Published in final edited form as:

J Early Adolesc. 2012 April 1; 32(2): 165–199. doi:10.1177/0272431610384484.

Ethnic Identity and Substance Use Among Mexican-Heritage Preadolescents: Moderator Effects of Gender and Time in the United States

Stephen S. Kulis¹, Flavio F. Marsiglia¹, Albert M. Kopak^{1,2}, Maureen E. Olmsted¹, and Ashley Crossman¹

¹Arizona State University, Phoenix

²Western Carolina University, Cullowhee, NC

Abstract

This study examined interactive relationships among ethnic identity, gender, time in the US, and changes in substance use outcomes among a school-based sample of 1,731 Mexican-heritage preadolescents (ages 9–13). Residual change multilevel models adjusting for school clustering and using multiply imputed data assessed changes from beginning to end of fifth grade in use of alcohol, cigarettes, marijuana and inhalants, and four substance use antecedents. Effects of ethnic identity were conditional on time in the US, and in opposite directions by gender. Among males living longer in the US, stronger ethnic identity predicted desirable changes in all but one outcome (substance offers). Among females living longer in the US, stronger ethnic identity predicted undesirable changes in alcohol use, pro-drug norms, and peer substance use. Interpretations focus on differential exposure to substance use opportunities and the erosion of traditional gender role socialization among Mexican-heritage youth having lived longer in the US.

Keywords

ethnic identity; substance use; Mexican-heritage; preadolescence

As a subgroup of the Hispanic population, people of Mexican heritage are among the largest and most youthful ethnic group in the United States (U.S. Census Bureau, 2008). They are also a group at especially high risk of early substance use initiation. Compared with other ethnic groups, Mexican American students in 4th through 6th grade report higher lifetime prevalence of alcohol use, about 25% (Yin, Zapata, & Katims, 1995). By 8th grade, more than 20% of Mexican heritage students have used marijuana or drunk alcohol heavily in the past 12 months (Delva et al., 2005). In national surveys since 1992, Latino youth have reported consistently higher rates of illicit drug use, alcohol intoxication, and binge drinking than African American and non-Hispanic White youth report (National Institute on Drug Abuse [NIDA], 2003; Johnston, O'Malley, & Bachman, 2007). Despite their somewhat

© The Author(s) 2012

Corresponding Author: Stephen S. Kulis, Southwest Interdisciplinary Research Center (SIRC), Arizona State University, Mail Code 4320, 411 N. Central Avenue, Suite 720, Phoenix, AZ 85004-0693 kulis@asu.edu.

Authors' Note

The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

elevated rates of substance use, most Mexican-heritage youth report little or no use of substances, suggesting that risk and promotive factors (e.g., social class, gender, generation status, and length of U.S. residence) may vary considerably across these subgroups (NIDA, 2003).

Research has shown that there are several factors that influence substance use among Mexican-heritage youth. As with other populations where recent immigration is a common family experience, many Mexican heritage youth find themselves acculturating to American society during the most formative years of their lives. During preadolescence, they also enter a critical period when factors antecedent to actual substance use, such as pro-drug personal norms endorsing use of substances, positive expectations about substance use, and intentions to use them begin to emerge (Elek, Miller-Day, & Hecht, 2006). By the start of adolescence, youth are also developing a sense of ethnic identity, acquiring knowledge about gender roles, and may be struggling to maintain traditional cultural values. These intersecting influences of ethnic and gender identity development, acculturation pressures, and permissive attitudes toward substance use have been linked to substance use among ethnic minorities, and they help to explain higher rates of drug use among U.S.-born Latinos compared with foreign born Latinos (Vega, Alderete, Kolody, & Aguilar-Gaxiola, 1998). It has also been suggested that a well-developed sense of positive ethnic identity may act as a buffer against substance use for this population (Love, Yin, Codina, & Zapata, 2006; Marsiglia, Kulis, & Hecht, 2001) given the experiences that are associated with being a Mexican-heritage early adolescent in the United States.

Ethnic Identity in Early and Preadolescence

Ethnic identity refers to an individual's sense of self as a member of a certain ethnic group. Associating oneself with a certain ethnic background supposes that an individual is knowledgeable about the values, social norms, and practices that characterize the group. At the individual level, ethnic identity is characterized by the manner in which individuals interpret and understand their ethnicity and, most importantly, the degree to which they see themselves as a member of their ethnic group (Phinney, 1996).

Ethnic identity emerges in a developmental process that involves complex factors related to one's self-concept. Phinney (1992) proposed that ethnic identity results from exploration of what it means to associate with one's ethnic group. Participation in ethnic-group-specific activities, such as traditional cultural events, is an example of how this exploration process can foster deeper understanding of what it means to belong to the group. An increased sense of belonging is likely to be associated with strong affinity, or commitment, to the ethnic group. This strong affinity may also develop from an increased sense of ethnic pride that comes with having extensive knowledge about the cultural nuances that are unique to a certain group (Castro, Sharp, Barrington, Walton, & Rawson, 1991). Ultimately, ethnic identity achievement can be viewed as the culmination of a process that involves creating cultural meaning, making a firm commitment to one's ethnic group, and achieving a stable comfort level with one's ethnic background (Umaña-Taylor & Alfaro, 2006; Umaña-Taylor, Yazedjian, & Bámaca-Gómez, 2004).

It is possible that ethnic identity begins to develop relatively early in life. However, most studies of ethnic identity development have been conducted with participants over the age of 13 (Knight et al., 2009; Phinney, 1992; Umaña-Taylor, Bhanot, & Shin, 2006; Umaña-Taylor & Fine, 2004). As a result, less is known about precisely when the identity development process begins. However, the few studies with younger samples suggest that ethnic identity development can begin quite early. Studies including preadolescents, ages 11 through 13 years, have reported that ethnic identity is already a prominent feature in this age

group (e.g., French, Seidman, Allen, & Aber, 2006; Scheier, Botvin, Diaz, & Ifill-Williams, 1997). In addition, researchers considering chronological age in relation to ethnic identity development have found that young Mexican American children (ages 6 to 10) understand their ethnic identity sufficiently to accurately sort children of their own ethnic group, place themselves in the correct group, and, for older children, to provide clear reasons for sorting their peers into their selected groups (Bernal, Knight, Garza, Ocampo, & Cota, 1990).

Research conducted with adolescents approximately 13 to 16 years of age indicates that members of this age group already experience moderate to high levels of ethnic identity. In addition, most adolescents maintain or enhance this aspect of their self-concept over the course of adolescence into early adulthood and few, if any, demonstrate a diminishing sense of identity over time (Knight et al., 2009). Other researchers have found that the affinity toward one's ethnic group tends to intensify over time, beginning in preadolescence and gradually increasing through adolescent development (French et al., 2006; Pahl & Way, 2006). This research suggests that ethnic identity is fairly constant by midadolescence. In addition, as preadolescents advance through later stages of social and cognitive development, it is likely that these relatively high levels of ethnic identity are accompanied by less intensive ethnic identity exploration over time, given the acquisition of ethnic knowledge that has already taken place (Pahl & Way, 2006).

The Importance of Social Context in Relation to Ethnic Identity

Ethnic identity development is shaped by forces in the immediate social environment, such as ethnic socialization at home and at school (Bernal et al., 1990). There is also strong evidence that these forces may vary according to important factors such as immigration and acculturation status, length of residence in the United States, and gender.

The family is perhaps the most influential factor for the development of ethnic identity among preadolescents in general and specifically among Mexican-heritage youth (Supple, Ghazarian, Frabutt, Plunkett, & Sands, 2006). Mexican-heritage youth become more sensitive to what their ethnicity means as they acquire knowledge of their cultural background through family life and as they become aware of their own minority status (Holley et al., 2009). Everyday interactions within the home environment and participation in certain traditional cultural events serve as consistent socializing forces that enhance the connection of Mexican-heritage youth with their ethnic heritage.

Youths' identity formation is also heavily influenced by other social contexts where they spend much of their time, such as in school. Empirical evidence suggests that ethnic composition of schools can affect the salience of ethnic identity among ethnic minority youth. When Latino adolescents are in a context where they constitute a numerical minority they appear more in touch with their identity compared with their counterparts in the numerical majority (Umaña-Taylor, 2004). This is especially relevant for Latinos in certain geographical regions of the United States. Although members of an ethnic minority group, Mexican-heritage youth in the U.S. Southwest are often in the numerical majority in their school and neighborhood environments. In these contexts, they may retain a strong connection to their culture of origin but without a need to defend or explain it (Kulis, Marsiglia, Nieri, Sicotte, & Hohmann-Marriott, 2004). Being in the position of the numerical majority may allow ethnic minority youth to be less acutely aware of their ethnic identity partly because they are less likely to be challenged by peers from the dominant ethnic group or because they face less intense ethnic discrimination (Umaña-Taylor, Vargas-Chanes, Garcia, & Gonzales-Backen, 2008). In the U.S.–Mexico borderlands, circular migration, a long historical connection with Mexico, and the strong Mexican-heritage presence may lessen the need to develop an identity separate from others (Holley et al.,

2009). The absence of a need to develop a defensive identity in such a context is not likely to result in a lack of ethnic identity formation. As children become more aware about the fact that they are no longer in a Mexican immigrant enclave or Mexican American neighborhood, they may adopt a more defined ethnic identity. Mexican-heritage youth are likely to develop a strong sense of ethnic identity regardless of their numerical status, but the salience of this feature at the individual level may be stronger in one context (e.g., school) versus another (e.g., neighborhood).

Immigration status is another sociocultural factor that influences ethnic identity formation. Ethnic minority youth from immigrant families, and Mexican-born preadolescents in particular, are likely to experience an acculturation process to American society. In general, the immigrant (first) generation is likely to hold more traditional values from the culture of origin compared with subsequent generations born in the United States. However, longer residence in the United States increases exposure to a new or different culture and may influence how individuals come to view their own ethnic identity. Measures of generational status indicate when Mexican heritage youth have arrived in the United States relative to their parents, but a concrete assessment of the length of time spent in the United States details the relationship between cultural exposure and identity development that may not be observable from generational status alone. Empirical results support this position, finding that Latino young adults (ages 19–30) who have spent more time in the United States report higher levels of ethnic identity achievement relative to those in the United States for a shorter period (Ontai-Grzebik & Raffaelli, 2004). Therefore, it is important to consider ethnic identity in conjunction with the length of time that Mexican-heritage youth have spent in the United States, aside from generational status.

Despite its importance, ethnicity is only one of the dimensions of youths' self-concept, and its role can be conditioned by other factors. Gender, especially in the latter portion of the elementary years and throughout the middle schools years, is also crucial in the development of preadolescents' self-concept. Ethnic identity formation is intimately linked to the process of establishing gender identity (Parks, Carter, & Gushue, 1996; Poindexter-Cameron & Robinson, 1997). For ethnic minority youth, problems in establishing either ethnic identity or gender identity appear to intensify uncertainties about the other parallel identity process (Wade, 1996). Ethnic minority children report that gender and ethnicity are equally important factors in the makeup of their overall identity, while gender identity formation is viewed as a relatively more important developmental task by ethnic majority youth (Turner & Brown, 2007). This suggests that being a member of an ethnic minority group in the United States makes it more likely that preadolescents will place significant value on their ethnic identity and its development. The cultural milieu of American society tends to stress any ethnic differences that are present which results in ethnic identity being more salient among minority youth while gender is equally salient feature of self-concept for both groups.

There is an interplay of ethnic and gender identity in minority youths' self-concept such that ethnic identity may be implicated in substance use in different ways for preadolescent girls compared with boys. Studies that have focused on the role of gender in the relationship between ethnicity and alcohol use, for example, suggest that Latinos are more likely than Latinas to develop permissive attitudes toward use as they experience greater exposure to American drinking norms (Caetano, 1987; Zamboanga, Raffaelli, & Horton, 2006). A possible reason for this difference is the pivotal role that women play in maintaining traditional Latino/a cultural values. These traditional values often include gender role expectations which differ from those of the dominant culture (Valentine & Mosley, 2000). Latinas in the United States may be expected to stay closer to family and maintain many of the family's traditional cultural values through gendered domestic tasks such as cooking

ethnic foods, caring for family members, and maintaining religious customs, especially in recent immigrant families (Williams, Alvarez, & Andrade Hauck, 2002). Therefore, although these girls' more intensive exposure to cultural practices may increase their sense of ethnic identity, their greater isolation in the home can limit their exposure to mainstream culture and its possible impact in eliciting ethnic identity. Latinas may sometimes encounter self-concept challenges both to their ethnic identity and their gender identity, thereby resulting in a "bifurcated self" and greater acculturation stress than Latinos experience (Williams et al., 2002).

For Latino youth, variations in the salience of ethnic identity according to gender, length of residence in the United States, and generation status suggest that these factors may be important moderators of how ethnic identity influences substance use attitudes and behaviors.

Inconsistencies in the Relationship Between Ethnic Identity and Substance Use

Researchers have found small but consistent links between a strong positive sense of ethnic identity and certain desirable outcomes among ethnic minority youth, including higher self-esteem (Phinney, Cantu, & Kurtz, 1997; Umaña-Taylor, 2004) and academic success (Fuligni, Witkow, & García, 2005; Supple et al., 2006). Research connecting ethnic identity and risky behaviors like youth substance use has reported less consistent and more complex results across ethnic groups. Ethnic identity has been found to predict Mexican-heritage youths' substance use in opposite directions depending on the aspect of identity that is measured, for example, ethnic pride versus involvement in ethnic activities (Marsiglia et al., 2001), and whether the youth is a member of an ethnic minority group or part of the non-Hispanic White majority (Marsiglia, Kulis, Hecht, & Sills, 2004). Ethnic identity has been found to be positively related to cigarette, alcohol, and marijuana use among a more diverse sample of Hispanic early adolescents that included Mexican-heritage youth and youth with ties to Puerto Rico, Honduras, Chile, Cuba, and other countries (Zamboanga, Schwartz, Jarvis, & Van Tyne, 2009). In studies of samples of multiethnic youth, ethnic minority group members with stronger ethnic identity also reported relatively heavier levels of substance use (James, Kim, & Armijo, 2000; Scheier et al., 1997).

Researchers also have reported different associations with substance use when measuring identification with simple ethnic labels rather than measures of the strength of that identification. Barger and Gallo (2008) found that self-identification as "Mexican" (compared with "Mexican American") was associated with reduced odds of smoking cigarettes. Further analysis, however, showed that being born in the United States rather than in Mexico was positively associated with cigarette use, regardless of self-identification as Mexican or Mexican American. Some have suggested that exposure to U.S. substance use norms is a key factor in explaining how ethnic identity influences substance use among Mexican-heritage individuals. This cultural conflict model is supported by a study of Mexican-heritage men in college among whom stronger ethnic identity was associated with higher levels of alcohol use (Zamboanga et al., 2006). The researchers suggested that strong ties to an ethnic group could be related to heavier alcohol use because, in the college setting, conflicts between traditional ethnic values and dominant social norms increase acculturation-related stress and, as a corollary, elevate substance use risk.

Although there are conflicting studies suggesting that a closer connection to one's ethnic group is a condition that can be favorable or unfavorable for substance use, many studies are compromised by relatively shallow measures of ethnic identity (i.e., an ethnic label), which fail to fully capture the full dimensions of this concept. Research on ethnic identity and

substance use has focused on a wide range of developmental periods, each characterized by greater or lesser propensities to use substances (e.g., college age sample vs. early adolescent sample). Overall, this mixed evidence suggests that the ethnic identity–substance use relationship may vary according to several factors including the measure of ethnic identity, the specific substance, the age group, the ethnic group to which they belong, and the amount of time spent in the United States.

Despite these mixed findings, for Mexican-heritage youth, there are a number of reasons to expect that a well-developed sense of ethnic identity can be a buffer against substance use. Given their ethnic minority status and likelihood of being raised in immigrant families, these youth often experience adverse social conditions in the United States, including acculturative stress and poverty, which can increase their susceptibility to problem behaviors, such as delinquency and substance use (Bui & Thongniramol, 2005; Schwartz, Zamboanga, & Jarvis, 2007; Unger, Ritt-Olson, Soto, & Baezconde-Garbanati, 2009). Length of residence in the United States can provide an indication of youths' exposure to these conditions as well as their exposure to permissive substance use norms and opportunities to use substances. Under these circumstances, a strong connection to one's ethnic group can serve as a promotive factor by helping to deflect the negativity associated with degrading experiences, lowering vulnerability to substance use and other problem behaviors (Wong, Eccles, & Sameroff, 2003). A positive view of one's own ethnic group may promote a sense of resilience against pressures to engage in risk behaviors that are prevalent during preadolescence and adolescence (Luthar, Cicchetti, & Becker, 2000).

Goals of the Present Study

The present study is designed to advance knowledge about ethnic identity and substance use and clarify the mixed findings in the literature. We expand on previous research first by examining variations in the relationship between ethnic identity and substance use by gender and time in the United States. Focusing specifically on Mexican-heritage youth is a second aspect of our approach, avoiding the imprecision that stems from aggregating different Latino/a groups into a single study. Third, we examine substance use during a developmental period, preadolescence, when much experimentation with substances begins (ages 10–12). Fourth, we examine both substance use antecedents and substance use behaviors. Specifying whether ethnic identity relates to key substance use antecedents, such as the development of pro-drug use norms, intentions, and substance-using peer networks, can help clarify how strong ethnic identity may guard against later substance use by interrupting the development of favorable orientations toward use. Fifth, we employ longitudinal data to ascertain whether ethnic identity is causally related to the subsequent development of substance use antecedents and behaviors over a short period, that is, whether ethnic identity predicts changes in these substance use outcomes from the beginning to the end of fifth grade.

Based on the existing empirical evidence, we hypothesized that ethnic identity would generally buffer against substance use but that this would be most promotive for subgroups of Mexican-heritage youth who are relatively more susceptible to substance use in preadolescence or have more opportunities to use substances: among boys more than among girls, and among those having spent more of their lives in the United States. This hypothesis is based on research that shows that traditional views toward alcohol consumption, especially for Mexican-born immigrants, foster greater abstention from use for females and greater consumption for males (Alaniz, Treno, & Saltz, 1999). There is evidence that U.S. Latino males have more permissive views toward alcohol use when they are more acculturated (Caetano, 1987). Evidence also suggests that the amount of time that Mexican-heritage preadolescents have spent in the United States may increase risk because it exposes

youth to the mainstream culture's pro-drug use norms and provides more opportunities for substance use (Swanson, Linskey, Quintero-Salinas, Pumariega, & Holzer, 1992). Compared with their male counterparts, Mexican-heritage preadolescent females might be expected to be less at risk of substance use due to socialization into traditional gender roles and more circumscribed or monitored social networks, limiting their opportunities to engage in substance use.

Method

Data and Sample

Data for the analysis came from fifth-grade students enrolled in 30 elementary schools in Phoenix, Arizona. The schools were part of a randomized trial of a substance use prevention program that recruited half of the school districts and elementary schools in the city. The study schools mostly served lower income neighborhoods and in all except two schools Latinos were the majority (more than 50%) of enrolled students. The exceptions included a school that was 65% African American and 32% Latino, and another school with no ethnic majority (41% Latino, 41% African American, 18% Other). Every fifth-grade student in the schools was invited to participate in the study. Active parental consent/permission and student assent to complete the survey were obtained from 82% of the eligible students, following both university and school district policies protecting human subjects in research. Students completed a 1-hr, written questionnaire (provided both in English and Spanish) at two times, in Fall 2004 and approximately 6 months later in Spring 2005. For translation of the questionnaire we followed Rogler's (1989) recommended procedures; a fluent Spanish speaker translated from English to Spanish, another back-translated, and a third resolved any discrepancies. The baseline survey was administered in both treatment and control schools just before the prevention program was delivered in the treatment schools, and the follow-up survey occurred approximately 2 months after the curriculum ended. Any impact of the prevention program on substance use outcomes is controlled in the analysis by introducing treatment as a covariate.

University-trained survey proctors administered the questionnaires in classrooms. Students were informed that the survey was part of a university research project, their participation was voluntary, and their answers were confidential. Consented students who were absent on the initial survey date were able to complete the survey in class within a 2-week follow-up period. More than 96% of students with parental consent (79% of all enrolled students) completed the first questionnaire in the initial or follow-up administration. More than 90% of the respondents to the baseline survey subsequently completed the follow-up survey 6 months later.

The sample analyzed here includes data from 1,731 self-identified Mexican-heritage students who completed the baseline survey, before the prevention program was implemented in randomly assigned schools. The majority of these students indicated they identified themselves as "Mexican American" or "Chicano" (64%), another 34% said they were "Mexican," and the remaining 2% said they were of mixed Mexican and other ethnic heritages. Most respondents (78%) were from immigrant families with one or both parents born in Mexico. As respondents used varying labels to describe their ethnic background, here we refer to them collectively as being of Mexican heritage. Alternative terms, such as Mexican American, might ill-describe those who were recent immigrants and still considered themselves to be Mexican nationals. Mexican-origin, another possibility, might imply recent immigration which would poorly describe the minority of respondents who were third generation or higher.

Measures

The study outcomes are Likert-type measures of substance use behaviors, intentions, norms, and exposure. The major independent variables are a scale measuring ethnic identity and an ordinal measure of time residing in the United States. Demographic variables serve as controls for individual risk and protective factors in drug use. All outcome measures were scored such that high values were undesirable, that is, indicating more frequent substance use, stronger pro-drug attitudes, or more exposure to substance using friends and opportunities to use.

Outcomes—The study examined eight substance use–related outcomes, half measuring substance use behaviors and half measuring substance use intentions, norms, and risk exposure. The questions were developmentally appropriate for this age group as shown in other studies of early adolescent drug use (Hecht et al., 2003; Kandel & Wu, 1995). Students reported the number of times in the last 30 days they had “drunk more than a sip of alcohol,” “smoked cigarettes,” “smoked marijuana (pot, weed),” and “sniffed glue, spray cans, paint or other inhalants to get high,” providing responses in seven categories (0, 1–2, 3–5, 6–9, 10–19, 20–39, 40 or more times). The last 30-day time frame was chosen because it permitted assessments of changes in substance use from the pretest to the posttest (beginning to the end of fifth grade) and because recall of recent substance use is more accurate than for longer intervals (Johnston, 1989). As responses to these measures were somewhat skewed toward low frequency, we ran exploratory analyses with logged versions to minimize effects of skewness and found the results to be similar to those obtained when using the original version. Therefore, we present here the results of the untransformed measures.

In addition to substance use frequency, we examined an array of outcomes that are important substance use antecedents for early and preadolescents: substance use intentions, pro-drug use norms, friends’ substance use, and exposure to substance use offers (Elek et al., 2006). Two scales were created: to measure future intentions to use substances and pro-drug personal norms. The substance use intentions scale included three items where students indicated whether they thought they would use alcohol, cigarettes, and marijuana in the coming weekend if they had the chance (from 1 = *definitely no* to 4 = *definitely yes*). The Personal Pro-Drug Norms scale assessed whether students thought use of alcohol, cigarettes, and marijuana is “okay for someone their age” (from 1 = *definitely not ok* to 4 = *definitely ok*). Both scales had high internal consistency as indicated by Cronbach’s alphas of .92 and .93, respectively, for the sample overall. Scale reliability was similar for the minority of students who completed the survey in Spanish (11% at the first and 9% at the second waves), with corresponding alphas of .96 and .87.

Single items indicated friends’ use substances and recent substance use offers. Students estimated the proportion of the friends they “hang out with” who “have tried alcohol, cigarettes, or marijuana at least once” (response scale: 1 = *hardly any or none*, 2 = *some*, 3 = *half*, 4 = *most or all*). Students reported the number of times in the last 30 days they had been “offered alcohol, cigarettes, marijuana or other drugs” (response scale: 1 = *none*, 2 = *once*, 3 = *2–3 times*, 4 = *4–6 times*, 5 = *7–10 times*, and 6 = *more than 10 times*).

The outcomes were measured at both the baseline and the 6-month follow-up survey using identical phrasing of the questions.

Independent variables—The key independent variable, ethnic identity, was a scale based on Phinney’s (1992) Multigroup Ethnic Identity Measure (MEIM). The six scale items, which followed immediately after students self-identified their single best ethnic group label, included “I have tried to learn more about my own ethnic group, such as its history and customs”; “I have often talked to other people, like my parents, to learn more about my

ethnic group”; “I am happy to be part of my ethnic group”; “I feel like I really belong to my own ethnic group”; “I’m very proud of my ethnic group and its accomplishments”; and “I am involved in the customs, such as food, music or celebrations, of my own ethnic group.” This scale had adequate internal consistency (Cronbach’s $\alpha = .82$ for the sample overall; $\alpha = .84$ for students completing the survey in Spanish). A principal components factor analysis of all items from the scale produced one factor, with loadings from .39 to .65.

Students reported the time they had lived in the United States in five categories: 1 = *less than 1 year*, 2 = *1–5 year*, 3 = *6–10 years*, 4 = *more than 10 year*, or 5 = *all my life*.

Control variables were gender, age, school grades, a proxy for family socioeconomic status, generation status, and treatment status (see Table 1 for means and standard deviations). Students self-reported their gender dichotomously as *male* (1) or *female* (0). Age was self-reported in whole years as of the last birthday. Participation in the school’s federal free or reduced price lunch program served as a measure of lower socioeconomic status: 0 = *not participating*, 1 = *reduced price lunch*, and 2 = *free lunch*. Although children in elementary school are unlikely to know their parents’ income or educational levels precisely, they are likely to know if they receive a free or reduced price lunch. Eligibility for the lunch benefit is based on their family’s economic status, making this measure a reasonable proxy for family socioeconomic status. Academic performance, a common predictor of substance use (Wright & Pemberton, 2004), was measured as self-reported “usual” grades in school on a scale ranging from 1 = *Mostly Fs* to 9 = *Mostly As*. Generation status was determined by the student’s report of their own and their parents’ places of birth and coded as 1 = *first generation (student born outside the United States)*, 2 = *second generation (U.S.-born student with at least one immigrant parent)*, and 3 = *third or higher generation (student and parents all U.S.-born)*. In model tests, generation status is entered as multinomial dummy variables representing second and third generation students with the first generation serving as the omitted reference group. Treatment was dichotomized: *respondents in schools that were randomized to receive the substance use intervention following the baseline survey* (1) and *those that were contrasted with students enrolled in control schools* (0).

Analyses

We used residual change models to assess the degree of change in the outcomes over the 6-month interval: baseline outcomes were used as controls in models that predicted the corresponding outcomes in the follow-up survey. The outcomes were analyzed using multilevel models and multiply imputed data. As students were sampled within schools, they are not independent sample units, and using standard regression analyses would risk biased hypothesis tests due to deflated standard errors. Instead, we used SAS Proc Mixed version 9.13 to estimate multilevel models that adjusted for random effects at the school level, allowing the intercept or base level of the substance use outcomes to vary across the schools in the study.

Missing data were a concern principally due to attrition rather than item missingness, which was minimal (less than 2%). Only 10% of respondents to the baseline survey were lost to attrition at the follow-up survey, but the exact reasons for attrition of individual students are unknown. Typical sources of attrition are student absences on survey day, dropping out of school, and transfers to other schools. Of these sources, the latter is of most concern because absent students had an opportunity to complete the survey later during a follow-up period, and dropping out in fifth grade is uncommon. The study’s tracking system was able to locate and subsequently survey any students who transferred to another study school but not students who transferred out of the study schools. It can be vital to retain the information from these students, rather than losing all trace of them through listwise deletion, because factors related to substance use may be implicated in the school transfer, for example,

conduct problems leading to school suspension and family instability. We employed multiple imputation techniques to create multiple complete data sets, analyzed them with standard statistical methods, and then combined the results to properly reflect the uncertainty in the imputed values. One assumption of multiple imputation methods is that, conditional on the observed values, the unobserved values are missing at random (MAR). Although this assumption cannot be tested, it can be strengthened by including relevant predictors of missing-ness in the imputation model. Therefore, in addition to the predictors of substance use, the imputation model variables included demographic, family structure, and other background variables that have been related to youth substance use, such as expectations for academic achievement and risk taking. We used SAS Proc MI to generate 10 imputed data sets and Proc MIAnalyze to combine the results from the 10 analyses.

After presenting descriptive analyses, we report on several models that were tested for each outcome. Each model included the main effects of ethnic identity, time in the United States, age, school grades, and federal school lunch program participation, plus an interaction term of ethnic identity by time in the United States. In these analyses, time in the United States, and ethnic identity were mean-centered so that they would produce more interpretable interaction terms (Aiken & West, 1991).

To test hypotheses that ethnic identity would predict substance use outcomes differently for boys and girls, models were first run separately by gender and then with the combined sample in a model that tested for significant gender differences with a three-way interaction among ethnic identity, time in the United States, and gender.

We ruled out possible collinearity among the various independent variables by assessing variance inflation factors, which for the variables in these models were well below 5 (highest VIF = 2.2) and most were close to 1. This test for multicollinearity was particularly important in assuring that the effects of time in the United States could be assessed independently from those of generation status. Further assurance came from reestimating the key models with interactions on split subsamples of first-generation versus higher generation status respondents. We also conducted sensitivity analyses, estimating alternate models that adjusted for skewed distributions toward nonuse in the substance use behavior outcomes, for example, using a natural logarithmic transformation of the original ordinal scales for these outcomes, or dichotomizing substance use frequency into use/nonuse and conducting logistic regression analyses using SAS Proc Glimmix. Results for the key tests were essentially similar in direction and statistical significance to those reported below without these transformations of the outcomes.

Results

Descriptive and Bivariate Results

Descriptive statistics and bivariate correlations between the key independent variables and substance use outcomes are presented in Table 1. The sample was nearly gender balanced (49% male, 51% female), and the vast majority (96%) of respondents was of the typical age for beginning fifth graders, ages 10 or 11. The mean for usual grades in school corresponded to “mostly Bs.” All but a minority of the students were from low-income families: 76% received free lunches, and 17% received reduced price lunches through the federal school lunch program. Just more than one quarter (28%) of the students were first generation (born outside the United States), half (50%) were second-generation U.S.-born children with at least one immigrant parent, and the remaining 22% were third or higher generation (child and parents born in the United States). A majority (62%) of students were in schools that implemented the prevention program between the baseline and follow-up surveys.

Most respondents had lived the majority of their lives in the United States, but nearly half (44%) reporting living at least some time outside the United States. That included 97% of first-generation respondents, 27% of second-generation respondents, and 12% of third-generation respondents. The mean of the ethnic identity scale indicated that moderately strong ethnic identity was typical.

Means for the substance use outcomes changed modestly from the baseline to the second survey, with aggregate decreases in cigarette and marijuana use, less endorsement of pro-drug personal norms, and somewhat larger changes in the undesirable direction for other outcomes.

There was also a clear gender difference in all eight baseline outcomes as revealed in *t* tests of means (not presented in tables), with males reporting significantly less desirable scores than females, either more frequent substance use or a stronger pro-drug orientation ($p < .05$).

Correlations in Table 1 of outcome and control variables with baseline measures of time in the United States and with ethnic identity revealed some patterns in the bivariate relationships. Time in the United States was positively correlated with baseline alcohol use frequency but inversely related at baseline to intentions to use substances and pro-drug personal norms. This suggests that longer amounts of time spent in the United States are related to greater alcohol use but weaker substance use intentions and less permissive norms toward substance use. Strong ethnic identity was inversely correlated at baseline with use of all substances and with all measures of substance use antecedents except friends' substance use. With the exception of alcohol and inhalants use, the same significant correlations were reported at time two as well. Generally, then, strong ethnic identity was modestly associated with more desirable substance use outcomes.

Time in the United States was also correlated with all the control variables except age and gender. Students living longer in the United States reported better school grades, lower socioeconomic status (participating in Federal school lunch program), and higher generation status. Ethnic identity was significantly correlated with age, school grades, generation status, and time in the United States. Students with a stronger sense of ethnic identity were generally younger, high academic performers, first rather than third generation, and living fewer years in the United States.

When broken down by gender groups, a notable trend emerged in these bivariate correlations (data not presented in tables; see Table 1 footnotes). Many significant correlations observed in the combined sample of males and females were significant for only one of the gender groups when they were analyzed separately. We thus tested whether correlations of the outcomes with time in the United States and with ethnic identity differed significantly by gender. These differences are noted in Table 1 with superscripts. The overall trend was that the direct relationship between time in the United States and undesirable outcomes was stronger for males than for females (in 5 of 16 baseline or time two outcomes), as was the inverse relationship between ethnic identity and undesirable outcomes (in 10 of 16 outcomes). There were only two exceptions where these relationships were stronger for females than for males.

Multivariate Results

While the bivariate correlations suggested gendered relationships between ethnic identity and substance use outcomes cross-sectionally, the multivariate models explored them longitudinally. Given the hypothesis that ethnic identity and the amount of time that youth have lived in the United States would have varying degrees of influence on substance use outcomes for each gender group, these models also tested a series of interaction terms. Table

2 presents the results of three models predicting changes from baseline to follow-up in the frequency of recent use of four substances: the first panel presents the models for males, the second panel presents the models for females, and the third panel, combining males and females, presents the tests of gender interactions with key predictors. Table 3 presents the same set of models but predicting four substance use antecedents as outcomes. All models predicted the outcome as measured at the follow-up survey and included as predictors the outcome measured at the baseline survey, controls for treatment, demographic and academic variables, the main effects of time in the United States and ethnic identity, and the interaction of the latter two variables. The last set of models in the third panel added to the above predictors the main effect of gender, two-way interactions of gender and time in the United States and of gender and ethnic identity, and a three-way interaction among gender, time in the United States, and ethnic identity. To simplify presentation and focus interpretation, only the interactions with gender are presented in the third panel because they constitute the key tests of whether there were significant gender differences in the effects of ethnic identity and its interaction with time in the United States. To concentrate on the predictors of interest, the discussion of the effects of the control variables has been reserved for the end of this results section.

Main effects of time in the United States and ethnic identity—The first and second panels of Tables 2 and 3 show that ethnic identity and time in the United States had independent effects on changes in at least some of the outcomes, both for males and females. The main effects of ethnic identity were as hypothesized for males on all outcomes: it predicted significantly larger decreases (or smaller increases) in the frequency of use of all four substances and larger desirable changes in use intentions, personal norms, friends' substance use, and substance offers. Among females, however, ethnic identity predicted fewer outcomes and inconsistently: females with stronger ethnic identity reported not only larger increases in use of alcohol and marijuana but also larger desirable changes in substance use intentions.

There were also significant main effects of longer time in the United States, which predicted mostly undesirable changes in outcomes: larger increases in alcohol, cigarette and marijuana use for males, larger increases in alcohol use for females, and undesirable changes among females in substance use intentions, personal norms, and substance offers. One exception to this negative influence was that greater time in the United States predicted less use of inhalants for males and females.

A test of whether the overall influence of ethnic identity on the outcomes differed for males and females appears as a two-way interaction at the top of the third panel of the tables. These tests showed that, for all outcomes except number of substance offers, ethnic identity predicted significantly more desirable changes in the outcomes for males than for females. The next tests were two-way interactions of gender and time in the United States which showed that living longer in the United States was significantly more of a risk factor for males than for females in predicting changes in alcohol, cigarette, and inhalant use but was more of a risk factor for females than for males in predicting substance use intentions and number of substance offers.

Interactions Between Ethnic Identity and Time in the United States

The first and second panels of Tables 2 and 3 also include two-way interactions between time in the United States and ethnic identity. Among males, these showed that stronger ethnic identity for those who had lived the longest in the United States predicted desirable changes in six outcomes: decreases in use of all four substances, in use intentions, and in pro-drug norms. One contrary effect emerged among males: for males living the longest in

the United States, ethnic identity predicted increasing substance offers. Among females the combination of strong ethnic identity and longer time in the United States did not predict desirable changes in any outcomes; instead, it predicted undesirable changes in alcohol use, pro-drug personal norms, and friends' substance use.

Interactions Between Ethnic Identity, Time in the United States, and Gender

The three-way interactions in the third panels of the tables demonstrated that for seven of the eight outcomes there were consistent significant gender differences in the effect of the interaction between ethnic identity and time in the United States. For all outcomes except number of substance offers, the added or selectively desirable effect of strong ethnic identity among those living longer in the United States emerged more strongly among males than among females. The sole exception to this pattern was that strong ethnic identity coupled with longer residence in the United States exposed males to more substance offers to a significantly greater degree than for females.

As described in the methods section, further analysis among generation status sub-groups (not presented in tables) indicated that the key findings above—that ethnic identity predicted more desirable substance use outcomes for males than for females, and even more so when those males had lived longer periods of their lives in the United States—applied both to first generation youth and those who were second or higher generation.

Effects of control variables

The effects for the control variables in Tables 2 and 3 showed, for both males and females, that baseline outcomes were strong predictors of the same outcomes 6 months later and that treatment through participation in the prevention program was generally not a significant predictor of changes in outcomes. Male students with better school grades reported more desirable changes on all eight outcomes. Among females, good grades predicted better outcomes on alcohol use, use intentions, personal norms, and substance offers, but undesirable changes in friends' substance use. Age emerged more often as a risk than a protective factor, but its effects varied by gender and outcome. Older male students reported more undesirable changes in the four substance use antecedents but less inhalant use. Older female students reported more use of inhalants and marijuana and undesirable changes in norms, friends' substance use and offers, but less use of alcohol. The effects of socioeconomic status also varied, even in this mostly low-income sample. Among males, the lowest SES students reported worse outcomes for alcohol use and substance using friends, but better outcomes for cigarettes use and number of substance offers. Among females, lower SES predicted worse outcomes for alcohol and cigarette use, but better outcomes on use of marijuana and inhalants, use intentions, friends' substance use, and substance offers.

Finally, generation status predicted changes in substance use in somewhat different ways for males and females. Among males, the second and third generations reported more use than the first generation of all four substances. Generation status predicted only one substance use antecedent among males—use intentions—and in a curvilinear manner, with the second generation reporting stronger and the third generation reporting weaker intentions than the first generation. Generation status effects were mixed among females: the second and/or third generations reported more desirable changes than the first generation on alcohol use, cigarette use, use intentions, and personal norms but worse changes than the first generation on marijuana use, inhalant use, friends' substance use, and substance offers.

Discussion

The present study expanded on mixed findings from prior research regarding the relationship between ethnic identity and youth substance use by exploring how this relationship varies by gender and the length of time living in the United States, by focusing specifically on preadolescents of Mexican heritage and by analyzing short-term changes in two sets of outcomes: substance use behaviors and antecedents. We hypothesized that ethnic identity generally would help protect these youth from substance use behaviors and pro-drug orientations but that this effect would appear more strongly among youth most at risk of substance use at this developmental period: among boys and those living longer in the United States.

Results generally confirmed that ethnic identity was a consistent buffer against substance use vulnerability for boys more than for girls, and particularly among the boys who had lived longer periods of their lives in the United States. Contrary to studies that have found stronger ethnic identity related to greater substance use among Latino youth (e.g., Marsiglia et al., 2004; Zamboanga et al., 2009), examining the effects of ethnic identity by gender produced an interesting pattern of findings. Among boys, stronger ethnic identity predicted only desirable changes and for all the outcomes except alcohol use, whereas for girls it predicted two desirable changes (i.e., less inhalant use and lower use intentions) and two unfavorable changes (i.e., increased alcohol and marijuana use). Moreover, the desirable buffering effect of ethnic identity was shown statistically to be larger for boys than for girls on all outcomes except inhalant use.

As a main effect, longer time in the United States emerged as a risk factor for half the outcomes for boys, all four measures of pro-drug orientations. For girls, longer time in the United States was a risk factor for alcohol use, use intentions, personal norms, and substance offers but predicted desirable changes in inhalant use. The significant gender differences in time in the United States as a risk factor were thus not consistent: longer time in the United States predicted poor outcomes more strongly for boys than for girls on three outcomes (i.e., more alcohol, cigarette, and inhalant use) but predicted poor outcomes for girls more strongly than for boys on use intentions and substance offers. While the main effects of time in the United States varied by outcome and gender, in interaction with strong ethnic identity, however, longer time in the United States had desirable effects that were quite consistently stronger for boys than for girls on all of the outcomes except one: number of substance offers.

One explanation for why the buffering effect of ethnic identity might be stronger and more consistent for Mexican-heritage male preadolescents than their female counterparts is that strong ethnic identity elicits protection primarily among those with high exposure or susceptibility to substance use. Early adolescent Mexican-heritage males may be more at risk than their female counterparts because they experience weaker parental monitoring, greater freedom outside the home to interact with peers, more substance using opportunities, and more substance-using friends (Marsiglia, Kulis, Hussaini, Nieri, & Becerra, 2010). Furthermore, traditional gender roles in Mexican culture discourage substance use among girls more than among boys. Alcohol use among Mexican-heritage males in social contexts, such as family gatherings, is generally viewed as acceptable (De La Rosa, 2002), whereas females may be encouraged to abstain from alcohol to avoid potentially negative social consequences for their family and friends (Perea & Slater, 1999). Girls' more constricted and supervised environments may also limit the degree to which longer residence in the United States increases their risk of actual substance use compared with boys, at least at this early developmental stage. However, the findings connecting longer U.S. residence for girls to their development of stronger intentions to use substances, pro-drug norms, and exposure

to more substance offers suggests that an elevated risk of actual substance use may emerge for them a later age.

Our hypothesis that ethnic identity would exert more of a buffering effect among Mexican-heritage youth living more of their lifetime in the United States was also based on the expectation that these youth would be more at risk of substance use due to greater exposure to substance using opportunities, more effective socialization into the mainstream culture's pro-drug use norms and values, and lesser influence of the conservative traditional values from their culture of origin. Although results confirmed that ethnic identity did have a significant buffering effect among boys who had lived longer in the United States, other results bearing on the reasons for this protection were mixed. Among boys, the main effects of time in the United States showed it to be a risk factor for alcohol, cigarette, and marijuana use but not for any of the substance use antecedents, including number of substance using friends, exposure to substance offers, and the adoption of pro-drug norms. In other words, boys living longer in the United States did not generally report exposure to more opportunities to use substances or greater normative inclinations to do so. However, boys who had lived longer in the United States but who had higher ethnic identity reported receiving increased substance offers yet had lower substance use intentions, suggesting that ethnic identity may insulate them from the dangers posed by those substance offers and enable them to resist temptation toward substance use.

Given the possibility that the effects of time in the United States were simply reflections of generation status differences that have been found to be related to greater substance use in prior research (e.g., Peña et al., 2008), we controlled for generation status in all reported models and also found the same interactive effects of gender, ethnic identity, and time in United States in separate analyses of first generation and higher generation status youth. Although the buffering effect of strong ethnic identity on boys' substance use was the same for first generation and higher generation youth, it is likely their ethnic identity processes differ qualitatively. Among first-generation youth, length of U.S. residence is likely to reflect developmental time of arrival in the United States, whether as a preschool child whose socialization takes place largely in a new culture or as an arriving school child who must transition to a very different school environment after already incorporating the origin culture and language and facing pressure to rapidly acquire a new language and culture. Among second- and higher generation youth—all by definition “born in the United States”—time spent outside the United States will likely reflect circular migration and time spent living with non-U.S. relatives. These different experiences of living outside the United States and their influence on the ethnic identity process deserve further exploration.

A final pattern in the results worthy of note is that ethnic identity generally predicted both substance use behaviors and antecedents in similar ways. Contrary to the findings that ethnic identity has been related to greater substance use (James et al., 2000; Scheier et al., 1997), the current study found that even among the majority of youth who have not yet started using substances, ethnic identity appears to protect them from the precursors of such use. Examining this relationship among Mexican-heritage early adolescents provided evidence that a strong sense of ethnic identity was promotive, for boys at least, against all types of antecedents examined—substance use intentions, norms, friends' use, and number of substance offers.

Study Limitations

Some limitations of this study must be considered. First, results have to be interpreted cautiously given the sampling limitation to one southwestern city and the fact that the sample was overwhelmingly made up of students from low-income families attending majority Mexican American serving schools. Mexican-heritage youth in the numerical

minority in their schools and neighborhoods are likely to face different challenges in ethnic identity development than the youth in this study. For instance, evidence suggests that Latino youth in predominantly non-Latino school contexts may have higher levels of ethnic identity compared with youth in a majority Latino school (Umaña-Taylor, 2004). Therefore, the findings may not generalize to Mexican-heritage youth in other regions of the United States, from higher socioeconomic backgrounds or in less ethnically homogeneous schools. Second, the students in the sample were very young and most of them were not yet using substances. Studies conducted with an older sample may yield different results since adolescence is a period marked by higher levels of substance use (Chen & Kandel, 1995). Low use rates, especially among girls, made some comparisons difficult, but these analyses, which focused on changes in substance use over a short period of time, provide important insight into the etiology of substance use in this population. The low levels of use and subsequent changes in use were likely to reflect initial substance experimentation. Therefore, these results were relevant since they likely capture the ability of ethnic identity to buffer against substance experimentation at the start of the developmental period—early or preadolescence—when rates of initiation of substance use accelerate markedly. Third, given that data were collected within classrooms, certain sample selection biases may be present such as the exclusion of youth not attending school or on long-term absences. Although substance use is likely to be more prevalent among absentees, research has shown that these students are likely to be absent for reasons unrelated to substance use and this proportion of students is so small that it is unlikely to have a significant impact on the mean levels of use (Johnston & O'Malley, 1985). Fourth, the data were drawn from self-reports of substance use and substance use antecedents. Although early adolescents might minimize their substance use in favor of socially desirable outcomes, inquiring about recent (i.e., past 30 days) use is a recommended approach to studying these behaviors (Harrell, 1985). This issue was also addressed by the longitudinal design of the analysis that assessed change in substance use rather than attempting to pinpoint true prevalence.

Conclusion

Despite its limitations, this study provides insights into how ethnic identity is related to substance use and substance use antecedents for Mexican-heritage youth. Examining the relationships between strength of ethnic identity, time in the United States, and substance use by gender is clearly important because Mexican-heritage gender groups appear to experience different levels of substance use according to their cultural experiences and identity process. Failure to recognize this would otherwise have led us to disregard how ethnic identity is differentially related to substance use within the largest ethnic group in the United States.

The evidence presented indicates that strong ethnic identity provides some protection against substance use for Mexican-heritage preadolescent males. This group seems to be susceptible to greater risk of substance use through prolonged exposure to certain antecedents of use the longer the amount of time spent in the United States. Researchers have argued that this could be due to greater involvement with individuals with access to substances (Escobar, Nervi, & Gara, 2000; Warner et al., 2006), and our results found these boys did get more substance offers. Under these circumstances, strong ethnic identity may buffer against the factors that often lead to later substance use. To develop a strong Mexican-heritage ethnic identity may be especially desirable for boys in preadolescence as they navigate multiethnic social networks and develop a sense of ethnic pride which may lead them to adopt or retain antidrug norms and behaviors.

Females do not experience similarly consistent relationships between ethnic identity and substance use or its antecedents. In fact, stronger ethnic identity seems to increase the

likelihood that preadolescent Mexican-heritage girls engage in alcohol use and marijuana use. Little research has investigated the gender differences in the relationship between ethnic identity and substance use and future research should investigate in more detail if this relationship holds for older (i.e., adolescent and emerging adult) Mexican-heritage females. It may be that younger Latinas, like those in this sample, are typically protected by restrictions on their independence due to close supervision by their parents and other family members (Rodriguez & Zayas, 1990). By limiting their exposure to ethnically diverse peers and keeping them closer to family and antidrug use norms, these younger Latinas may face less urgent pressure to reconcile what ethnic identity means to them while navigating conflicting cultural traditions. However, some Latinas may become embedded in social groups that foster substance use and simultaneously encourage development of a strong sense of ethnic identity. This scenario may involve a complex set of issues that includes turning away from traditional Latina anti-drug use norms in favor of pro-drug use norms in conjunction with a strong sense of ethnic pride. Given the limited knowledge of these potentially gendered relationships between substance use and ethnic identity, future research should investigate these possibilities through longitudinal studies with older and socioeconomically diverse samples.

Acknowledgments

The data for this study were collected with support from the National Institute on Drug Abuse (R01 DA005629).

Funding

The authors disclosed that they received the following support for their research and/or authorship of this article: Data analysis and manuscript preparation were supported by a Center of Excellence grant from the National Center on Minority Health and Health Disparities (P20MD002316-04, F. Marsiglia, P.I.) for the Research Core project (P20 MD002316-049001, S. Kulis, P.I.).

References

- Aiken, L.S.; West, S.G. Multiple regression: Testing and interpreting interactions. Thousand Oaks, CA: Sage; 1991.
- Alaniz ML, Treno AJ, Saltz RF. Gender, acculturation, and alcohol consumption among Mexican Americans. *Substance Use & Misuse*. 1999; 34:1407–1426. [PubMed: 10446767]
- Barger SD, Gallo LC. Ability of ethnic self-identification to partition modifiable health risk among U.S. residents of Mexican ancestry. *American Journal of Public Health*. 2008; 98:1971–1978. [PubMed: 18799775]
- Bernal ME, Knight GP, Garza CA, Ocampo KA, Cota MK. The development of ethnic identity in Mexican American children. *Hispanic Journal of Behavioral Sciences*. 1990; 12:3–24.
- Bui HN, Thongniramol O. Immigration and self-reported delinquency: The interplay of immigration generations, gender, race, and ethnicity. *Journal of Crime and Justice*. 2005; 28:71–99.
- Caetano R. Acculturation and attitudes toward appropriate drinking among U.S. Hispanics. *Alcohol & Alcoholism*. 1987; 22:427–433. [PubMed: 3426772]
- Castro FG, Sharp EV, Barrington EH, Walton M, Rawson RA. Drug abuse and identity in Mexican Americans: Theoretical and empirical considerations. *Hispanic Journal of Behavioral Sciences*. 1991; 13:209–225.
- Chen K, Kandel DB. The natural history of drug use from adolescence to mid-thirties in a general population sample. *American Journal of Public Health*. 1995; 85:41–47. [PubMed: 7832260]
- Delva J, Wallace JM, O'Malley P, Bachman JG, Johnston LD, Schulenberg J. The epidemiology of alcohol, marijuana, and cocaine use among Mexican American, Puerto Rican, Cuban American, and other Latin American eighth-grade students in the United States: 1991–2002. *American Journal of Public Health*. 2005; 95:696–702. [PubMed: 15798132]
- De La Rosa M. Acculturation and Latino adolescents' substance use: A research agenda for the future. *Substance Use & Misuse*. 2002; 37:429–456. [PubMed: 12064428]

- Elek E, Miller-Day M, Hecht ML. Influences of personal, injunctive and descriptive norms on early adolescent substance use. *Journal of Drug Issues*. 2006; 36:147–171.
- Escobar JI, Nervi CH, Gara MA. Immigration and mental health: Mexican Americans in the United States. *Harvard Review of Psychiatry*. 2000; 8:64–72. [PubMed: 10902095]
- French SE, Seidman E, Allen L, Aber JL. The development of ethnic identity during adolescence. *Developmental Psychology*. 2006; 42:1–10. [PubMed: 16420114]
- Fuligni AJ, Witkow M, García C. Ethnic identity and the academic adjustment of adolescents from Mexican, Chinese, and European backgrounds. *Developmental Psychology*. 2005; 41:799–811. [PubMed: 16173876]
- Harrell, AV. Validation of self-report: The research method. In: Rouse, BA.; Kozel, NJ.; Richards, LG., editors. *Self-report methods of estimating drug use: Meeting current challenges to validity* (DHHS Publication No 85-1402). Rockville, MD: National Institute on Drug Abuse; 1985. p. 12-21.
- Hecht ML, Marsiglia FF, Elek E, Wagstaff DA, Kulis S, Dustman P, et al. Culturally grounded substance use prevention: An evaluation of the keepin' it REAL curriculum. *Prevention Science*. 2003; 4:233–248. [PubMed: 14598996]
- Holley LC, Moya-Salas L, Marsiglia FF, Yabiku S, Fitzharris B, Jackson KF. Youth of Mexican descent of the Southwest: Exploring differences in ethnic labels. *Children & Schools*. 2009; 31:1–64.
- James WH, Kim GK, Armijo E. The influence of ethnic identity on drug use among ethnic minority adolescents. *Journal of Drug Education*. 2000; 30:265–280. [PubMed: 11092148]
- Johnston LD. The survey technique in drug abuse assessment. *Bulletin of Narcotics*. 1989; 41:29–40.
- Johnston, LD.; O'Malley, PM. Issues of validity and population coverage in student surveys of drug use. In: Rouse, BA.; Kozel, NJ.; Richards, LG., editors. *Self-report methods of estimating drug use: Meeting current challenges to validity* (DHHS Publication No 85-1402). Rockville, MD: National Institute on Drug Abuse; 1985. p. 31-54.
- Johnston, LD.; O'Malley, PM.; Bachman, JG. NIH Publication No 07-6205. Bethesda, MD: National Institute on Drug Abuse; 2007. *Monitoring the future: National Survey Results on Drug Use, 1975–2006. Volume I: Secondary school students*.
- Kandel DB, Wu P. The contribution of mothers and fathers to the inter-generational transmission of cigarette smoking in adolescence. *Journal of Research on Adolescence*. 1995; 5:225–252.
- Knight GP, Vargas-Chanes D, Losoya SH, Cota-Robles S, Chassin L, Lee JM. Acculturation and enculturation trajectories among Mexican American adolescent offenders. *Journal of Research on Adolescence*. 2009; 19:625–653. [PubMed: 20300539]
- Kulis S, Marsiglia FF, Nieri T, Sicotte D, Hohmann-Marriott B. Majority rules? The effects of school ethnic composition on substance use by Mexican heritage adolescents. *Sociological Focus*. 2004; 37:373–393.
- Love AS, Yin Z, Codina E, Zapata JT. Ethnic identity and risky health behaviors in school-age Mexican-American children. *Psychological Reports*. 2006; 98:735–744. [PubMed: 16933671]
- Luthar SS, Cicchetti D, Becker B. The construct of resilience: A critical evaluation and guidelines for future work. *Child Development*. 2000; 71:543–562. [PubMed: 10953923]
- Marsiglia FF, Kulis S, Hecht ML. Ethnic labels and ethnic identity as predictors of drug use among middle school students in the Southwest. *Journal of Research on Adolescence*. 2001; 11:21–48.
- Marsiglia FF, Kulis S, Hecht ML, Sills S. Ethnicity and ethnic identity as predictors of drug norms and drug use among preadolescents in the U.S. Southwest. *Substance Use & Misuse*. 2004; 39:1061–1094. [PubMed: 15387204]
- Marsiglia FF, Kulis S, Hussaini SK, Nieri TA, Becerra D. Gender differences in the effect of linguistic acculturation on substance use among Mexican-origin youth in the Southwest United States. *Journal of Ethnicity in Substance Abuse*. 2010; 9:40–63. [PubMed: 20390972]
- National Institute on Drug Abuse. *Drug use among racial/ethnic minorities*, revised. Bethesda, MD: U.S. Department of Health and Human Services; 2003.
- Ontai-Grzebik LL, Raffaelli M. Individual and social influences on ethnic identity among Latino young adults. *Journal of Adolescent Research*. 2004; 19:559–575.

- Pahl K, Way N. Longitudinal trajectories of ethnic identity among urban Black and Latino adolescents. *Child Development*. 2006; 77:1403–1415. [PubMed: 16999807]
- Parks EE, Carter RT, Gushue GV. At the crossroads: Racial and womanist identity development in Black and White women. *Journal of Counseling and Development*. 1996; 74:624–631.
- Peña JB, Wyman PA, Brown CH, Matthieu MM, Olivares TE, Hartel D, et al. Immigration generation status, and its association with suicide attempts, substance use, and depressive symptoms among Latino adolescents in the USA. *Prevention Science*. 2008; 9:299–310. [PubMed: 18855139]
- Perea A, Slater M. Power distance and collectivist/individualist strategies in alcohol warnings: Effects of gender and ethnicity. *Journal of Health Communication*. 1999; 4:295–310. [PubMed: 10790786]
- Phinney JS. The multigroup ethnic identity measure: A new scale for use with diverse groups. *Journal of Adolescent Research*. 1992; 7:156–176.
- Phinney JS. Understanding ethnic diversity: The role of ethnic identity. *American Behavioral Scientist*. 1996; 40:143–152.
- Phinney JS, Cantu CL, Kurtz DA. Ethnic and American identity as predictors of self-esteem among African American, Latino, and White adolescents. *Journal of Youth and Adolescence*. 1997; 26:165–185.
- Poindexter-Cameron JM, Robinson TL. Relationships among racial identity attitudes, womanist identity attitudes, and self-esteem in African American college women. *Journal of College Student Development*. 1997; 38:288–296.
- Rodriguez, O.; Zayas, LH. Hispanic adolescents and antisocial behavior: Sociocultural factors and treatment implications. In: Stiffman, AR.; Davis, LE., editors. *Ethnic Issues in adolescent mental health*. Newbury Park, CA: Sage; 1990. p. 147-171.
- Rogler LH. The meaning of culturally sensitive research in mental health. *American Journal of Psychiatry*. 1989; 146:296–303. [PubMed: 2919686]
- Scheier LM, Botvin GJ, Diaz T, Ifill-Williams M. Ethnic identity as a moderator of psychosocial risk and adolescent alcohol and marijuana use: Concurrent and longitudinal analyses. *Journal of Child and Adolescent Substance Abuse*. 1997; 6:21–47.
- Schwartz SJ, Zamboanga BL, Jarvis LH. Ethnic identity and acculturation in Hispanic early adolescents: Mediated relationships to academic grades, prosocial behaviors, and externalizing symptoms. *Cultural Diversity and Ethnic Minority Psychology*. 2007; 13:364–373. [PubMed: 17967105]
- Supple AJ, Ghazarian SR, Frabutt JM, Plunkett SW, Sands T. Contextual influences on Latino adolescent ethnic identity and academic outcomes. *Child Development*. 2006; 77:1427–1433. [PubMed: 16999809]
- Swanson JW, Linskey AO, Quintero-Salinas R, Pumariega AJ, Holzer CE. A binational school survey of depressive symptoms, drug use, and suicidal ideation. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1992; 31:669–678. [PubMed: 1644730]
- Turner KL, Brown CS. The centrality of gender and ethnic identities across individuals and contexts. *Social Development*. 2007; 16:700–719.
- Umaña-Taylor AJ. Ethnic identity and self-esteem: Examining the role of social context. *Journal of Adolescence*. 2004; 27:139–146. [PubMed: 15023513]
- Umaña-Taylor, AJ.; Alfaro, EC. Ethnic identity among U.S. Latino adolescents: Theory, measurement, and implications for well-being. In: Villarruel, FA.; Luster, T., editors. *The crisis in youth mental health: Critical issues and effective programs*. Vol. 2. Disorders in adolescence. Westport CT: Praeger; 2006. p. 195-211.
- Umaña-Taylor AJ, Bhanot R, Shin N. Ethnic identity formation during adolescence: The critical role of families. *Journal of Family Issues*. 2006; 27:390–414.
- Umaña-Taylor AJ, Fine MA. Examining ethnic identity among Mexican-origin adolescents living in the United States. *Hispanic Journal of Behavioral Sciences*. 2004; 26:36–59.
- Umaña-Taylor AJ, Vargas-Chanes D, Garcia CD, Gonzales-Backen M. A longitudinal examination of Latino adolescents' ethnic identity, coping with discrimination, and self-esteem. *Journal of Early Adolescence*. 2008; 28:16–50.

- Umaña-Taylor AJ, Yazedjian A, Bámaca-Gómez M. Developing the ethnic identity scale using Eriksonian and social identity perspectives. *Identity*. 2004; 4:9–38.
- Unger JB, Ritt-Olson A, Soto DW, Baezconde-Garbanati L. Parent–child acculturation discrepancies as a risk factor for substance use among His-panic adolescents in Southern California. *Journal of Immigrant Minority Health*. 2009; 11:149–157.
- U.S. Census Bureau. US Hispanic population surpasses 45 million: Now 15 percent of total. 2008 May 1. Retrieved September 4, 2010, from <http://www.census.gov/newsroom/releases/archives/population/cb08-67.html>
- Valentine S, Mosley G. Acculturation and sex-role attitudes among Mexican Americans: A longitudinal analysis. *Hispanic Journal of Behavioral Sciences*. 2000; 22:104–113.
- Vega WA, Alderete E, Kolody B, Aguilar-Gaxiola S. Illicit drug use among Mexicans and Mexican Americans in California: The effects of gender and acculturation. *Addiction*. 1998; 93:1839–1850. [PubMed: 9926572]
- Wade JC. African American men’s gender role conflict: The significance of racial identity. *Sex Roles*. 1996; 34:17–33.
- Warner LA, Valdez A, Vega WA, de la Rosa M, Turner RJ, Canino G. Hispanic drug abuse in an evolving cultural context: An agenda for research. *Drug and Alcohol Dependence*. 2006; 84S:S8–S16. [PubMed: 16750335]
- Williams LS, Alvarez SD, Andrade Hauck KS. My name is not Maria: Young Latinas seeking home in the heartland. *Social Problems*. 2002; 49:563–584.
- Wong CA, Eccles JS, Sameroff A. The influence of ethnic discrimination and ethnic identification on African American adolescents’ school and socio-emotional adjustment. *Journal of Personality*. 2003; 71:1197–1232. [PubMed: 14633063]
- Wright, D.; Pemberton, M. Risk and protective factors for adolescent drug use: Findings from the 1999 National Household Survey on Drug Abuse. Rockville, MD: Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Office of Applied Studies; 2004.
- Yin Z, Zapata JT, Katims DS. Risk factors for substance use among Mexican American school-age youth. *Hispanic Journal of Behavioral Sciences*. 1995; 17:61–76.
- Zamboanga BL, Raffaelli M, Horton NJ. Acculturation status and heavy alcohol use among Mexican American college students: Investigating the moderating role of gender. *Addictive Behaviors*. 2006; 31:2188–2198. [PubMed: 16603321]
- Zamboanga BL, Schwartz SJ, Jarvis LH, Van Tyne K. Acculturation and substance use among Hispanic early adolescents: Investigating the mediating roles of acculturative stress and self-esteem. *Journal of Primary Prevention*. 2009; 30:315–333. [PubMed: 19408121]

Biographies

Stephen S. Kulis, PhD, is Cowden Distinguished Professor of sociology in the School of Social and Family Dynamics and the director of research at the Southwest Interdisciplinary Research Center at Arizona State University, Phoenix. His research focuses on gender identity and ethnic identity and their role in risk behaviors of Mexican American and American Indian youth, and the cultural adaptation of prevention interventions.

Flavio F. Marsiglia, PhD, is the Distinguished Foundation Professor of cultural diversity and health at the School of Social Work and the director of the Southwest Interdisciplinary Research Center (SIRC) at Arizona State University. His research focuses on health disparities and on the protective effects of culture of origin on the health outcomes of Latino and American Indian youth and their families.

Albert M. Kopak, PhD, was a graduate research assistant at the Southwest Interdisciplinary Research Center and is now an assistant professor in the Department of Criminology and Criminal Justice at Western Carolina University, Cullowhee, North Carolina. His research

focuses on the relationship between cultural factors and delinquency among ethnic minority youth.

Maureen E. Olmsted, PhD, is the project coordinator for the Center for the Study of Religion and Conflict at Arizona State University.

Ashley Crossman, PhD, was a graduate research assistant at the Southwest Interdisciplinary Research Center during the analysis for this study and is now an informatics analyst at Health Services Advisory Group in Phoenix, Arizona.

Table 1

Descriptive Statistics for Study Variables

	<i>N</i> ^a	<i>M</i>	<i>SD</i>	Range	Correlation with time in the United States	Correlation with ethnic identity
Alcohol use—Baseline	1,703	1.17	0.63	1–7	0.064***	–0.067***, <i>b</i>
Alcohol use—Time two	1,556	1.21	0.66	1–7	0.041 ^{<i>b</i>}	–0.008 ^{<i>b</i>}
Cigarette use—Baseline	1,716	1.08	0.52	1–7	0.032	–0.111***, <i>b</i>
Cigarette use—Time two	1,556	1.07	0.46	1–7	0.011 ^{<i>b</i>}	–0.049***, <i>b</i>
Marijuana use—Baseline	1,725	1.07	0.53	1–7	0.026	–0.103***, <i>b</i>
Marijuana use—Time two	1,560	1.06	0.42	1–7	0.042	–0.061***, <i>b</i>
Inhalant use—Baseline	1,720	1.11	0.57	1–7	0.016 ^{<i>b</i>}	–0.076***, <i>b</i>
Inhalant use—Time two	1,560	1.15	0.66	1–7	0.032 ^{<i>b</i>}	–0.044
Use intentions—Baseline	1,512	1.24	0.49	1–4	–0.063***	–0.085***
Use intentions—Time two	1,528	1.28	0.53	1–4	–0.014	–0.107***, <i>b</i>
Personal norms—Baseline	1,559	1.22	0.50	1–4	–0.053**	–0.119***, <i>c</i>
Personal norms—Time two	1,525	1.18	0.46	1–4	0.037	–0.067***, <i>b</i>
Friend's use—Baseline	1,527	1.29	0.66	1–4	0.036	–0.039
Friend's use—Time two	1,484	1.39	0.74	1–4	0.041	–0.042 ^{<i>b</i>}
Substance offers—Baseline	1,576	1.26	0.84	1–6	0.022 ^{<i>b</i>}	–0.091***
Substance offers—Time two	1,509	1.36	0.93	1–6	0.033 ^{<i>c</i>}	–0.094***, <i>b</i>
Gender (1 = <i>male</i> ; 0 = <i>female</i>)	1,731	0.49	0.57	0–1	–0.014	–0.043
Age	1,731	10.37	1.84	9–13	–0.030	–0.053**
Usual grades in school	1,713	6.83	0.59	1–9	0.104***	0.148***
Low SES (federal school lunch status)	1,705	1.30	0.45	1–3	0.149***	–0.020
1st-generation status	1,674	0.28	0.50	0–1	–0.502***	0.082***
2nd-generation status	1,674	0.50	0.41	0–1	0.373***	–0.008
3rd-generation status	1,674	0.22	0.48	0–1	0.313***	–0.079***
Treatment (1 = <i>yes</i> ; 0 = <i>no</i>)	1,731	0.62	1.30	0–1	0.049**	–0.011

	<i>N</i> ^a	<i>M</i>	<i>SD</i>	Range	Correlation with time in the United States	Correlation with ethnic identity
Time in the United States	1,704	3.99	0.57	1–5	—	–0.054**
Ethnic identity	1,648	3.21		1–4	–0.054**	—

^a*N* before imputation.

^bCorrelation with outcomes significantly stronger in absolute value for males than for females.

^cCorrelation with outcomes significantly stronger in absolute value for females than for males.

**
p < .05.

p < .01.

p < .001.

Results of Multilevel Models Predicting Substance Use Frequency at Time Two From EI and TUS Controlling for Baseline Substance Use, Treatment, Age, School Grades, SES, and Generation Status

Table 2

	Alcohol use		Cigarette use		Marijuana use		Inhalant use	
	B	SE	B	SE	B	SE	B	SE
Male only model (N = 850)								
Outcome at baseline	0.232	0.010 ****	0.134	0.008 ****	0.182	0.007 ****	0.330	0.010 ****
Treatment (1 = yes; 0 = no)	-0.042	0.045	-0.014	0.042	-0.004	0.027	0.005	0.045
Age	0.010	0.013	0.012	0.009	0.010	0.008	-0.045	0.012 ****
Usual grades in school	-0.033	0.004 ****	-0.027	0.003 ****	-0.024	0.002 ****	-0.015	0.004 ****
Low SES (Federal school lunch status)	0.033	0.013 **	-0.017	0.010 *	-0.012	0.008	-0.004	0.012
2nd-generation status	1.031	0.145 ****	1.094	0.108 ****	0.980	0.092 ****	1.343	0.132 ****
3rd-generation status	0.232	0.010 ****	0.134	0.008 ****	0.182	0.007 ****	0.330	0.010 ****
EI	-0.007	0.007	-0.030	0.005 ****	-0.022	0.005 ****	-0.015	0.007 **
TUS	0.027	0.011 **	0.037	0.008 ****	0.033	0.007 ****	-0.015	0.007 **
EI × TUS	-0.030	0.007 ****	-0.013	0.005 **	-0.025	0.004 ****	-0.008	0.006 **
Intercept	1.031	0.145 ****	1.094	0.108 ****	0.980	0.092 ****	1.343	0.132 ****
Female only model (N = 881)								
Outcome at baseline	0.283	0.014 ****	0.088	0.014 ****	0.469	0.010 ****	0.330	0.015 ****
Treatment (1 = yes; 0 = no)	-0.064	0.050	-0.039	0.024 *	-0.021	0.026	-0.005	0.044
Age	-0.023	0.011 **	-0.011	0.008	0.030	0.007 ****	0.082	0.013 ****
Usual grades in school	-0.017	0.004 ****	0.002	0.003	-0.001	0.002	0.004	0.004
Low SES (federal school lunch status)	0.029	0.011 ***	0.023	0.008 ****	-0.027	0.007 ****	-0.029	0.013 **
2nd-generation status	-0.100	0.019 ****	-0.064	0.013 ****	0.002	0.011	0.005	0.021
3rd-generation status	-0.054	0.023 **	-0.007	0.016	0.104	0.013 ****	0.069	0.025 ****
EI	0.027	0.006 ****	0.007	0.004	0.011	0.004 ***	-0.013	0.007 *
TUS	0.017	0.008 **	0.001	0.006	0.002	0.005	-0.028	0.009 ****
EI × TUS	0.026	0.007 ****	0.004	0.005	0.004	0.004	0.006	0.007

	Alcohol use		Cigarette use		Marijuana use		Inhalant use	
	B	SE	B	SE	B	SE	B	SE
Intercept	1.285	0.130	1.096	0.091	0.300	0.074	-0.054	0.143
Overall model: Interaction results only ($N = 1,731$)								
Male $\times$ EI	-0.036	0.010	-0.041	0.007	-0.024	0.006	0.000	0.010
Male $\times$ TUS	0.042	0.010	0.018	0.007	-0.005	0.006	0.052	0.010
Male $\times$ TUS $\times$ EI	-0.052	0.010	-0.017	0.007	-0.032	0.006	-0.017	0.010

Note: EI = ethnic identity; TUS = time in the United States.

* $p < .10$.

** $p < .05$.

*** $p < .01$.

**** $p < .001$.

Table 3

Results of Multilevel Models Predicting Use Intentions, Personal Norms, Friend's Use, and Substance Offers at Time Two From EI, and TUS, Controlling for Baseline, Treatment, Age, School Grades, SES, and Generation Status

	Use intentions			Personal norms			Friend's use			Substance offers		
	B	SE		B	SE		B	SE		B	SE	
Male only model ($N = 850$)												
Outcome at baseline	0.328	0.011	****	0.247	0.010	****	0.321	0.011	****	0.217	0.011	****
Treatment (1 = yes; 0 = no)	-0.043	0.044		0.018	0.051		0.091	0.048	*	0.066	0.083	
Age	0.106	0.010	****	0.048	0.009	****	0.041	0.014	****	0.127	0.018	****
Usual grades in school	-0.035	0.003	****	-0.029	0.003	****	-0.013	0.004	****	-0.027	0.005	****
Low SES (federal school lunch status)	0.012	0.010		0.011	0.009		0.046	0.014	****	-0.051	0.018	****
2nd-generation status	0.039	0.018	**	0.019	0.017		-0.031	0.025		0.043	0.033	
3rd-generation status	-0.056	0.021	***	-0.008	0.020		0.001	0.029		0.000	0.038	
EI	-0.050	0.006	****	-0.026	0.005	****	-0.037	0.008	****	-0.079	0.010	****
TUS	0.002	0.008		0.007	0.008		0.015	0.011		-0.014	0.015	
EI $\times$ TUS	-0.016	0.005	***	-0.009	0.005	*	-0.009	0.007		0.030	0.009	***
Intercept	0.066	0.111		0.605	0.109	****	0.569	0.153	****	0.049	0.204	
Female only model ($N = 881$)												
Outcome at baseline	0.315	0.011	****	0.202	0.009	****	0.312	0.012	****	0.276	0.013	****
Treatment (1 = yes; 0 = no)	-0.021	0.040		-0.016	0.028		0.032	0.076		0.036	0.075	
Age	-0.011	0.009		0.029	0.007	****	0.171	0.013	****	0.091	0.016	****
Usual grades in school	-0.019	0.003	****	-0.013	0.002	****	0.012	0.004	****	-0.010	0.005	*
Low SES (federal school lunch status)	-0.043	0.009	****	-0.010	0.007		-0.071	0.013	****	-0.087	0.016	****
2nd-generation status	-0.107	0.015	****	-0.048	0.012	****	0.009	0.021		0.055	0.026	**
3rd-generation status	-0.038	0.018	**	0.000	0.014		0.139	0.026	****	0.087	0.032	****
EI	-0.010	0.005	**	0.001	0.004		-0.011	0.007		0.012	0.009	
TUS	0.036	0.007	****	0.027	0.005	****	0.007	0.010		0.043	0.012	****
EI $\times$ TUS	0.005	0.005		0.011	0.004	***	0.035	0.008	****	-0.006	0.009	

	Use intentions		Personal norms		Friend's use		Substance offers	
	B	SE	B	SE	B	SE	B	SE
Intercept	1.232	0.102	0.738	0.080	-0.832	0.155	0.166	0.185
Overall model: Interaction results only (N = 1,731)								
Male × EI	-0.046	0.007	-0.028	0.007	-0.038	0.011	-0.089	0.013
Male × TUS	-0.018	0.007	-0.006	0.007	-0.015	0.011	-0.076	0.013
Male × TUS × EI	-0.020	0.007	-0.023	0.007	-0.050	0.011	0.027	0.013

Note: EI = ethnic identity; TUS = time in the United States.

* $p < .10$.
** $p < .05$.
*** $p < .01$.
**** $p < .001$.