Adolescent substance use: The role of demographic marginalization and socioemotional distress

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Abstract

We investigated the links between race/ethnic marginalization (i.e., having few same-race/ethnic peers at school) and adolescents' socioemotional distress and subsequent substance use (alcohol and marijuana) initiation and use. Data from 7,731 adolescents (52% females; 55% White, 21% African American, 16% Latino, 8% Asian American) were drawn from the National Longitudinal Study of Adolescent to Adult Health (Add Health). In our path analysis model, we found that adolescents who were racial/ethnically marginalized at school (i.e., who had less than 15% same-ethnic peers) reported poorer school attachment, which was linked to greater depressive symptoms. More depressive symptoms were associated with higher levels of subsequent marijuana and alcohol use. These relationships showed some variation by students' gender, race/ethnicity, and age. Findings suggest that the influence of school demographics extends beyond the academic domain into the health and well-being of young people.

Keywords

alcohol use; marijuana use; adolescence; depression; school attachment; school demographics

Adolescence is a time of rapid change and development, a period of heightened identity exploration in which primary socialization moves from parents to peers (Brown & Larson, 2009; Erikson, 1968). Although adolescence is not all storm and stress (Hall, 1904), this developmental period is a time when individuals may experiment with various problem behaviors, including substance use (Siegel & Scovill, 2000). Substance use issues often emerge during adolescence (King & Chassin, 2007), and adolescent substance abuse has pernicious consequences for subsequent life course outcomes, including school dropout, teen pregnancy and parenthood, obesity, hypertension, delinquency, and incarceration (D'Amico et al., 2008; Krohn et al., 1997; Oesterle et al., 2004; Rohde et al., 2001).

As a result, the etiology of adolescent substance use has been studied extensively, including its social etiology. Such research has focused on the ways in which peer group memberships, especially those in school, shape substance use (Aseltine, 1995; Cleveland & Wiebe, 2003). Less often studied is the related yet seemingly orthogonal issue of substance use arising from isolation and marginalization within schools. Here, we focus on numeric marginalization that arises from having few same-race/ethnic peers, research that could then

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inform new directions of intervention. Using data from the National Longitudinal Study of Adolescent Health (Add Health), we explored two critical research questions (see conceptual model in Figure 1) that connect substance use intervention goals to major debates in educational policy (e.g., school desegregation and diversity). First, we investigated the links between numeric race/ethnic marginalization in school and adolescents' subsequent substance use and the extent to which social isolation and distress accounted for at least part of this relation. Second, we determined whether the primary relations under study varied as a function of key individual and school demographics (i.e., student race/ethnicity, gender, and age). We focus specifically on alcohol and marijuana use, as extensive scholarship documents that these are the most commonly used illicit substances during adolescence (Johnston et al., 2013b).

Race/ethnic Marginalization and Substance Use

Schools are a primary developmental context for adolescents, and a vast array of research has examined how various school demographic characteristics, such as school size and socioeconomic composition, influence students' learning (Lee, 2001; Lee & Smith, 1997; Rothstein, 2004; Rumberger & Palardy, 2005). There also has been an ongoing focus on school racial/ethnic composition, motivated by rulings from *Brown v. Board of Education* (1954) to *Parents Involved* (2007). Much of this work centers on promoting school diversity as a means of advancing schools' educational missions, and although school diversity is generally conceptualized as a public education issue—linking more balanced racial/ethnic composition to greater learning (Benner & Crosnoe, 2011)—it represents a public health issue as well, as diversity is not without its challenges, particularly in relation to young people's socioemotional well-being (Eitle & Eitle, 2004; Goldsmith, 2004).

Thus, numeric race/ethnic marginalization can serve as a potential challenge to well-being. Because diversity is higher when there are more groups represented and when groups are more equally distributed, this means the representation of a given group has a much more limited upper-bound; as such, numeric representation is more constrained in more diverse educational contexts (Budescu & Budescu, 2011). Prior research suggests that having a critical mass of same-race/ethnic peers is critical for reaping the advantages of both diversity and same-race/ethnic representation (Benner & Crosnoe, 2011), and prior reviews suggest that 15% same-race/ethnic representation is likely the lower end of the critical mass threshold (Linn & Welner, 2007).

Feelings of marginalization tied to numeric race/ethnic representation could lead to not only socioemotional struggles but engagement in risky behaviors as well. Recent scholarship has found that the risk for drug and alcohol use and related offenses is higher in suburban schools and schools with fewer minority and low-income students (Boticello, 2009; Eitle & Eitle, 2004; O'Malley et al., 2006). We seek to extend this work by examining the possible repercussions of the racial/ethnic match (or mismatch) between students and their schools for students' substance use initiation and level of use.

This work is motivated by bioecological theory and its attention to person-context interactions (Bronfenbrenner, 1979). Matches (or mismatches) between individuals and their

environments can shape individual development and explain variations in the association between school contexts and young people's outcomes (Elder, 1985; Shinn & Rapkin, 2000). Scholars investigating developmental domains such as academic performance and socioemotional well-being observe that the racial/ethnic match (Benner & Graham, 2007, 2009) and SES match (Crosnoe, 2009) between students and schoolmates are critical components for promoting adolescents' developmental competencies, pointing to both advantages and disadvantages of major efforts to desegregate schools.

Socioemotional Distress as a Mediating Mechanism

The desire to fit in and form close interpersonal relationships is a fundamental human need (Baumeister & Leary, 1995). For adolescents, schools are settings of social relations in which student functioning is, in part, dependent on one's place within this system of relations (Johnson, Crosnoe, & Elder, 2001), and a lack of school attachment signals a loss of social connections (Libbey, 2004). For the current study, we focus on students' perceptions of school belonging. Ample evidence suggests that the demographic composition of social contexts is a basic dimension on which young people base their sense of belonging in that context (Aboud et al., 2003; Graham & Cohen, 1997), and youth feel more accepted and report greater school belonging when they have more same race/ethnic peers in their schools (Benner & Graham, 2011; Postmes & Branscombe, 2002). Likewise, numerous studies observe associations between perceptions of fit and adolescent substance use—those who feel more connected to their schools report delayed initiation and lower frequency of alcohol and marijuana use (Boticello, 2009; Catalano et al., 2004; Resnick et al., 1997).

Although feelings of misfit may be the more common response to race/ethnic marginalization, particularly during adolescence when fitting in is of particular import (Crosnoe, 2011), such marginalization may engender other types of emotional distress as well. Drawing on neighborhood composition research, findings suggest that residential segregation is linked to greater depressive symptoms in adults (Lee, 2009; Ludwig et al., 2012). Whether race/ethnic marginalization exerts similar effects during adolescence remains an unknown, and it may be that the effects of marginalization on depressive symptoms may be more indirect. In the current study, we hypothesize just such indirect effects, as the evidence suggests direct links between marginalization and feelings of fit, and the extant literature focused on adolescence finds that school belonging is linked to depressive symptoms and negative affect (Anderman, 2002; Newman et al., 2007; Shochet et al., 2011). In turn, depressive symptoms are often positively linked to substance use (Clark et al., 2011; King et al., 2004; Maslowsky et al., 2013), which is typically explained by the self-medication hypothesis (i.e., socioemotional struggles drive individuals to self-medicate with alcohol or illicit drugs to escape psychological pain or discomfort; Khantzian, 1997). The current study bridges these extant research bases by comprehensively examining how race/ethnic marginalization at school initiates distressing feelings of misfit that, in turn, may contribute to depression and adolescents' subsequent substance use as a form of coping.

Variation in Model Relationships by Student and School Characteristics

Bioecological theory asserts that a person's position in society influences access to and interactions within proximal developmental contexts and the interpersonal relationships therein (Bronfenbrenner & Morris, 1998). Thus, when considering individual development, characteristics such as race/ethnicity and gender are markers of key social positions, and the current study examines the moderating role of each. Prior research has found mean-level differences in the primary constructs of interest. Some findings are quite consistent, such as those favoring girls for greater school attachment but boys for fewer depressive symptoms (Anderman, 2002; Nolen-Hoeksema & Girgus, 1994), but other findings are more equivocal, such as those for race/ethnic and gender differences in substance use (Chen & Jacobson, 2012; Johnston et al., 2013a). In addition, the school diversity literature suggests that the effects of race/ethnic diversity and same-ethnic representation vary by race/ethnicity (Benner & Crosnoe, 2011). We extend this research by examining whether the relationships between marginalization, socioemotional well-being, and substance use vary for boys versus girls or for students of different race/ethnic groups. Additionally, given the age-graded effects of substance use, in terms of who has the opportunity to engage in substance use (Swendsen et al., 2012), and the variations in long-term outcomes tied to age of initiation documented in the developmental psychopathology literature (Grant & Dawson, 1997; King & Chassin, 2007), we also investigated whether the central relations of interest varied across student age.

The Current Study

We rely on longitudinal data from Add Health data to investigate two primary research questions. First, to what extent is the link between race/ethnic marginalization and substance use explained, at least in part, by adolescents' socioemotional distress. We hypothesize that race/ethnic marginalization is associated with poorer feelings of school attachment, that in turn, are related to greater depressive symptoms, and this socioemotional distress then contributes to greater alcohol and marijuana use and substance use initiation. Second, we examine possible variation in the relations under study by student race/ethnicity, gender, or grade level/age.

Method

Data

Data were drawn from the Add Health study, a longitudinal, nationally representative sample of seventh to twelfth graders in 1994–95. Add Health used a multistage, stratified, school-based cluster design. Almost all students ($N = 90{,}118$) in the selected schools responded to an In-School survey, and a nationally representative sample was selected for in-home interviews at Wave I, with a subsequent follow-up one year later (Wave II). For the current study, we selected 7,731 participants who were in one of four main racial/ethnic groups (i.e., Latino, African American, Asian American, White) and who attended the same school in Waves I and II. Compared to the excluded students ($N = 7{,}619$ in total), students in our analytic sample were more likely to be White (χ^2 (1) = 64.6, $p < .001$), younger (t (15,299) = −25.9, $p < .001$), live with both biological parents (χ^2 (1) = 182.9, $p < .001$), and

have parents with higher education (χ^2 (1) = 72.1, $p < .001$); they were also more likely to be in schools in the midwest (χ^2 (1) = 50.8, $p < .001$) and northeast (χ^2 (1) = 18.2, $p < .001$) and in rural areas (χ^2 (1) = 95.4, $p < .001$), and in schools serving either high school grades only (χ^2 (1) = 8.2, $p < .01$) or mixed grade levels (χ^2 (1) = 193.1, $p < .001$).

The final analysis sample is diverse in terms of gender (52% females) and race/ethnicity (55% White, 21% African American, 16% Latino, 8% Asian American). The 131 schools in our sample were diverse in sector (public versus private), grade span, geographic location, and urbanicity. Demographic information for students and schools is displayed in Table 1.

Measures

Descriptive statistics and bivariate correlations for study constructs are displayed in Table 2.

Peer race/ethnic marginalization—A dichotomous peer race/ethnic marginalization variable was created using In-School survey data. First, we used student self-reports to identify individual race/ethnicity as White, African American, Latino, Asian American, or other. Students who selected multiple racial/ethnic groups were further asked to choose a group with which they were most identified. Second, we aggregated data from all students within each school and constructed five variables to represent the proportion of each race/ethnic group in each school. Third, we determined the percentage of peers in a school who did *not* share the same race/ethnicity for each student by matching individual race/ethnicity to school proportions of all other race/ethnicities. On average, students had 41% (*SD* = 29) peers at school who were *not* from their race/ethnic group (26% for White, 58% for African American, 53% for Latino, 77% for Asian American). Finally, we created a dichotomous variable to identify each student's marginalization status (1 = *marginalized*, i.e., having more than 85% of peers at school from *other* race/ethnic groups; 0 = *not marginalized*). Overall, the sample included 10% (*N* = 741) marginalized students.

Socioemotional distress—At Wave I, students reported their school attachment and depressive symptoms. School attachment was assessed by the mean of three items (e.g., "You feel close to people at school;" Johnson, Crosnoe, & Elder, 2001; Moody, 2001) on a 5-point scale ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). Items were coded such that higher scores denoted greater school attachment (*a* = .77). The depressive symptom measure was adapted from the Center for Epidemiological Studies Depression Scale (CES-D; Radloff & Locke, 1986). Students rated how often they experienced 15 depressive symptoms (e.g., "You were bothered by things that usually don't bother you") from 0 (*never or rarely*) to 3 (*most or all of the time*). Scores were summed to create the depressive symptoms composite (*a* = .86).

Substance use—Data on two measures of substance use, marijuana use and alcohol use, were collected at Waves I and II. Students answered three items regarding marijuana use (i.e., "How old were you when you tried marijuana for the first time?" "During your life, how many times have you used marijuana?" "During the past 30 days, how many times did you use marijuana?"). They reported two items on alcohol use (i.e., "Have you had a drink

of beer, wine, or liquor more than 2 or 3 times in your life?" "During the past 12 months, on how many days did you drink alcohol?").

We employed two approaches to determine substance use. First, we created continuous variables of substance use at each wave that takes into account both lifetime use and more temporary use based on prior Add Health conventions (Resnick et al., 1997). Marijuana was coded from 0 (*never tried in life time*) to 6 (*more than three times in life time and more than five times in the past 30 days*). Alcohol use was similarly coded from 0 (*never had a drink in life time or in the past year*) to 6 (*every day or almost every day in the past year*). Second, we created categorical variables to capture alcohol and marijuana use initiation between Waves I and II. Based on students' substance use at both waves, we determined whether each student never used (i.e., 0 at both waves), initiated (i.e., changed from 0 at Wave I to 1 or higher at Wave II), or used at both waves (i.e., greater than zero at Waves I and II).

Covariates—We controlled for a variety of student, family, and school characteristics in all analyses. Students reported their gender, race/ethnicity, nativity status (1 = *both parents born in U.S.,* 0 = *at least one parent born outside U.S.*), age, and whether they had repeated a grade (1 = *yes*, 0 = *no*) at Wave I. Students' cognitive ability was measured at Wave I by age-standardized scores on the Picture Vocabulary Test (PVT). For family characteristics, students reported family structure (1 = *living with both biological parents*, 0 = *other family structure*) and parent education (1 = *less than high school*, 4 = *four-year college graduates or higher*) at Wave I. Because of the heritability component of substance use (Walters, 2002), we included parent reports of their own alcohol use (1 = *never*, 6 = *nearly every day*) at Wave I. For school characteristics, school administrators reported school sector (private, public), size, school location (west, Midwest, northeast, south), urbanicity (urban, suburban, rural), and grade span (middle school, high school, combination middle and high school grades) at Wave I. We also controlled for two indicators of alcohol use. One indicator was schoolwide alcohol use, aggregating individual responses to the drinking item described above from the In-School Survey to the school level, as prior research has shown that schoolwide norms around alcohol are linked to adolescents' substance use (Crosnoe et al., 2012). A second indicator of peer alcohol use was close friends' alcohol use, which was created by linking each student's nomination of their five closest friends to these friends' reports of the drinking item described above from the In-School wave.

Analysis Plan

We conducted path analyses in a structural equation modeling (SEM) framework to test our conceptual model (see Figure 1). We first tested mediation models to examine the relations among race/ethnic marginalization, school attachment, depressive symptoms, and substance use (i.e., marijuana use and initiation, alcohol use and initiation). Direct and indirect effects were estimated simultaneously using maximum likelihood estimation with robust standard errors (MLR). In the initiation models, substance use indicators were binary with students who initiated substance use as the reference group, and logistic regressions were used to estimate all paths linked to these outcomes. In all models, both school attachment and depressive symptoms were correlated with the Wave I substance use measures. Standard errors of all indirect effects were estimated using the delta method (Muthén, 2011).

Our second set of models examined whether the relations under study varied by student gender, race/ethnicity, or age/grade level. Using multiple group analyses, we estimated a baseline model with all paths freely estimated across groups followed by a fully constrained model (i.e., all paths constrained to be equal across groups). If the fully-constrained model fit the data significantly worse than the baseline model, we introduced constraints on individual paths. Satorra-Bentler scaled chi-square tests were used to provide adjusted estimations due to the use of MLR estimators (Satorra & Bentler, 2001). When a negative chi-square test statistic was produced (Satorra & Bentler, 2010), we conducted Wald chi-square tests of parameter constraints to estimate the increased chi-square value by constraining a path to be equal across groups (Muthén & Muthén, 1998–2012). For race/ethnic differences, we omitted Asian American students due to sample size issues.

All analyses were conducted in Mplus 7.3 (Muthén & Muthén, 1998–2014). Mplus handles missing data with the full-information maximum likelyhood (FIML), one of the preferred methods to deal with missing data, as it allows for generalizing study findings to the population (Enders, 2011). Mplus handled the dependency in our data (i.e., students nested in schools) by estimating robust standard errors with the Cluster command.

Results

The Mediating Role of Socioemotional Distress

We first examined whether socioemotional distress mediated the relationship between race/ethnic marginalization and substance use. Estimations of direct effects for the four models are displayed in Figures 2a, 2b, 3a, and 3b. The relationships between peer race/ethnic marginalization, adolescents' school attachment, and their depressive symptoms were identical across the four models. Adolescents who were racial/ethnically marginalized at school reported significantly poorer school attachment; poorer school attachment, in turn, was associated with more depressive symptoms. Peer race/ethnic marginalization was not directly related to depressive symptoms but was indirectly associated with depressive symptoms via its effects on school attachment. More depressive symptoms were linked to higher levels of subsequent marijuana and alcohol use, net all covariates and Wave I substance use. School attachment was not directly related to later substance use (see Figures 2a and 3a) but did exert indirect effects via its effect on depressive symptoms. These models explained a considerable amount of variance in the continuous substance use outcomes (r^2 = .39 for marijuana use and .32 for alcohol use).

Shifting to links between socioemotional distress and substance use initiation, as displayed in Figures 2b and 3b, depressive symptoms were consistently linked to substance initiation. Adolescents with more depressive symptoms were more likely to initiate than abstain from marijuana and alcohol use at Waves I and II; they were also more likely to initiate than to consistently use alcohol or marijuana across the two data collection waves. Similarly, those adolescents with poorer school attachment were more likely to initiate marijuana use than to abstain across Waves I and II and to consistently use marijuana across the two waves than to initiate use. Table 3 presents all indirect effects for the path analysis models.

The Moderating Role of Student Characteristics

We next examined whether the relations among race/ethnic marginalization, socioemotional distress, and substance use varied by student gender or race/ethnicity. We observed significant differences by gender for the use models (χ^2 (6) = 16.32, $p < .05$ for marijuana use; χ^2 (6) = 13.38, $p < .05$ for alcohol use) and the initiation models (χ^2 (9) = 25.47, $p < .01$ and χ^2 (9) = 18.89, $p < .05$ for marijuana and alcohol initiation, respectively). Paths that differed significantly between boys and girls are displayed in the upper portion of Table 4. Although poorer school attachment was significantly related to more depressive symptoms for both boys and girls, this relation was stronger for girls than boys. Additionally, the relation between depressive symptoms and marijuana use was significant for girls but not boys, as was the relation between depressive symptoms and the likelihood of initiating versus abstaining from marijuana and alcohol use. In contrast, the negative link between school attachment and alcohol use was significant for boys but not girls.

We did not observed significant race/ethnic differences in the models for alcohol use (χ^2 (12) = 16.03, $p = .18$) or in the model for marijuana initiation (χ^2 (18) = 23.65, $p = .17$). We did, however, observed significant race/ethnic differences in the model for marijuana use (χ^2 (12) = 22.79, $p < .05$) and in the model for alcohol initiation (χ^2 (18) = 32.55, $p < .05$). As seen in the second set of results in Table 4, two paths showed significant racial/ethnic differences. Specifically, greater depressive symptoms were significantly linked to greater marijuana use for White students but not for Latino or African American students. Additionally, racial/ethnic marginalization was associated with greater likelihood of initiating marijuana use versus abstaining across waves for African American students; this relationship was not significant for Latino or White students.

Finally, we examined the moderating effects of age in our models. We introduced interaction terms between age and race/ethnic marginalization and between age and each socioemotional indicator (i.e., school attachment, depressive symptoms). As seen in the last sets of results in Table 4, two significant interaction effects emerged. Specifically, greater depressive symptoms were linked to greater likelihood of using marijuana across two waves rather than initiating for younger students but not for older students. Somewhat unexpectedly, while racial/ethnic marginalization was not significantly related with depressive symptoms, it was associated with less depressive symptoms for younger students; this relationship was not significant for older students.

Discussion

Substance use is an all too common occurrence during adolescence, and the detrimental consequences of early use and abuse can be seen across the life course (Young et al., 2002). In the current study, we investigated the intersection of school and personal demographics, seeking to understand how racial/ethnic marginalization influenced substance use and initiation. Further, we sought to establish whether the link between race/ethnic marginalization and substance use was explained by socioemotional distress (i.e., feelings of misfit at school, depressive symptoms) and whether these relationships varied by key social status markers (i.e., gender, race/ethnicity, age).

First, our results indicated that students who are at the numeric margins of their schools racially/ethnically reported poorer school attachment, which were in turn related to greater depressive symptoms. Depression was subsequently related to adolescents' substance use. These findings lend additional credence to the developmental significance of the self-medication hypothesis for adolescents, as the vast majority of existing scholarship on self-medication is based on adult samples (see reviews by Allan, 1995; Khantzian, 1997; Kushner et al., 2000). Recent work has documented a significant link between depressive symptoms and alcohol use for adolescents (Tomlinson & Brown, 2012), and the current study provides further evidence of how socioemotional distress can lead adolescents to engage in self-medication behaviors related to both alcohol and marijuana use. This is consistent with prior scholarship that suggests alcohol use seems to be less of a method for fitting in with peers, instead contributing more to social isolation (Crosnoe, Benner, & Schneider, 2012). That said, there may be alternate mechanisms by which feelings of fit might be exerting their influence on substance youth, such as promoting increased affiliations with more deviant peers, a well-established predictor of adolescent substance use (Dishion & Owen, 2002; Monahan, Steinberg, & Cauffman, 2009).

These results point to two potential entry points for substance use intervention and prevention efforts. The first is structural, suggesting that students benefit socioemotionally from having a critical mass of same-race/ethnic peers (Linn & Welner, 2007). Given current research highlighting the resegregation of American schools (Orfield & Lee, 2007) combined with other work highlighting the benefits of critical mass in racially-diverse contexts (Benner & Crosnoe, 2011), our study suggests that greater attention to racial/ethnic balance in American schools might help curb substance use and substance use initiation for some students, particularly race/ethnic minority youth. There are legal limits to demographic balancing efforts (see *Parents Involved, 2007* case), and such efforts are more difficult in smaller and rural communities where certain racial/ethnic groups simply do not have adequate representation to achieve a critical mass level. The second potential entry point relates to socioemotional distress, as our research suggests that such distress is linked to alcohol and marijuana use and initiation into these risky behaviors. Thus, efforts promoting the mental health of young people could have the added health benefit of deterring substance use. Certainly socioemotional distress is not the sole driver of adolescent substance use, as an extensive literature base highlights the social learning and social integration aspects of alcohol use in particular (Crosnoe et al., 2004; Schulenberg & Maggs, 2002), but promoting greater school attachment and fit are more manageable intervention and prevention mechanisms than changing the drinking culture of a peer group or school.

In the current study, we observed that race/ethnic marginalization represented more of a risk factor for African American students' substance use than for White students. This is consistent with previous work on socioeconomic marginalization, which found the relationship between marginalization and psychosocial problems was more pronounced among Latino and African American adolescents (Crosnoe, 2009). We suspect that race/ethnic marginalization may be less challenging for White students, who typically benefit from the status tied to their social position regardless of their numeric representation (McDermott & Samson, 2005). Further, when considered along with prior work

documenting higher rates of substance use in schools enrolling more White students (Eitle & Eitle, 2004), our findings suggest that White adolescents in contexts with fewer same-race/ ethnicity peers may be less exposed to or have fewer opportunities to engage in substance use.

Moving to the gender differences in model relationships, we observed a stronger association between depressive symptoms and substance use for girls, but a stronger link between school attachment and substance use for boys. Although prior work has identified gender-differentiated associations between psychological distress and substance use (i.e., a stronger association between depressive symptoms and substance use among girls, a stronger link between conduct disorders and substance use among boys; Latimer et al., 2002), other work observed more similarities than differences between boys and girls (e.g., Dornbusch et al., 2001; Maslowsky et al., 2013). Our findings suggest that the link between socioemotional distress and substance use look different based on how distress is conceptualized. We also observed moderate associations between distress indicators (i.e., lack of school attachment linked to more depressive symptoms) for both boys and girls, although the strength of the relationships did differ statistically. Taken as a whole, these findings suggest that it is important to target multiple indicators of socioemotional distress when intervening in boys' and girls' substance use.

Although the study makes several contributions to the adolescent substance use literature, it is not without some limitations. First, due to the design of Add Health and our research questions, the current sample is restricted to students who remained in the same school across a two-year period. We made this decision to ensure students were not exposed to other more integrated (or segregated) contexts, but this data decision had implications for the representativeness of our sample. Student mobility is strongly linked to race/ethnicity and socioeconomic status (Hanushek et al., 2004), and these differences emerged when we compared the larger Add Health sample to our analysis sample, which included more White students, younger students, and students from two-parent households. Future studies are thus needed to replicate the current findings. Such work could also explore how changing contexts, which would likely be linked to shifting race/ethnic marginalization, might affect adolescents' well-being. Although school mobility in general is linked to poorer adjustment (Mehana & Reynolds, 2004; Ou & Reynolds, 2008), to the extent to which such mobility might result in greater race/ethnic representation in a racially/ethnically diverse school context, we might observe possible benefits (or fewer negative repercussions) for these school moves.

Second, the race/ethnic composition of our sample may have affected our power to detect possible group differences. Although nationally-representative of U.S. schools in the 1994–95 school year, the Add Health sample included a majority of White students and lower representation of race/ethnic minority youth, and the representation of race/ethnic minorities was further limited by the analytic sample restrictions that we imposed. Given the current demographic composition of American schools, particularly the increases in the Latino and Asian American populations (Aud et al., 2012), future research should revisit possible differential effects of race/ethnic marginalization for adolescents' socioemotional distress and substance use with more racially/ethnically diverse (and balanced) samples. Finally,

most of the central variables of interest were drawn from self-report measures, and thus shared method variance is a potential concern. However, given that our models included temporal sequencing between mediators and outcomes and that our outcomes controlled for prior levels of substance use, there is greater evidence for the observed sequence of relations.

Substance use is a challenge for many American adolescents, and our findings suggest that experiences of race/ethnic marginalization and the subsequent distress this invokes heighten the likelihood that adolescents will initiate or engage in more frequent use of alcohol and marijuana. The findings reported here suggest possible intervention points and avenues for policy intervention as a way of addressing the pernicious effects of adolescent substance use across the life course and their potential contribution to health disparities and other forms of race/ethnic and socioeconomic inequality large-scale policies try to reduce.

Acknowledgments

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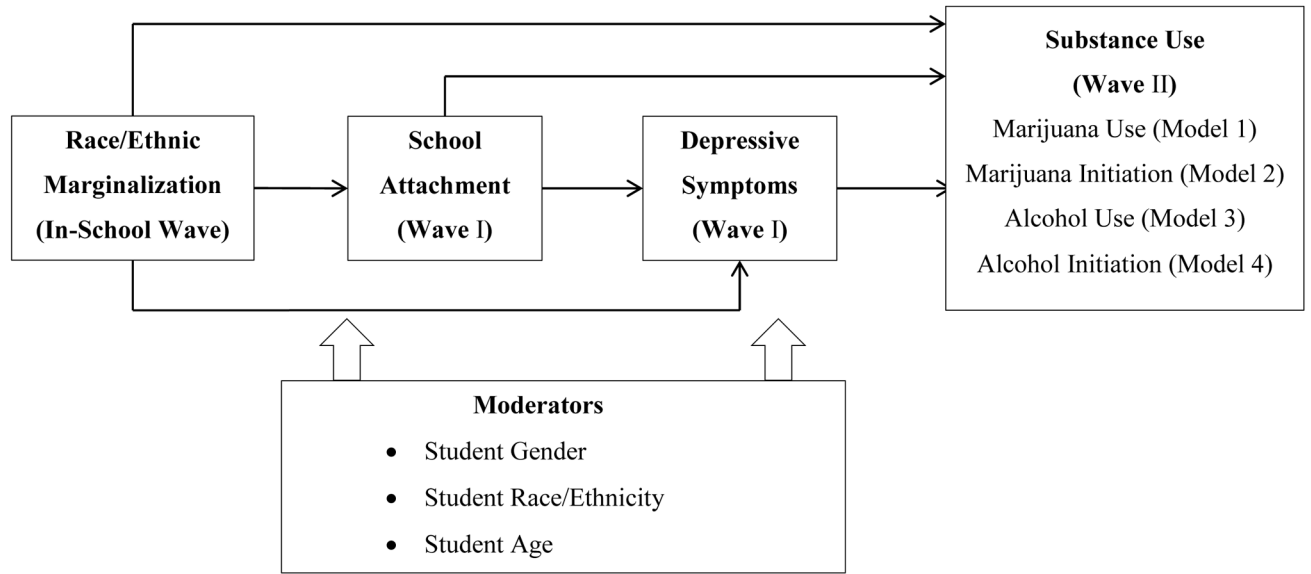**Figure 1.**
Conceptual model of relationships among race/ethnic marginalization, socioemotional distress, and substance use with student gender, race/ethnicity, and schoolwide race/ethnic diversity as moderators.
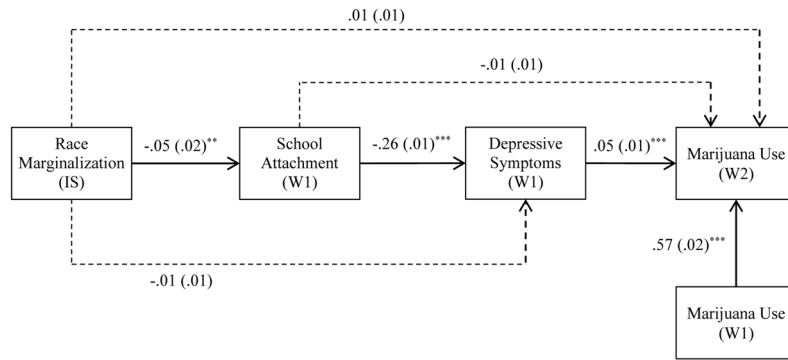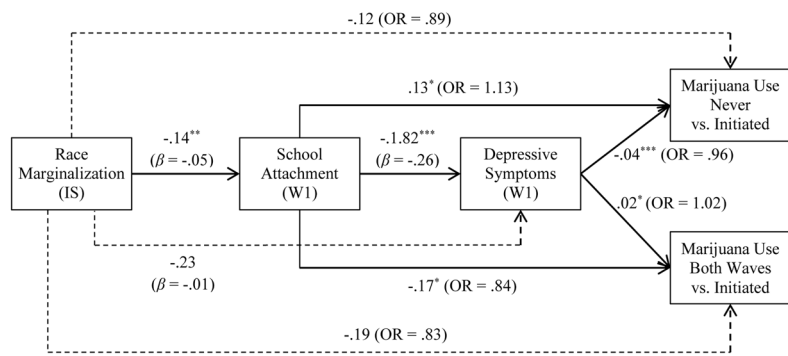
Figure 2a.

Figure 2b.

Figure 2.

Figure 2a. Standardized coefficients for model of race/ethnic marginalization, socioemotional distress, and marijuana use (χ^2 (1) = 2.79, p = .10, CFI = .999, RMSEA = .015, SRMR = .001). Dashed lines indicate nonsignificant paths. N = 7,731. *** p < .001, ** p < .01, * p < .05.

Figure 2b. Unstandardized coefficients, standardized coefficients, and odds ratios for model of race/ethnic marginalization, socioemotional distress, and marijuana initiation. Dashed lines indicate nonsignificant paths. Odds ratios or standardized coefficients are reported in parentheses following unstandardized coefficients. N = 7,731. *** p < .001, ** p < .01, * p < .05.
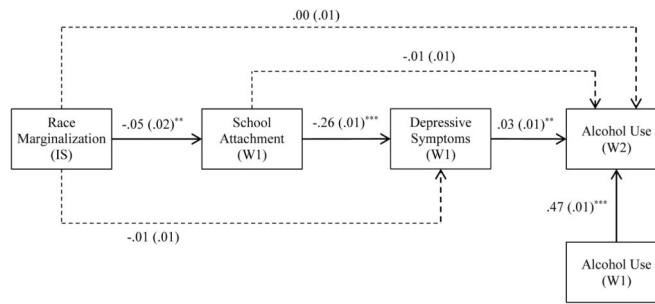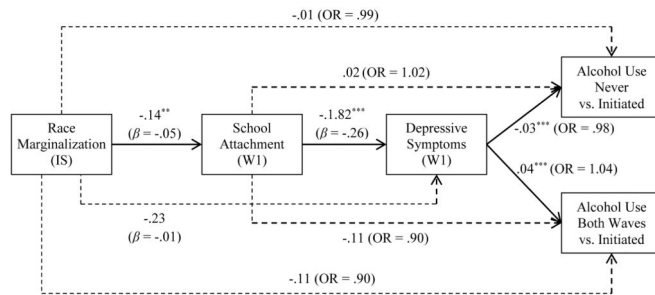
Figure 3a.

Figure 3b.

Figure 3.

Figure 3a. Standardized coefficients for model of race/ethnic marginalization, socioemotional distress, and alcohol use (χ^2 (1) = .22, p = .64, CFI = 1.000, RMSEA = .000, SRMR = .000). Dashed lines indicate nonsignificant paths. N = 7,731. *** $p < .001$, ** $p < .01$, * $p < .05$.

Figure 3b. Unstandardized coefficients, standardized coefficients, and odds ratios for model of race/ethnic marginalization, socioemotional distress, and alcohol initiation. Dashed lines indicate nonsignificant paths. Odds ratios or standardized coefficients are reported in parentheses following unstandardized coefficients. N = 7,731. *** $p < .001$, ** $p < .01$, * $p < .05$.

Table 1

Demographic Characteristics of Study Participants and their Schools

Variable	N	%	M	SD
Adolescent and Family Characteristics				
Gender	7,731			
Female	4,000	51.7		
Male	3,731	48.3		
Race/ethnicity	7,731			
White	4,245	54.8		
African American	1,639	21.2		
Latino American	1,245	16.1		
Asian American	602	7.8		
Age	7,709		14.70	1.50
Repeat Grade	7,725			
Yes	1,310	17.0		
No	6,415	83.0		
Picture Vocabulary Test scores	7,390		101.24	14.66
Generational status	7,731			
Both parents born in U.S.	5,978	77.3		
At least one parent foreign-born	1,753	22.7		
Intact family (living with both biological parents)	7,731			
living with both biological parents	4,401	56.9		
living with one or none biological parents	3,330	43.1		
Parent education	7,427		2.89	1.06
Parent alcohol use	6,822		1.95	1.15
Close friends' alcohol use	6,423		1.09	.94
School Characteristics				
School size	7,731		1206.08	819.99
School sector	7,731			
Private	601	7.8		
Public	7,130	92.2		
School location	7,731			
West	1,582	20.5		
Midwest	1,912	24.7		
South	2,928	37.9		
Northeast	1,309	16.9		
Urbanicity	7,731			
Urban	2,138	27.7		
Suburban	4,069	52.6		
Rural	1,524	19.7		
Grade span	7,731			
Middle school	1,195	15.5		

Variable	N	%	M	SD
High school	4,256	55.1		
Mixed school	2,280	29.5		
School racial diversity	7,731		.45	.20
Schoolwide alcohol use	7,731		1.16	.36

Table 2

Correlations, Means, and Standard Deviations for Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Race/Ethnic Marginalization (IS)	--										
2. School Attachment (W1)	-.05 ***	--									
3. Depressive Symptoms (W1)	.02	-.29 ***	--								
4. Marijuana Use (W2)	-.01	-.12 ***	.14 ***	--							
5. Marijuana Use (W1)	-.03 *	-.16 ***	.15 ***	.60 ***	--						
6. Alcohol Use (W2)	-.04 ***	-.08 ***	.09 ***	.44 ***	.35 ***	--					
7. Alcohol Use (W1)	-.05 ***	-.10 ***	.15 ***	.38 ***	.46 ***	.54 ***	--				
8. Marijuana Use Never	.01	.14 ***	-.16 ***	-.83 ***	-.63 ***	-.47 ***	-.43 ***	--			
9. Marijuana Use Both Waves	-.02	-.14 ***	.15 ***	.73 ***	.85 ***	.40 ***	.45 ***	-.74 ***	--		
10. Alcohol Use Never	.04 ***	.09 ***	-.13 ***	-.39 ***	-.35 ***	-.80 ***	-.63 ***	.47 ***	-.39 ***	--	
11. Alcohol Use Both Waves	-.05 ***	-.11 ***	.14 ***	.41 ***	.42 ***	.69 ***	.83 ***	-.48 ***	.45 ***	-.76 ***	--
M	.10	3.83	6.83	.71	.60	1.02	.93	.77	.14	.51	.36
SD	.31	.81	5.67	1.61	1.42	1.44	1.34	.42	.35	.50	.48

Note: IS = In-School Wave; W1 = Wave I; W2 = Wave II. Sample size ranged from 6,123 to 7,731.

[a] Correlations between the dichotomous substance use initiation variables and other study variables were point-biserial.

***
p < .001,

**
p < .01,

*
p < .05.

Table 3

Tests of Mediation for Path Analysis Models

Model	Pathway	Indirect Effects	
		β^a	SE
1	1 Marginalization → School Attachment → Depressive Symptoms → Marijuana Use	.001	(.000) *
	2 Marginalization → School Attachment → Marijuana Use	.000	(.000)
	3 Marginalization → Depressive Symptoms → Marijuana Use	−.001	(.001)
2	1 Marginalization → School Attachment → Depressive Symptoms → Marijuana Use Never vs. Initiated	−.010	(.004) *
	2 Marginalization → School Attachment → Marijuana Use Never vs. Initiated	−.017	(.009)
	3 Marginalization → Depressive Symptoms → Marijuana Use Never vs. Initiated	.010	(.009)
	4 Marginalization → School Attachment → Depressive Symptoms → Marijuana Use Both vs. Initiated	.005	(.003)
	5 Marginalization → School Attachment → Marijuana Use Both vs. Initiated	.023	(.011) *
	6 Marginalization → Depressive Symptoms → Marijuana Use Both vs. Initiated	−.005	(.006)
3	1 Marginalization → School Attachment → Depressive Symptoms → Alcohol Use	.000	(.000) *
	2 Marginalization → School Attachment → Alcohol Use	.001	(.001)
	3 Marginalization → Depressive Symptoms → Alcohol Use	.000	(.000)
4	1 Marginalization → School Attachment → Depressive Symptoms → Alcohol Use Never vs. Initiated	−.006	(.003) *
	2 Marginalization → School Attachment → Alcohol Use Never vs. Initiated	−.002	(.006)
	3 Marginalization → Depressive Symptoms → Alcohol Use Never vs. Initiated	.006	(.006)
	4 Marginalization → School Attachment → Depressive Symptoms → Alcohol Use Both vs. Initiated	.009	(.003) *
	5 Marginalization → School Attachment → Alcohol Use Both vs. Initiated	.014	(.009)
	6 Marginalization → Depressive Symptoms → Alcohol Use Both vs. Initiated	−.008	(.008)

*
$p < .05$.

a
coefficient estimates in models 2 are unstandardized because the endogenous variables are categorical.

Table 4

Significant Group Differences in Relations among Race/Ethnic Marginalization, Socioemotional Distress, and Substance Use across Student Gender, Race/Ethnicity, and Age

Moderator	Path	Group Differences	Standardized Coefficient Estimates by Group		
		Wald df			
Gender			Boys	Girls	
	School Attachment → Depressive Symptoms	7.87 (1) **	−.25 ***	−.27 ***	
	Depressive Symptoms → Marijuana Use	9.21 (1) **	.01	.09 ***	
	Depressive Symptoms → Marijuana Use Never vs. Initiated [a]	6.50 (1) *	−.02	−.06 ***	
	School Attachment → Alcohol Use	5.76 (1) *	−.04 *	.01	
Race/Ethnicity		*Wald df*	Latino	African American	White
	Depressive Symptoms → Marijuana Use	8.28 (2) *	.02	.02	.07 ***
	Marginalization → Alcohol Use Never vs. Initiated [a]	7.27 (2) *	−.11	−.51 *	.54
Age			Younger [b]	Older [b]	
	Marginalization → Depressive Symptoms	.02 *	−.34 **	.01	
	Depressive Symptoms → Marijuana Use Both vs. Initiated [a]	−2.13 **	.62 ***	−.03	

Note: All model paths tested, but only paths with significant group differences are included.

***
$p < .001$,

**
$p < .01$,

*
$p < .05$.

[a] Coefficient estimates are unstandardized because the endogenous variables are categorical.

[b] Younger students were one standard deviation or more below the average age; older students were one standard deviation or more above the average age.