated with viewing alcohol and marijuana as less harmful (respectively), which would increase the impact of attitudes towards substances on substance use. Lastly, we examined person-environment fit and hypothesized that student race would moderate the relationship between school racial composition (percent White and percent Black) and substance use attitudes, such that having a higher percentage of White students would increase risk for alcohol attitudes and use for both races, but the effect would be stronger for Black students, as it is anticipated that they feel more pressure to conform to social norms than White students given their minority status within the setting. Similarly, having a higher percentage of Black students would increase risk marijuana use for both races, but the effect would be stronger for White students, as it is anticipated that they would also feel more pressure to conform to social norms given their numerical minority status.

Method

Participants and Procedures

The current study involves participants drawn from a larger 5-wave parent study examining school and health behavior outcomes among students between fourth and twelfth grade (see Barnes, Almerigi & Hsu, 2009, for further information about the parent study). Retention rates for waves 2 through 5 were modest with approximately half of the participants (45.3%) completing more than one wave of data. Given high rates of attrition, lack of school level data for years three through five, and that school diversity was only assessed at year two, only year two of the dataset was used for the current study. Participants were sampled from 159 schools in a large Midwestern county through a partnership with a local university. All students in the schools in the participating county were provided with informed consent forms. Forms were sent home to parents, and parents were asked to return signed forms back to the school if they wished to provide consent. Participants were 4,228 students in the 6th-8th grades from a large county in the Midwest. The sample was 53% female and 89% White (n = 3743; Black n = 485). The number of participants from each grade was commensurate (6th grade = 30%, 7th grade = 35%, 8th grade =35%).

Measures

Family Mobility.—Family mobility was included in the analyses as a covariate due to its known relationship with socioeconomic status as well as adolescent substance use (Buu et al., 2009; Jelleyman & Spencer, 2008). Family mobility was measured with one item that asked, "How many times have you moved into another home or apartment in the past year." Students chose from a 5-point Likert scale from 0 (*no times*) to 4 (*4 for more times*).

School Enjoyment.—Enjoyment of school is strongly tied to substance use behaviors (Fletcher, Bonnell, & Hargreaves, 2008), so to control for this fact, it was included in our analyses as a covariate. School enjoyment was measured by a six-item measure. Sample items included: "I enjoy learning new things at my school," "I feel like I am a part of my school," and "I like my school." Students indicated their enjoyment of school on a Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). This measure showed high internal consistency (α = .794).

Religious Involvement.—Religious involvement was included in the data analyses due to research indicating that those who endorse higher levels of religiosity exhibit lower substance use behaviors (Hill, Burdette, Weiss, & Chitwood, 2009). Religious involvement was measured by one item that asked students "During the past year how often did you participate in religious youth groups?" Students answered on a 5-point Likert scale from 1(*never*) to 5 (*every day or almost every day*).

School Racial Composition.—The racial composition of each school was determined by archival data from the National Center for Educational Statistics (NCES) Common Core of Data. The variable was created by using the percentage of White or Black students in a school. This form of measurement allows for the identification of the largest samples of racial groups in schools. Additional control variables were also gleaned from the NCES

Common Core of Data to include the percentage of American Indian, Asian American, and Latino students within each school.

Marijuana and Alcohol Use Attitudes.—The marijuana and alcohol use attitude measures were adapted from items included in various national studies conducted among youth (e.g., Monitoring the Future, Youth Risk Behavior Surveillance Survey; YRBSS). Participants were asked to indicate how harmful they thought it was to "use marijuana" or to "drink alcohol occasionally" on a three-point Likert scale ranging from 1 (*very bad for you*) to 3 (*not very bad for you*), with higher scores indicative of viewing the substance as less harmful. These scales have demonstrated utility with diverse populations (Zapolski, Fisher, Banks, Hensel, & Barnes-Najor, 2016)

Marijuana, Alcohol, and Polydrug use.—Participants were asked to indicate "How many days in the past 30 days did you smoke marijuana" and "How many days in the past 30 days did you have at least one drink of alcohol." Responses were provided on a 7-point Likert scale, with 1 (0-days), 2 (1 or 2 days), 3 (3–5 days), 4 (6–9 days), 5 (10–19 days), 6 (20–29 days) and 7 (everyday). Single-item measures of substance use have demonstrated utility with diverse populations (Chung et al., 2012; Fisher, Zapolski, Sheehan, & Barnes-Najor, 2017). The Polydrug use variable, included as a control, was created by adding the responses to the substance use questions including other drugs such as inhalants and other drugs (i.e., Cocaine, ecstasy, LSD). This variable was then dichotomized to indicate 1 for the use of 2 or more substances or 0 for 1 substance or less.

Data Analyses

To examine the first hypotheses that substance use attitudes differed by race, a one-way ANOVA was conducted using alcohol attitudes and marijuana attitudes as the outcome and race as the factor. The effects of race on marijuana use attitudes and past 30-day substance use were examined using a path modeling approach. As these data were multilevel – that is students (Level 1) were nested within schools (Level 2), we explored the use of a multilevel model. Interclass Correlation Coefficients, however, indicated no significant effect of school on the variables of interest (ICC =.023 - .027), therefore all analyses were conducted at the individual level. All analyses were performed using SPSS 24.0. Demographic variables (i.e., grade, gender), as well as factors known to influence substance use (i.e., family mobility, enjoyment of school, religious involvement, and polydrug use), were included as covariates in our analysis.

To examine the study hypotheses, simple mediation and moderated-mediation analyses were performed using the PROCESS macro (Model 4: simple mediation; Model 7: moderated mediation, specified by Hayes, 2013). The PROCESS macro estimates the total and direct effect of the independent variable on the dependent variable, and the direct effect of the independent variable on the mediator, the mediator on the dependent variable. The PROCESS macro also estimates the indirect effect of the independent variable on the dependent variable through the mediator and conditional indirect effect of the predictor on the outcome variable at each value of the moderator. It uses bootstrapping to generate bias-corrected confidence intervals for the indirect effect and various indices of effect size for the

indirect effect (Hayes, 2013). For all mediation analyses in the current study, we used 10,000 bootstrap samples. Only participants who provided complete data were included in the current study, thus no imputation of missing data was required.

Results

Descriptive Statistics

Descriptive statistics are presented in Table 1. Prior to conducting the path modeling, a correlation matrix was constructed to assess the association between the study variables. Because gender is dichotomous, correlations between these two variables are point-biseral coefficients; correlations with grade are Spearman correlations and Pearson correlations for all remaining variables (Table 2).

Racial Differences in Substance Use Attitudes

A one-way ANOVA was conducted to determine if alcohol and marijuana attitudes differed by student race. The results indicated that White students viewed alcohol as less harmful (p<.001), while Black students (p<.001) viewed marijuana as less harmful than White students.

Path Models

To test our first hypothesis examining the relationship between percent Black and percent White and substance use and its indirect effect through substance use attitudes, a simple mediation analysis was conducted (Model 4; Hayes, 2013). To determine if the effects of the percentage of White or Black students on substance use attitudes or substance use differed by race (hypothesis 2), Model 7 (moderated mediation model) of PROCESS was examined (Hayes, 2013). Gender, grade, family mobility (a proxy for SES), religious involvement, school enjoyment, polydrug use and percentages of non-Black minority students (e.g., American Indian, Latino, Asian American) were controlled for within the path models.

Alcohol Use

Percentage of White Students and Alcohol Use.—After accounting for the control variables, higher percentages of White students within a school was predictive of less harmful views of alcohol (b = .0020, p<.05), with a non-significant moderating effect of race (b = .0018, *ns*). Additionally, although percentage of White students within a school was not directly predictive of alcohol use (b = .0007, *ns*), a significant indirect effect was found between percentage White and alcohol use with alcohol use attitudes (b = .0003, CI .0001 to .0005). This indirect effect was not moderated by race (b=.0003, CI −.0002 to .0008). See Table 3 for detailed results of the path models for percentage of White students on alcohol use outcomes.

Percentage of Black Students and Alcohol Use.—After accounting for the control variables, students in schools with higher percentages of Black students was significantly related to more harmful views of alcohol (b=−.0021, p<.01; see Table 4), however the direct relationship between the percentage of Black students in schools and alcohol use was non-significant (b = −.0007, *ns*). Race was significant, with White students viewing alcohol as

less harmful than their Black counterparts (b=−.1711, p<.001). The interaction between race and the percentage of Black students in a school was not significant (b = −.0018, *ns*). Further, family mobility, religious involvement, school enjoyment, percentage of Asian American students, and polydrug use were all significantly related to alcohol use (see Table 4). A significant indirect effect was found between the percentage of Black students in a school, attitudes towards alcohol and alcohol use (b = −.0003, CI −.0005 to −.0001). The moderated mediation analysis found that the indirect effect of percentage of Black students on alcohol use through alcohol attitudes by race was not significantly different for Black and White students (CI −.0019 to −.0002).

Marijuana Use

Percentage of White Students and Marijuana Use.—Schools with higher percentages of White students viewed marijuana as more harmful (b=−.0021, p<.05; see Table 5). Students in schools with higher percentages of White students reported also reported less marijuana use (b = −.0018, *p* <.01). As expected, less harmful attitudes towards marijuana was significantly related to higher levels of marijuana use (b =.3361, *p*<.001). The mediation model examining the indirect effect of percentage of White students on marijuana use attitudes and marijuana use attitudes on substance use was significant (b = −.0006, CI −.0012 to −.0003). This relationship did not differ by student race (b=.0001, CI −.0008 to .0012). See Table 5 for detailed results of the path model.

Percentage of Black Students and Marijuana Use.—Students in schools with higher percentages of Black students viewed marijuana as less harmful (b=.0021, p<.05; see Table 6). Analyses also revealed that students in schools with higher percentages of Black students, report higher rates of marijuana use (b = .0011, *p* <.05). Students were also more likely to use if they moved more frequently (b=.0825, p<.001) or reported higher levels of polydrug use (b=1.131, p<.001). The mediation model examining the indirect effect of percentage of Black students on marijuana use attitudes and marijuana use attitudes on substance use was significant (b = −.0006, CI .0002 to .0012), but did not differ by student race (b= −.0001, CI −.0013 to .0009).

Discussion

The purpose of the current study was to examine the relationship between school racial composition and substance use outcomes, as to date, limited research has been conducted on understanding the impact of this contextual factor on youth substance use behaviors. Moreover, to our knowledge, no study has examined the moderating effect of student characteristics within the context of school racial composition on substance use outcomes. The current study sought to fill these gaps by examining the indirect effect of substance use attitudes on the relationship between school racial composition and substance use, and whether this effect was moderated by student race.

Results of the analyses revealed several interesting findings. The first was that mediation effects were found for both schools with higher percentages of White and Black students, alcohol and marijuana attitudes, and alcohol and marijuana use respectively. Specifically, students in schools with higher percentages of White students had less harmful views of

alcohol, and higher levels of alcohol use. Similarly, students in schools with higher percentages of Black students had less harmful views of marijuana and higher reported levels of marijuana use. This finding is significant as it provides a mechanism through which school racial composition influences student substance use behavior. Previous research has noted the relationship between school racial composition and substance use but had not yet elucidated how this relationship operated (Hill & Mrug, 2015; O'Malley et al., 2006). The present study provides evidence that the relationship between school racial composition and substance use behavior operates in part through the transmission of cultural norms related to attitudes towards substance use. This aligns with primary socialization theory which asserts that deviant behavior, such as substance use, is a learned social behavior that occurs through the transmission of cultural norms for behavior (Oetting & Donnermeyer, 1998).

The second significant finding was that the relationship between school racial composition, substance use attitudes, and substance use was not moderated by student race. This finding is contrary to our original hypotheses which asserted that students who were in schools with higher percentages of another race that was not their own, with different norms related to substance use, would feel more pressure to conform to social norms within the school environment (Monahan, Rhew, Hawkins, & Brown 2014). This, however, was not found to be true. Thus, in the present study Black and White students alike, regardless of the school racial composition were similarly impacted by the social norms related to substance use. Reliance on peers for social cues and norms is a trademark of the adolescent developmental period (Glynn, 1981). Given that the current sample of students was in middle school (6th-8th grade), they are making the transition from relying on parents for information to relying on peers (Kandel, 1996). Youth during this stage are more open to other substance use perspectives, overestimate peer use of substances and have lower refusal strength (Hemovich, Lac, & Crano, 2011). The results of the present study suggest that youth this this developmental stage, regardless of person-environment fit, are similarly vulnerable to the influence of peers.

Limitations

While the current study adds to the literature by examining the intersectionality of school racial composition and student race on substance use outcomes, several limitations should be noted. First, data were collected in a small geographic region of the United States and are not generalizable to the US as a whole. Second, school racial composition was used in the study as a proxy for peer interactions and school norms and did not directly assess these factors. However, we posit that school racial composition is an appropriate proxy, as a recent study by Su and Supple (2016) found that school racial composition moderated the effect of peer substance use on adolescent substance use, suggesting a direct link between school racial composition, peer interactions, and subsequent adolescent substance use. Moreover, the use of a school racial composition variable also has clinical relevance, as it allows for the identification of school-level correlates of risk, potentially making it easier to address risk factors without having to administer student level measures. Future research should examine the cross-racial friendship development of students in culturally dissonant settings and its relationship to substance use outcomes. Third, the present study only focused on race as a potential moderator in the relationship between school racial composition and substance use

attitudes; other potential moderators (e.g., depression, school engagement, bullying) should be examined. Lastly, although the current study is drawn from a 5-wave parent study, attrition across waves of data collection was high, which restricted our ability to examine prospective relationships across study variables. Thus, the current study examined the relationship between the variables of interest in a cross-sectional sample. While there are noted limitations to the investigation of indirect effects in cross-sectional data (Maxwell, 2007), other scholars cite the acceptance of such methods (Hayes, 2013).

Despite the noted limitations, the current study is significant, as there is limited existing research examining the impact of school racial composition on substance use. Moreover, among the limited literature available on the topic, none, to our knowledge, examined the moderating effect of individual student characteristics on substance use risk (Hill & Mrug, 2015; O'Malley et al., 2006). Our findings suggest that racial composition of the school is important to consider when investigating substance use attitudes and use, but that this process does not vary significantly based on the student's race. Thus, school administrators and personnel should consider the racial makeup of their schools when assessing risk for substance use behavior. For example, administrators of schools with higher percentages of White students should be aware of the permissive cultural norms around alcohol use and the impact of these norms on attitudes towards alcohol and alcohol use within their building. This information can then be used to inform social influence models of substance use prevention. The social influence approach to substance use prevention focuses on preventing direct or indirect social influence/pressure to use substances (Cuijpers, 2002). A meta-analysis conducted by Tobler and colleagues (2000) found social influence interventions to be the most effective method of prevention. It accomplishes this goal by focusing on norms such as knowledge of social prevalence, social acceptability, normative expectations, and substance use intentions. Thus, administrators with knowledge of the relationship between the ethnic makeup of their school and specific substance use attitudes and use can use this information to target specific drug attitudes. For example, administrators in schools with higher percentages of White students can be explicit about the social prevalence of alcohol use and normative expectations within those settings and the desire for adolescents to conform to the attitudes and beliefs of the majority. Identifying students most at risk to be influenced by norms around substance use can inform prevention and intervention efforts lessening the deleterious impact of adolescent substance use on psychological and educational outcomes.

Acknowledgments

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Table 1.

Descriptive Statistics

	White		Black	
	Mean	**SD**	**Mean**	**SD**
Alcohol Use	1.24	.77	1.24	.75
Marijuana Use	1.11	.68	1.20	.83
Alcohol Attitudes	1.64	.73	1.43	.67
Marijuana Attitudes	1.17	.49	1.24	.54
Family Mobility	.42	.81	.77	1.03
Religious Involvement	1.88	1.33	1.82	1.33
School Enjoyment	2.86	.622	2.88	.55
Polydrug use	.074	.261	.091	.288

Table 2.

Correlation Coefficients

	Sex	Race	Grade	Social Mobility	Religious Involvement	School Enjoy-ment	% White	% Black	% Amer. Ind.	% Latino	% Asian Amer.	Polydrug	Alcohol Use	Marijuana Use	Alcohol Beliefs	Marijuana Beliefs
Sex	-	.025	-.008	-.005	.085**	.143**	.006	.000	-.037**	-.042**	-.008	.003	.002	.014	-.021	-.044**
Race		-	.089**	.123**	-.010	.001	-.345**	.318**	-.004	-.127**	-.085**	.019	-.003	.058**	-.090**	.058**
Grade			-	-.020	.047**	-.114**	-.035**	.076**	-.093**	-.051**	-.015	.139**	.126**	.076**	.143**	.111**
Family Mobility				-	-.032*	-.057**	-.049**	.042**	.019	.003	-.006	.117**	.097**	.098**	-.020	.081**
Religious Involvement					-	.106**	.052**	-.042**	-.054**	-.056**	.036**	-.025	-.016	-.025	-.007	-.032*
School Enjoyment						-	-.015	.008	-.002	-.026*	.034**	-.197**	-.178**	-.156**	-.128**	-.207**
% White							-	-.875**	-.160**	-.115**	-.124**	-.035**	-.019	-.046**	.023	.062**
% Black								-	.032**	-.010	.180**	.040**	.025	.043**	-.005	.055**
% Amer Ind									-	.600**	-.326**	.025	.025	-.006	-.087**	-.0013
% Latino										-	-.449**	.030*	.037**	.011	-.040**	-.012
% Asian American											-	-.038**	-.031*	-.046**	.074**	.004
Polydrug												-	.914**	.511**	.296**	.419**
Alcohol Use													-	.432**	.303**	.372**
Marijuana Use														-	.153**	.459**
Alcohol Beliefs															-	.348**
Marijuana Beliefs																-

Notes: Gender: male = 0; female = 1; Race: White = 0; Black = 1

*
p < .05

**
p < .01

Table 3.

Percentage of White students and Alcohol Use

Direct Effects

Predictors		Alcohol attitudes				Alcohol use		
		coeff	se	p		coeff	se	p
% White	a¹	.0020	.0008	.0103	c'	.0007	.0005	.1793
Race	a²	−.3036	.1378	.0276				
% White * Race	a³	.0018	.0018	.3116				
Alcohol attitudes					b	.1463	.0124	.0000
Sex		−.0056	.0217	.7977		.0089	.0172	.6041
Grade		.1094	.0137	.0000		.0057	.0109	.5999
Family Mobility		−.0259	.0132	.0501		.0685	.0104	.0000
Religious Involvement		−.0065	.0082	.4234		.0159	.0065	.0142
School Enjoyment		−.1143	.0184	.0000		−.0636	.0146	.0000
% American Indian		−.0038	.0088	.6665		−.0038	.0059	.5234
% Latino		−.0190	.0112	.0918		.0014	.0086	.8669
% Asian American		.0358	.0098	.0003		−.0128	.0067	.0558
Polydrug Use		.6450	.0424	.0000		1.875	.0346	.0000

Indirect Effects

	b	se	LL	UL
%W →AA→AU	.0003	.0001	.0001	.0005
%W x race →AA→AU	.0003	.0003	−.0002	.0008
White	.0000	.0001	−.0002	.0005
Black	.0004	.0002	.0001	.0007

Note. Confidence Intervals are stated at 95%. Sex, grade, social mobility, religious involvement, and school enjoyment were included as covariates in all analyses. %W = Percentage of White students; AA = Alcohol Attitudes; AU = Alcohol Use. Race: White = 0; Black = 1. Bolded values are significant.

Table 4.

Percentage of Black students and Alcohol Use

Direct Effects

Predictors		Alcohol attitudes				Alcohol use		
		coeff	se	p		coeff	se	p
% Black	a¹	**−.0021**	**.0008**	**.0093**	c'	−.0007	.0005	.1813
Race	a²	**−.1711**	**.0458**	**.0002**				
% Black * Race	a³	−.0018	.0018	.3418				
Alcohol attitudes					b	**.1463**	**.0124**	**.0000**
Sex		−.0056	.0217	.7950		.0089	.0172	.6040
Grade		**.1095**	**.0137**	**.0000**		.0058	.0109	.5950
Family Mobility		**−.0259**	**.0132**	**.0504**		**.0684**	**.0104**	**.0000**
Religious Involvement		−.0066	.0082	.4182		**.0158**	**.0065**	**.0144**
School Enjoyment		**−.1142**	**.0184**	**.0000**		**−.0636**	**.0146**	**.0000**
% American Indian		−.0054	.0084	.5245		−.0046	.0057	.4243
% Latino		−.0198	.0112	.0773		.0008	.0088	.9239
% Asian American		**.0344**	**.0095**	**.0003**		**−.0137**	**.0068**	**.0443**
Polydrug Use		**.6451**	**.0424**	**.0000**		**1.875**	**.0346**	**.0000**

Indirect Effects

	b	se	LL	UL
%B→AA→AU	**−.0003**	**.0001**	**−.0005**	**−.0001**
%B x race→AA→AU	−.0003	.0003	−.0008	.0003
White	−.0001	.0002	−.0005	.0003
Black	**−.0004**	**.0001**	**−.0007**	**−.0001**

Note. Confidence Intervals are stated at 95%. Sex and grade were included as covariates in all analyses. %B = Percentage of Black students; AA = Alcohol Attitudes; AU = Alcohol Use. Race: White = 0; Black = 1. Bolded values are significant.

Table 5.

Percentage of White students and Marijuana Use

Direct Effects

Predictors		Marijuana Attitudes				Marijuana Use		
		coeff	se	p		coeff	se	P
% White	a¹	**-.0021**	**.0008**	**.0115**	c'	**-.0018**	**.0007**	**.0081**
Race	a²	-.0429	.0877	.6244				
% White * Race	a³	.0004	.0012	.7178				
Marijuana attitudes					b	**.3361**	**.0207**	**.0000**
Sex		-.0262	.0138	.0576		.0222	.0182	.2235
Grade		.0127	.0087	.1439		-.0206	.0114	.0724
Family Mobility		**.0234**	**.0084**	**.0053**		**.0563**	**.0110**	**.0000**
Religious Involvement		.0044	.0052	.3993		.0063	.0068	.3534
School Enjoyment		**-.1257**	**.0117**	**.0000**		-.0250	.0156	.1093
% American Indian		**-.0160**	**.0056**	**.0044**		**-.0201**	**.0063**	**.0014**
% Latino		.0110	.0072	.1231		-.0071	.0091	.4347
% Asian American		.0118	.0063	.0593		**-.0196**	**.0071**	**.0056**
Polydrug Use		**.7726**	**.0270**	**.0000**		**1.131**	**.0390**	**.0000**

Indirect Effects

	b	se	LL	UL
%W→MA→MU	**-.0006**	**.0002**	**-.0012**	**-.0003**
%W x race→MA→MU	.0001	.0005	-.0008	.0012
White	-.0007	.0004	-.0017	.0000
Black	**-.0006**	**.0003**	**-.0012**	**-.0001**

Note. Confidence Intervals are stated at 95%. Sex and grade were included as covariates in all analyses. % W = Percentage of White students; MA = Marijuana Attitudes; MU = Marijuana Use. Race: White = 0; Black = 1. Bolded values are significant.

Table 6.

Percentage of Black students and Marijuana Use

Direct Effects

Predictors			Marijuana Attitudes				Marijuana Use		
			coeff	se	p		coeff	se	P
% Black	a¹		**.0021**	**.0009**	**.0209**	c'	**.0011**	**.0006**	**.0496**
Race	a²		−.0040	.0390	.9187				
% Black * Race	a³		−.0004	.0012	.7552				
Marijuana attitudes		b					**.3361**	**.0207**	**.0000**
Sex			−.0263	.0138	.0572		.0222	.0182	.2237
Grade			.0125	.0087	.1514		−.0207	.0114	.0701
Family Mobility			**.0235**	**.0084**	**.0052**		**.0563**	**.0110**	**.0000**
Religious Involvement			.0044	.0052	.3931		.0064	.0068	.3487
School Enjoyment			**−.1251**	**.0117**	**.0000**		−.0251	.0156	.1090
% American Indian			**−.0137**	**.0054**	**.0106**		**−.0191**	**.0060**	**.0016**
% Latino			.0128	.0071	.0726		−.0061	.0093	.5124
% Asian American			**.0143**	**.0061**	**.0181**		**−.0183**	**.0072**	**.0107**
Polydrug Use			**.7727**	**.0270**	**.0000**		**1.131**	**.0390**	**.0000**

Indirect Effects

	b	se	LL	UL
%B→MA→MU	**.0006**	**.0002**	**.0002**	**.0012**
%B x race→MA→MU	−.0001	.0006	−.0013	.0009
White	.0007	.0005	−.0001	.0018
Black	**.0006**	**.0003**	**.0001**	**.0012**

Note. Confidence Intervals are stated at 95%. Sex and grade were included as covariates in all analyses. %B = Percentage of Black students; MA = Marijuana Attitudes; MU = Marijuana Use. Race: White = 0; Black = 1. Bolded values are significant.