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A Cross-National Study of Preadolescent Substance Use: Exploring Differences Between Youth in Spain and Arizona

Maria Angeles Luengo¹, Stephen Kulis², Flavio Francisco Marsiglia², Estrella Romero¹,
José Antonio Gómez-Fraguela¹, Paula Villar¹, and Tanya Nieri³

¹University of Santiago de Compostela, Santiago de Compostela, Spain

²Arizona State University, Phoenix, Arizona, USA

³University of California, Riverside, California, USA

Abstract

This study aims to comparatively examine drug use in Arizona and Spain, in order to know if similarities and differences in drug use patterns justify the administration in Spain of U.S. prevention intervention programs. Data were obtained from independent samples of seventh-grade students recruited from urban public schools and surveyed in 1998: 4,035 ethnically diverse Arizona students (Latinos and non-Hispanic Whites), and 2,243 Spanish-White students. Comparisons using Odds ratios and Chi-square tests allowed assessment of differences in drug use rates between preadolescents in Arizona and Spain taking into account gender. Furthermore, ethnicity differences in preadolescent drug use and in psychosocial risk factors were explored using multivariate analysis (ANOVA and logistic regression). Our results showed similar trends in drug use between Arizona and Spain students, with gateway drugs already in use by early adolescents, and with higher rates of drug use among males than among females. However, cross-national differences in marijuana/cannabis use were noteworthy: Arizona preadolescents were over 25 times more likely to report marijuana/cannabis use than preadolescents from Spain. Moreover, when ethnic differences were considered, Latinos in Arizona reported higher marijuana/cannabis use compared with non-Latino students. Drug use patterns among Latino preadolescents, as well as the relevance of some risk factors among the diverse groups, were strongly influenced by their level of acculturation. Study limitations and the implications of our findings for early drug use prevention and future research are discussed.

Keywords

Preadolescents; substance use; cross-national; Spain; Arizona; gender; ethnicity

Substance abuse¹ among adolescents is an important public health problem both in the United States and in Europe. Adolescent substance misuse has been related to other behavioral problems such as school dropout, truancy, aggression, and antisocial behavior (Donovan and Jessor, 1978; Eggert and Randell, 2003). In addition, drug use during late childhood and adolescence may lead to diverse social and emotional problems during adulthood and, therefore, considerably impair psychosocial development (National Institute on Drug Abuse, 2003; Severson, Andrews, and Walker, 2003). The strong relevance of the drug use problem

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Address correspondence to Stephen Kulis, Director of Research, Southwest Interdisciplinary Research Center (SIRC), Arizona State University, 411 North Central Ave., Suite 720, Phoenix, AZ, 85004-0963. E-mail: Kulis@asu.edu.

¹The journal's style utilizes the category *substance abuse* as a diagnostic category. Substances are used or misused; living organisms are and can be *abused*. Editor's note.

has promoted the development of prevention strategies in different countries (Ferrer-Wreder, Stattin, Lorente, Tubman, and Adamson, 2004). Usually, prevention programs that have been proven as efficacious in other contexts are selected for administration. In fact, many European countries have imported prevention strategies developed in the United States, given that the better known U.S. programs are supported by rigorous evaluation data. Within this context, the present study is aimed at comparatively examining drug use in Arizona and Spain, in order to know if similarities and differences in drug use patterns justify the administration in Spain of U.S. programs.

A shared aspect of efficacious preventive strategies is the emphasis on early drug use as a predictor of misuse in late adolescence and adulthood. In fact, recent research has demonstrated that individuals who initiate substance use in early adolescence are significantly more vulnerable to drug-abuse problems than those who initiate substance use during late adolescence or young adulthood (Duncan, Alpert, Duncan, and Hops, 1997). On the other hand, epidemiological research in the United States and Europe has recently shown that the use of substances such as alcohol, tobacco, and cannabis is relatively common in preadolescents in different countries—hence the importance of giving attention to early substance use when analyzing the development of drug use and misuse. For example, recent findings from the Monitoring the Future (MTF) study of youth nationwide (Johnston et al., 2006) indicate that substantial proportions of 8th- to 12th- graders in the United States continue to use substances, despite gradual declines in the percentages in the recent years. The 2005 MTF study (Johnston, O'Malley, Bachman, and Schulenberg, 2006) found that alcohol use remained widespread among teenagers; 75% had consumed alcohol by the end of high school (17–18 years old), and 41% had so done by eighth grade (13–14 years old). The next most-used substance was cigarettes. More than half (50%) of students had tried cigarettes by 12th grade and more than a quarter (26%) had done so by 8th grade. Rates of marijuana/cannabis uses were somewhat lower, with 45% of students by 12th grade and 17% of students by 8th grade reporting lifetime use. The proportions of students reporting use of any illicit drug other than marijuana in their life were 27% by 12th grade and 12% by 8th grade.

In Spain, according to recent statistics, many types of substance use have been increasing in the last decade or remain at troublesome levels among adolescents. A 2004 national school-based drug survey sampled 25,521 students between 14 and 18 years of age from 573 public and private schools in Spain (Plan Nacional Sobre Drogas, 2004). Alcohol was the substance most frequently consumed by students, followed by tobacco and marijuana/cannabis. More than 90% (93.8%) of students reported lifetime use of alcohol by the end of high school (18 years old), and 59.2% of 14-year-olds have done so. Rates of tobacco use were similarly high, with 77.3% of 18-year-old and 42.1% of 14-year-old youth reporting lifetime uses. Rates of marijuana/cannabis use were somewhat lower, with 63.5% of 18-year-old and 19.6% of 14-year-old youth reporting lifetime use. The proportions of students reporting use of any illicit drug other than marijuana/cannabis in their life were 20.5% by 12th grade and 7.9% by 8th grade.

These epidemiological data indicate that substance use increases with age. Epidemiological data also show that use of the so-called “gateway drugs” becomes common in early adolescence. Initiation drugs, such as tobacco and alcohol, often lead to greater use of marijuana/cannabis, increasing, in turn, the risk of progression to other drugs such as cocaine, hallucinogens or other illicit substances. Moreover, it has been well documented that early adolescents who report any substance use may continue to use drugs in late adolescence, increase their use over time, and often progress to use of other drugs (see Duncan, Duncan, and Hops, 1998). These current findings from the research literature suggest that a careful study of early adolescent drug use could help to improve young-adult health outcomes. So, it is

particularly relevant to examine drug use patterns in early adolescence, as well as common factors which, in different countries, are related to drug use onset.

Gender and Ethnic Differences in Adolescent Drug Use

Research has shown that female and male adolescents have different drug-related behaviors. For example, U.S. epidemiological data on adolescent drug use indicate that, generally, males have higher rates of drinking and somewhat higher rates of illicit drug use than females (Johnson, O'Malley, Bachman, and Schulenberg, 2004). In Spain, epidemiological data indicate that, generally, there are gender differences in substance use, except for alcohol, for which rates are similar for males and females. Compared to boys, girls are more likely to report monthly tobacco use. For other substances, such as marijuana/cannabis and other illegal drugs, there is an inverse trend, with boys reporting higher rates than females. Another study in Europe, carried out in England by Rodham and associates (2005) reported similar results to those found in the Spanish data in a comparative analysis of cigarette and illicit drug use between females and males. However, in England males were more likely to use alcohol compared to females.

Considering the increasing geographical mobility and cultural diversity in Europe and beyond, ethnicity is another important variable when analyzing patterns of adolescent drug use. Alongside gender differences, ethnic and intercultural differences are attracting substantial attention in current studies, which consider ethnicity to be a powerful determinant of adolescent drug use (see, e.g., Kulis, Marsiglia, and Hecht, 2003; Kulis, Marsiglia, and Hurdle, 2003; Rodham, Hawton, Evans, and Weatherall, 2005; Wallace et al., 2003). Most of these studies compare Hispanics to non-Hispanic adolescents. Yet, the composition of the Hispanic group is not the same across the different studies. Although many important studies consider Latino adolescents as an undifferentiated group (Schinke et al., 1992; Gil, Werner, and Tumban, 2004), other research has explored differences among Latino subgroups such as Mexican-Americans, Cuban-Americans, Puerto Ricans, and those with other Latin-American origins (e.g., Suárez, and Randall, 1992; Vega, Zimmerman, Warheit, Apospori, and Gil, 1993; Wallace et al., 2003).

Generally, these studies show a common trend, indicating fairly similar rates of tobacco and alcohol use among non-Hispanic Whites and Latinos in adolescence, with slightly higher rates among non-Hispanic Whites at older ages. When marijuana/cannabis rates are compared, this trend is inverted; although the differences are still slight, marijuana/cannabis rates are higher in the Latino group (Vega et al., 1993; Wallace et al., 2003; Warheit, Vega, Khoury, Gil, and Elfenbein, 1996). Another important finding is that there appear to be few significant differences among the various Latino subgroups (see Bachman et al., 1991; Warheit et al., 1996). Moreover, when differences were found, they were related more closely to levels of acculturation than to nativity.

The relevance of acculturation as a critical factor when predicting adolescent health-related behaviors is well documented (e.g., Balls Organista, Organista, and Kurasaki, 2003), and, thus, should be considered in the study of drug use. Some recent studies have acknowledged its power as a variable in adolescent drug use; such studies have evidenced the mediating effects of acculturation in the relationship between ethnicity and early adolescence drug use patterns (see Epstein, Botvin, and Díaz, 2000; Kulis, Marsiglia, and Hurdle, 2003; Vega and Gil, 1998).

Most research comparing drug use between Hispanic and non-Hispanic White adolescents has analyzed samples of U.S. students. This paper aims to provide a cross-cultural comparative analysis of prevalence and correlates of drug use, considering three populations: non-Hispanic Whites in the United States, Latinos in the United States, and Spanish Whites.

Research on adolescent drug use has consistently underlined the relevance of a vast array of social and psychological determinants. In this study, some of the most relevant factors were selected for an analysis of their effects on drug use in different adolescent populations. This selection is founded on the widespread evidence relating: (a) involvement with drug-using peers to the onset/increase in drug use (e.g., Catalano and Hawkins, 1996); (b) refusal skills to lower rates of alcohol and tobacco use, as well as lower risk of substance abuse (e.g., Gosling, Marsiglia, and Hecht, 2003); (c) low school involvement to drug use onset (e.g., Manson and Dwindle, 2001); and (d) family bonding and good parent—child relations to a lower risk of drug use (e.g., Moon, Jackson, and Hecht, 2000).

This cross-cultural comparative analysis may provide valuable contributions to the literature on substance use and abuse. First, in addition to providing a comparative analysis of adolescent drug use in two countries, this study includes the comparison of drug use between adolescents from different cultures, but with similarities potentially related to the degree of convergence in drug abuse patterns across the different groups. For example, Latino adolescents share language with Spanish adolescents, but Spanish cultural values seem to be closer to the cultural values of non-Hispanic Whites (e.g., individualism, goal-oriented behavior; see Gosling, Marsiglia, and Hecht, 2003; Elzo et al., 1999). On the other hand, acculturation in Latinos also seems to be relevant to the explanation of drug use patterns: more “acculturated” adolescents might show higher substance use rates, due to the loss of positive values from the origin culture and the adoption of behavioral patterns favorable to drug use, in an attempt to become integrated into the dominant culture.

Second, the samples considered in this study consist of males and females in seventh grade (12–13 years old). Many studies in the United States and Spain that describe adolescent drug use are carried out with samples older than 14 years. This study compares preadolescent drug use in both countries and analyzes whether the relationship between gender and drug use is the same in both samples. Finally, previous research on drug use in different ethnic groups has focused mainly on adolescents older than eighth graders. This study extends this research by including preadolescent samples and analyzing whether drug use prevalence in different ethnic groups shows a pattern similar to the one found at older ages.

The data collected in our samples allows us to address three main aims: first, to examine differences in drug use rates between preadolescents in Arizona and preadolescents in Spain taking into account gender; and second, to compare drug use rates between Spanish and U.S. preadolescents from different ethnic groups and at different levels of acculturation. Third, to examine and compare risk factors² in preadolescents across the different groups.

Methods

Participants

The data were obtained from independent samples of students in two countries: the United States and Spain. The two samples are part of separate longitudinal studies on the prevention of drug abuse during early adolescence that were designed to assess the effects of two preventive programs among middle-school students in the 1998–1999 and 1999–2000 academic years. Both samples were recruited and surveyed in 1998. To meet the study aims

²The concepts of risk and protective factors are often noted in the literature, but without an adequate delineation of their dimensions (linear, nonlinear), their “demands,” and the critical necessary conditions (endogenous as well as exogenous ones), which are necessary for either of them to operate (begin, continue, become anchored and integrate, change as de facto realities change, cease, etc.) or not to and whether their underpinnings are theory driven, empirically based, individual, and/or systemic stake-holder-bound, based on “principles of faith.” This is necessary to clarify whether these terms are not to remain as yet another shibboleth in a field of many stereotypes. Editor’s note.

and ensure comparability across samples, only pre-adolescent students (ages 12–13) were considered.

The U.S. sample is drawn from a southwestern state, Arizona (AZ), that borders on Mexico and contains a large Latino population predominantly of Mexican origin. Thirty-five urban public schools were recruited there. The participating schools provided a population of 4,035 seventh-grade students (49.1% female; mean age = 12.41; $SD = 0.56$). The 35-school sample sizes ranged from 56 to 725 student respondents per school. A large plurality of the Arizona students were Latino (79.9%), overwhelmingly of Mexican heritage. Less than one fifth (18.8%) of the students were non-Hispanic White, and the remaining 1.3% were of various ethnic backgrounds (American Indian, African American, Asian American). The Latino sample was further divided in the analysis into two categories according to their level of linguistic acculturation: 1,535 pre-adolescents (55.3% of Latino students) who spoke English “mostly” or “exclusively” with their friends and family were considered “more acculturated,” and the remaining 1,329 who were bilingual or Spanish dominant with family and friends were considered “less acculturated.”

For the sample in Spain, 47 public schools were recruited in urban areas from 22 Spanish provinces. The participating schools provided a population of 2,243 students (45.1% female) in the first grade of Secondary Compulsory Education (mean age = 12.46; $SD = 0.49$). The sample sizes by province ranged from 54 and 476 students.

Procedures

Both in Arizona and in Spain, parental consent was obtained. All the parents of the targeted grades received a letter signed by the school principal and the principal investigator. This letter provided information on the study aims and explained that the surveys would be anonymous, that participation would be voluntary, and that only the research team would have access to the individual-level survey data. The consent process was passive: Students were recruited through an implicit parental assent.

Data were collected through self-reports provided by the preadolescents during regular classroom time. Students who were not willing to participate or whose parents refused to consent were assigned an alternative task while the survey was administered. Questionnaires were administered by trained research staff from the School of Social Work at Arizona State University, United States, or from the Unit for Research on the Prevention of Conduct Problems at the University of Santiago de Compostela, Spain. In both sites, anonymity and confidentiality were guaranteed. The assessment procedures and human subjects protections in Arizona were approved by the local university’s Institutional Review Board and the U.S. National Institutes of Health, whereas those in Spain were approved by the Spanish Department of Education.

Instruments and Measures

The instruments used in Arizona and Spain were surveys elaborated by the research teams in their respective countries; The surveys were designed to (a) assess use of alcohol, tobacco, and marijuana/cannabis; (b) assess correlates of drug use in the peer, school, family, and individual domains; (c) be administered in the classroom setting in a 1-hour period; (d) suit students ages 11 years or older; and (e) be optically scannable.

In accordance with the objectives of this study, items that were shared by the Arizona and Spain surveys were selected for analysis. Specifically, 15 items from the original questionnaires were selected to provide information on demographics (age and gender); lifetime use of alcohol, tobacco, and marijuana/cannabis (one item each); recent use of alcohol and tobacco (one item each); extent of drug use by peers (three items); confidence in one’s ability to refuse drug offers

(or self efficacy; two items); school satisfaction (one item); family relations (one item), and the usual grades received in school (one item).

The Arizona survey also included six items to assess ethnicity and a set of items to assess English- and Spanish-language usage that were combined to form an indicator of linguistic acculturation for Latino students. Although language use captures only one dimension of acculturation, it has been demonstrated to be comparable to multidimensional measures, accounting for up to 65% of the variance in acculturation status (Rogler et al., 1991; Samaniego and Gonzales, 1999). Language use relates to substance use in several ways. Children's English-language acquisition and preference may erode family communication and protective ties because adults learn English more slowly than children do (Marsiglia, Miles, Dustman, and Sills, 2002; Rogler, Cortes, and Malgady, 1991). It may also introduce and reinforce behaviors of the mainstream culture, such as through pro-substance-use images in mainstream English-language media (Caetano, 1986; Dalton et al., 2003; Gilbert and Cervantes, 1986; Vega, Zimmerman, Warheit, Apospori, and Gil, 1997). English-language acquisition may also induce stress as the individual attempts to resolve conflicting cultural differences or to manage perceive ethnic discrimination, leading to coping via drug use (Beauvais, 1998; Gil and Wagner, 2000; Vega and Gil, 1998). In contrast, Spanish-language maintenance protects adolescents by sheltering them from a developmentally driven expansion of their social networks that puts them at greater risk for encountering pro-drug peers and opportunities to use substances (Escobar, 1998). It also helps to preserve the protective, identity enhancing effects of maintaining cultural ties through continued use of Spanish (Chandler, Tsai, and Wharton 1999; Denner, Kirby, and Coyle 2001; Duncan et al., 1998; Flannery, Williams, and Vazsonyi, 1999; Suarez-Orozco and Suarez-Orozco 1995).

Substance Use

Items for lifetime drug use and recent alcohol and tobacco use were administered in a comparable format in both surveys. To assess lifetime alcohol and tobacco use, Arizona students were asked to indicate how many drinks of alcohol they have had in their entire life; Spanish adolescents were asked how frequently they have used alcoholic drinks. To assess lifetime tobacco use, Arizona students answered the question, "How many cigarettes have you smoked in your entire life?" Spanish students answered the question "Do you smoke cigarettes?" Lifetime marijuana/cannabis use was assessed by the question, "How many times have you used marijuana in your entire life?" in Arizona and by the question, "Have you ever used cannabis?" in Spain. To compare samples, these outcomes were dichotomized, with any affirmative answer to these items considered to indicate some lifetime use of the substance. Both in Arizona and Spain, recent alcohol use was defined as having used one or more alcoholic drinks during the last 30 days; recent tobacco use was defined as having smoked one or more cigarettes during the last 30 days.

Ethnicity/Acculturation

Arizona students indicated their ethnicity by responding to six dichotomous (yes/no) items, which asked if they were (a) Mexican-American, Mexican, Chicano/a; (b) other Latino; (c) White (Anglo); (d) African-American (Black); (e) American Indian; or (f) Asian or Pacific Islander. For this study, only those subjects who reported membership in the first three categories (Latino or White) were utilized in the analysis; those groups constituted over 90% of the original sample. Students from other ethnic backgrounds were excluded from the analyses of the Arizona data because of their small sample size and heterogeneity.

The Latino group was further broken down by linguistic acculturation: English- and Spanish-language use. Students who chose to complete the questionnaire in Spanish, and/or who indicated that they spoke Spanish "mostly" or "exclusively" with their family and friends were

considered to be Spanish dominant and “less acculturated.” Remaining Latino respondents were considered to be English dominant and “more acculturated.”

All Spanish respondents were native born and of the same ethnicity; so acculturation was not assessed.

Psychosocial Variables

A three-item measure assessed friends' use of drugs. This measure is an average of scores for the items relative to friends' use of alcohol, cigarettes, or marijuana/cannabis. To capture the students' confidence in their ability to refuse an offer of alcohol, cigarettes, or marijuana/cannabis from friends and from a stranger, two yes-or-no items were used. Family relations were assessed through one item measuring closeness to parents scored from “not at all close” (1) to “very close” (5). Last, a single item captured the degree of students' school satisfaction: “I really feel I belong in this school,” on a scale from 1 (strongly agree) to 4 (strongly disagree).

All scales had good to excellent internal consistency as indicated by Cronbach's alpha coefficients (.75 to .86; see Gómez-Fraguela, Luengo, and Romero, 2003; Kulis, Marsiglia, and Hurdle, 2003).

Statistical Analyses

Three sets of analyses addressed the four research aims. First, to evaluate differences in drug use patterns between boys and girls in AZ and Spain, odds ratios and 95% confidence intervals were selected as the preferred analytic method. Odds ratios from bivariate logistic regression analyses offer an arithmetic contrast of one group relative to another group (in this case, females to males), and confidence intervals determine the statistical probability of the odds ratios occurring by chance alone. Second, significant differences in the prevalence rates of substance use among preadolescents in Arizona and Spain were identified using chi-square tests based on crosstabular analyses. In the third set of analyses, differences in levels of substance use among four ethnic groups were assessed through Scheffé post-hoc tests following ANOVA. Last, we used multivariate logistic regression to explore simultaneously the role of gender, ethnicity, and psychosocial risk factors in predicting drug use, and to examine whether risk factors differentially predicted drug use across the various national, ethnic, and acculturation groups.

For the multivariate analyses, several variables were considered as controls. Students reported their gender, marking “male” or “female.” Age was indicated by Arizona students by their birth date and by Spanish students by their age in years (10 to 19). The student's “usual grades in school,” on a Likert scale from 1 (Mostly D & F's) to 3 (Mostly A & B's), were a self-reported global assessment of academic performance.

Results

Rates of Substance Use

Table 1 compares the proportions of boys and girls who have used tobacco, alcohol, and marijuana/cannabis in Arizona and Spain, and the odds ratios indicate the odds that girls used the substance relative to the odds that their male counterparts used the substance. Alcohol was the substance used most by males and females in the two samples, both for lifetime and monthly prevalence. In addition, females reported lower lifetime alcohol use than males both in Arizona and in Spain, as indicated by the significant odd ratios (i.e., those where the lower and upper bounds of the 95% confidence interval remained below 1.0, or even odds). The same gender difference was found for recent alcohol use in the Spanish sample, but not in the Arizona sample. The next most frequently consumed substance was tobacco. In the Arizona sample,

female tobacco use was lower than male use, both for lifetime and the last month use, but there were no significant gender differences in tobacco use in the Spanish sample. Lifetime marijuana/cannabis use was also significantly lower for females than for males both in Arizona and Spain.

Table 1 also suggests that there were cross-national differences in substance-use prevalence within each gender group. Chi-square tests based on separate crosstabulations by gender showed that differences between males from Arizona and males from Spain were significant for lifetime alcohol and marijuana/cannabis use, and for last 30 day tobacco use ($\chi^2 = 12.388$, $p < .001$; $\chi^2 = 258.673$, $p < 0.001$; & $\chi^2 = 4.879$, $p < .05$, respectively). There were also significant differences between females from Arizona and females from Spain in the lifetime prevalence of alcohol and marijuana use ($\chi^2 = 28.07$, $p < .001$; $\chi^2 = 217.3$, $p < .001$), as well as in the prevalence of alcohol and tobacco use in the last month ($\chi^2 = 10.143$, $p < .001$; $\chi^2 = 13.332$, $p < .001$). The direction of these differences indicated that substance use was more common in Arizona than in Spain, with two exceptions: both females' and males' last-month tobacco use was higher in the Spanish sample. Notably, there were no cross-national differences in the prevalence of lifetime tobacco use for either boys or girls.

Ethnic Differences in Substance Use

Figure 1 and Figure 2 show mean drug use for males and females in each ethnic/acclulturation group (means correspond to the proportions using substances). Lifetime alcohol, tobacco, and marijuana/cannabis use was more common among more-acclultured Arizona Latino males and females than among Spanish males and females (see Figure 1). Regarding lifetime alcohol use, and comparing males to males and females to females, the more-acclultured Latino males and females differed significantly from Spanish males and females ($p < .001$) and from less-acclultured Latino males and females ($p < .001$). Regarding lifetime tobacco use, more acclultured Latinos differed significantly from (a) both male and female non-Hispanic Whites ($p < .01$), (b) Spanish males ($p < .05$), and (c) less-acclultured Latina females ($p < .01$). Tobacco use among Spanish females was significantly higher than among non-Hispanic White females ($p < .05$). For lifetime use of marijuana/cannabis, scores were lower across genders among Spanish students than among each of the other three AZ groups ($p < .001$); on the other hand, more-acclultured Latinos showed higher scores than the less-acclultured Latinos and non-Hispanic Whites of the same gender ($p < .001$).

When recent alcohol and tobacco use was considered (Figure 2), few differences were observed among the groups. For recent alcohol use, the more-acclultured Latina females reported significantly higher scores than Spanish females ($p < .05$). For recent tobacco use, Spanish males and females had significantly higher scores than their non-Hispanic White counterparts ($p < .05$).

Ethnic Differences in Factors Related to Drug Use

Table 2, Table 3, Table 4 present logistic regression analyses of how drug use relates to national/ethnic/acclulturation status and individual, peer, school, and family factors. Because of the gender differences commonly found in drug use research, gender was introduced along with other control variables as predictors of drug use (Model I). Then, peer, individual, school, and family factors were added as predictors (Model II); and finally, results were split by ethnicity/acclulturation (Model III).

The combined-samples regressions in Models I and II showed that some of the differences in substance-use rates between Arizona and Spain preadolescents were due to the influence of certain risk and protective factors for drug use. For example, for less-acclultured Latinos compared to Spanish youth, higher rates of lifetime alcohol and cigarette use, as well as recent

alcohol use appeared to be due to differences in risk and protective factors, as indicated by the substantial reduction in the size of the national/ethnicity/accluturation effects when “drug use by peers,” “refusal confidence,” “school satisfaction,” and “family relations” were controlled in Model II. This reduction also occurred for more-accluturated Latinos in lifetime cigarette use and recent alcohol use. Yet, despite controlling for these factors in Model II, several of the group differences remained significant: the higher level of cannabis use in all three Arizona groups than in the Spanish group; the lower rates of lifetime and recent cigarette use among Arizona Whites compared to Spanish youth; and the higher rates of lifetime alcohol use among more-accluturated Latinos and non-Hispanic Whites than among Spanish youth. Another difference that did not appear in Model I but did achieve significance in Model II after the introduction of controls for risk and protective factors was the lower rates of recent cigarette use among the less acculturated and the more acculturated Latinos than among the Spanish youth.

The combined-samples regressions also showed some overall gender differences: as a group, boys from both countries were more likely than girls to use alcohol (lifetime and recent), cigarettes (lifetime), and marijuana/cannabis (lifetime), but the difference was reduced to nonsignificance in predicting recent alcohol and marijuana use after controlling for risk and protective factors (see Model II). In the analyses of the subgroup differences in the impact of risk and protective factors (Model II), results show that perceived peer drug use predicted greater lifetime and recent use of all substances. In addition, “refusal confidence” was inversely related to lifetime marijuana/cannabis use, and recent alcohol use. School satisfaction was inversely related to lifetime and recent alcohol and tobacco use. Last, good family relations significantly predicted less lifetime tobacco and marijuana/cannabis use and less recent tobacco use.

Because differences in some outcomes by national/ethnic/accluturation groups persisted after adding other predictors in Model II, we proceeded to run the analyses separately by these subgroups (Model III). Age differences in substance use, which for lifetime and recent alcohol use had been substantially reduced by entering risk and protective factors in Model II, failed to emerge as significant predictors of the alcohol outcomes in the Model III subgroup analyses. There were scattered effects of age on cigarette and marijuana outcomes for different Model III subgroups. Academic grades, which predicted all the outcomes except lifetime alcohol use for the combined sample, was a significant predictor of four of the outcomes for only one subgroup—the less acculturated Arizona Latinos. Grades did, however, predict less marijuana use for all subgroups except Arizona non-Hispanic Whites. Gender differences emerged among only two subgroups: Spanish males reported more lifetime and recent alcohol use than Spanish females, and a similar gender gap was found for cigarette use in the Arizona non-Hispanic White subgroup.

There were also patterns of subgroup differences in the risk and protective factors. Only one variable was a consistent predictor across all subgroups and all outcomes: Drug use by peers significantly predicted less desirable outcomes in each subgroup. Refusal confidence predicted better outcomes for all subgroups, except in the case of lifetime alcohol and cigarette use among less acculturated Latinos, and in the case of lifetime alcohol use among Arizona Whites and Spanish youth. School satisfaction did not influence recent cigarette use in any national/ethnic/accluturation subgroup. It did, however, predict less use of substances among the less-accluturated Latinos on every other outcome, and less lifetime alcohol use among Spanish youth. Good family relations predicted less substance use only for the Spanish students, for whom it was inversely related to lifetime and recent cigarette use and lifetime cannabis use.

Discussion

Using independent samples in Arizona and Spain, this study analyzed similarities and differences in drug use by preadolescent boys and girls and analyzed the influence of ethnicity on patterns and correlates of preadolescent drug use.

Our results support findings from previous studies that, at the onset of adolescence, gateway drugs are already in use (e.g., Duncan, Duncan, and Hops, 1998) and that alcohol is preadolescents' drug of choice, followed by cigarettes and marijuana/cannabis (Johnston et al., 2006; Plan Nacional Sobre Drogas, 2004). Among both Arizonan and Spanish youth, males were at higher risk than females for lifetime alcohol and marijuana/cannabis use. Males in Spain, but not in Arizona, were at higher risk of using alcohol frequently than their female counterparts. However, in contrast to previous epidemiological studies in Spain (see Plan Nacional Sobre Drogas, 2004), the trend toward higher cigarette use among females relative to males was not found in the Spanish sample. The pattern was opposite among Arizona students, with higher rates of tobacco use among boys than among girls and with especially pronounced gender differences among the non-Hispanic White students. These results document that gender differences are already evident by early adolescence, with higher rates of substance use among boys, and suggest that at later ages, girls are likely to catch up with boys in some kinds of use (e.g., alcohol use in Spain). Girls might even reach higher rates in some substances, as was the case with tobacco in both the Spain and Arizona samples in this study.

Comparisons between Arizona and Spain samples allowed us to discover some cross-national differences in drug use. Preadolescents in Arizona were more likely than those in Spain to report lifetime alcohol and marijuana/cannabis use. The differences in lifetime marijuana/cannabis use are noteworthy: Arizonan pre-adolescents were over 25 times more likely to report having used marijuana/cannabis than Spanish preadolescents. These results were somewhat surprising, given that recent epidemiological studies in the United States and Spain reveal similar high rates of marijuana/cannabis use among adolescents over 14 years.

Two reasons might explain the higher marijuana/cannabis use rates in Arizona. First, the availability of marijuana/cannabis may differ between Arizona and Spain. In fact, the twofold label we use in this paper ("marijuana/cannabis") reflects one difference between the United States and Spain. Whereas in the United States it is common to smoke marijuana in less processed forms, in Spain it is common to use a cannabis derivative labeled "hashish" which is smoked in a mixture with tobacco. Differences in the supply of this substance might lead to differences in the availability for adolescents. Second, youth in Spain and Arizona at the age of youth in this study may be poised at a different educational thresholds that affect marijuana/cannabis use. The lower use of marijuana/cannabis among Spanish preadolescents may reflect the fact that at ages 12–13 Spanish youth are still transitioning from elementary to secondary education, entering a new school, extending their relations to new teachers and peers (who may be different in age), and experiencing changes their family relations. Within this cultural setting, an apparently short time interval (1 year) might be long enough for risk factors to precipitate the onset of cannabis or other substance use beyond age 14. Differences between the school and family contexts before and after age 14 may not be so clear-cut for Arizona adolescents. In any case, given the cultural diversity of the U.S. sample, it seems necessary to attend to the variability among the various ethnic groups to fully understand the patterns of marijuana/cannabis use.

When lifetime marijuana/cannabis use rates among the various Arizona ethnic/acculturation groups were compared, higher use rates were found among Latinos than among non-Hispanic Whites. Within the Latino group, marijuana use was higher among more acculturated youth.

These differences in marijuana use might be related to cultural aspects of Arizona Latinos that are not shared by non-Hispanic Whites or even by Spanish preadolescents. An analysis of the depth and quality of such cultural aspects exceeds the objectives of the present study, but they might be an interesting focus for future studies. Our results clearly indicate that acculturation is a critical dimension when predicting differences in patterns of adolescent marijuana/cannabis use.

As predicted, lifetime use rates were considerably higher for more acculturated Latinos. However, these differences did not emerge for recent alcohol and cigarette use. In fact, when recent cigarette use was analyzed, Spanish preadolescents showed the highest use rate.

To further understand the effects of ethnicity/acculturation on drug use, we tested for interactions of ethnicity/acculturation with risk factors. For all outcomes except cannabis use, the differences between ethnic groups appear to be due largely to risk/protective factors, mainly “drug use by peers” and “refusal confidence.”

Drug use by peers emerged as the most consistent and important predictor of substance use in all the groups. The predictive power of refusal confidence was weaker for less acculturated Latinos and stronger for non-Hispanic Whites, more-acculturated Latinos, and Spanish youth. Value differences between Latino and non-Latino cultures might explain why refusal confidence was a less consistent predictor of substance use among less acculturated AZ Latinos than among the other groups (AZ Whites, acculturated AZ Latinos and Spaniards) who now may share many mainstream European-American values. Less acculturated Latinos in the United States, with close roots to traditional immigrant cultures may emphasize collective values (i.e., familism; Sabogal, Marin, Otero-Sabogal, Marin, and Perez-Stable, 1987) as the motivation for abstinence rather than the individualistic emphasis implied by refusal confidence or self-efficacy. Again, future studies should examine these hypotheses in depth.

School satisfaction was a more salient protective factor for less-acculturated Arizona Latinos and for Spaniards than for the other Arizona groups. Positive family relations appear more consistently salient to use of drugs other than alcohol by the Spaniards than to the Arizona groups. These results may be interpreted in the light of what is known about adolescent social development. Adolescents adopt behaviors that are consistent with attitudes and expectations of the social institutions, such as school and family, to which they are strongly linked (Catalano and Hawkins, 1996). Given this, strong school bonds would be related to a lower substance use among less-acculturated Latinos in Arizona, many of whom are from immigrant families and thus are more sensitive to issues of belonging or not belonging in a school, particularly given their status as a numerical minority in some schools. Developers of culturally relevant programs focusing on prevention for the Latino community (e.g., *keepin'it REAL*; see Hecht, Marsiglia, Elek, Wagstaff, Kulis, Dustman, & Miller-Day, 2003) can build on this finding by addressing issues of belonging and institutional integration. Our finding of no effect of family relations on licit drug use among less-acculturated Latinos might be related to stronger tolerance of alcohol or cigarettes relative to illicit drugs, and to a relatively higher tolerance of alcohol use by males among Latinos (De La Rosa, 2002; Wycoff, 2000).

In Spain the social relevance of drug use in recent years has led to campaigns aimed to promote awareness among parents and schools of the drug use problem. Such policies might have promoted the development of school and family norms against “gateway drug” use. Therefore, a stronger bond with family and school may explain the lower use of tobacco and marijuana/cannabis among Spanish preadolescents although, as for Arizona Latinos, family bonding does not seem to be effective in protecting Spanish youth from alcohol use. This result could be explained by the permissive social norms towards alcohol use which still characterize Spanish society.

Study Limitations

The present findings must be considered in light of several limitations of the study. Both the Arizona and Spanish samples came from urban settings. Although this condition makes the samples more similar, it also hinders the generalizability of results to non-urban populations in both countries. In addition, the Spanish sample did not include students from different ethnicities; future research should include other groups to enrich the results concerning ethnic influences on drug use. Another limitation of this study is that the results were based on self-reported measures, and it is possible that different reporting biases were operating in the two countries. We tried our best to control potential biases derived from self-reports: scales were equated, and those students who failed particular honesty criteria were eliminated from analyses. Finally, given that the assessment instruments were not developed specifically for this study (they belonged to two independent research studies), it was necessary to limit the number of the psychosocial variables selected as correlates of drug use. These variables are only a sample of the large number of individual, peer, family, and school factors related to adolescent drug use. The present study is not intended to offer a reductionistic view of the framework of drug use correlates.

Conclusion

This study's objective was to examine similarities and differences in preadolescent drug use patterns to determine whether the adaptation of prevention programs is warranted. At this moment, drug use among youth is a troublesome fact in different cultures and societies; so the sharing of validated prevention experiences is important. A first step in program adaptation is to determine whether drug-use patterns differ across contexts, and whether risk factors differentially influence drug use across populations. Our analyses identified similarities in drug-use patterns among male and female adolescents in Arizona and Spain, as well as differences that are relevant for prevention in both contexts. Among similarities, it is noteworthy that, at early adolescence, "gateway drugs" were already in use in both countries, and that drug use rates were higher among males. So, it seems that prevention strategies in both contexts should aim to prevent gateway drug use, even in the youngest adolescent populations. However, the identified cross-national differences in marijuana/cannabis use indicate that this substance should be taken into account mainly by U.S. preventionists, and perhaps less so by Spanish preventionists, who should focus mainly on alcohol and tobacco.

Ethnic differences were also present in the rates of marijuana/cannabis use, showing a possible influence of culture on drug use among Latino and non-Latino preadolescents. Cultural differences might also underlie the ethnic differences we found when examining predictors of drug use. For example, results documented that drug use by peers was the most powerful drug use predictor for all the groups, and that students' confidence in their ability to resist drug offers was more relevant for non-Latino adolescents than for Latinos, particularly those who were less acculturated. Many prevention strategies focus on training adolescents to resist drug use offers, with emphasis on resisting offers from peers. Given that the predictive power of refusal confidence differs across populations, it would be beneficial to examine how prevention programs should be adapted to match their emphasis on these components to the target populations.

The predictive power of family relations also differed across the various national groups. Our findings showed that family bonding was a powerful predictor of tobacco and alcohol use among Spanish students. Therefore, prevention programs for that population should make the family a privileged focus of intervention. Future research also could analyze in depth cultural differences within and across Spanish society and Latino and European-American societies in search of explanations for this finding.

RÉSUMÉ

Une étude transnationale de la consommation pré-adolescent de substances: En explorant les différences entre la jeunesse en Espagne et en Arizona

Cette étude essaie de comparer la consommation de drogues en Arizona et en Espagne, pour savoir si les similitudes et les différences dans les modèles de consommation de drogues justifient l'application en Espagne des programmes d'intervention préventive des États-Unis. Les données ont été obtenues à partir d'échantillons indépendants d'étudiants du septième degré, obtenus des écoles publiques urbaines et qui ont été sondés en 1998: 4035 étudiants d'Arizona d'origine ethnique diverse (Latinos et Blancs non-Hispanos) et 2.243 étudiants Blancs Espagnols. La comparaison en utilisant Odds ratios et χ^2 tests a permis d'évaluer les différences dans le niveau de consommation de drogues parmi les pré-adolescents en Arizona et en Espagne en considérant la variable genre. En plus, on a exploré les différences ethniques dans la consommation de drogues pré-adolescents et dans les facteurs de risque psychosocial en utilisant des analyses multivariées (ANOVA et des analyses de régression logistique). Nos résultats montrent des tendances similaires dans la consommation de drogues parmi les étudiants d'Arizona et de l'Espagne, avec des drogues d'entrée déjà utilisées pendant la précoce adolescence, et avec des niveaux de consommation plus élevés parmi les mâles que les femelles. Cependant, les différences transnationales par rapport à la consommation de marijuana/cannabis ont été remarquables: les pré-adolescents d'Arizona étaient à peu près 25 fois plus enclins à la consommation de marijuana/cannabis que les pré-adolescents de l'Espagne ne l'étaient. De plus, dans le cas des différences ethniques, en Arizona, les Latinos manifestaient une plus haute consommation de marijuana/cannabis que les étudiants non-Latinos. Pourtant, le niveau culturel des pré-adolescents Latinos a une profonde influence sur les modèles de consommation de drogues, ainsi que sur l'importance de quelques facteurs de risque. Les implications de nos résultats dans le contexte de la prévention de la consommation de drogues quand on est très jeune sont l'objet de débats.

RESUMEN

Un estudio trans-cultural del consumo de drogas en pre-adolescentes: Explorando las diferencias entre jóvenes en Arizona y España

En este estudio se compara el consumo de drogas de los adolescentes en Arizona y España con el fin de conocer en qué medida las similitudes o diferencias en los patrones de consumo de ambos grupos, justifican la aplicación en España de programas preventivos, previamente validados en el contexto americano. Se han obtenido datos de dos muestras independientes de estudiantes de séptimo grado de centros escolares públicos en 1998. Un grupo está formado por 4.035 estudiantes de Arizona, de diverso origen étnico (Latinos y Blancos no-Hispanos), otro por 2.243 estudiantes españoles. La comparación de estos grupos, utilizando Odds ratios y contrastes Chi-cuadrado, nos ha permitido evaluar las diferencias en el nivel de consumo de sustancias entre los pre-adolescentes de Arizona y España, teniendo en cuenta la variable género. Además, utilizando análisis multivariados (ANOVA y análisis de regresión logística), se han explorado las diferencias étnicas en los patrones de consumo y en los factores de riesgo psicosociales. Los resultados muestran tendencias similares en los patrones de consumo de sustancias en Arizona y España. En ambos grupos, se presenta un uso de "drogas de entrada" durante la adolescencia temprana, y existen mayores niveles de consumo entre los pre-adolescentes varones. Sin embargo, son notables las diferencias en el consumo de marihuana/cannabis, los pre-adolescentes de Arizona tienen una probabilidad 25 veces superior de consumir marihuana/cannabis que los españoles. Asimismo, cuando se tienen en cuenta las diferencias étnicas, se observa que el consumo de marihuana/cannabis es superior entre los estudiantes Latinos que entre los no-Latinos y que el nivel de aculturación de los pre-adolescentes latinos influye de forma significativa, en las diferencias encontradas en los

patrones de consumo de sustancias y en la importancia de ciertos factores de riesgo en los distintos grupos. Se discuten las implicaciones de estos resultados para la prevención del consumo de drogas a edades tempranas.

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Biographies

Maria Angeles Luengo, Ph.D., is a Professor of Personality, Assessment, and Psychological Treatment, specialist in Clinical Psychology of the Department of Clinical Psychology and Psychobiology, Director and research coordinator of the Unit on Prevention and Treatment of Conduct Disorders of the Applied Psychology Service at the University of Santiago. Since 1982, the research group GI-1416 has been working in the areas of conduct disorders in children and adolescents and of prevention and treatment program evaluation (Luengo, Sobral, Romero, & Gómez Fraguera, 2002; Sobral, Romero, LuengoyMarzoa, 2000). She had directed numerous doctoral theses on these topics, among them, those of all of the members of her

research team. Luengo has been the principal investigator of numerous research projects on drug use and antisocial conduct, financed by the Spanish Ministry of Education, the National Plan on Drugs, and the Autonomous Government of Galicia, and she has been the coordinator of development, implementation, and evaluation of the program Construyendo Salud (Building Health; Luengo, Gómez-Fraguela, Garra, Romero y Lence, 1999; Gómez-Fraguela, Luengo y Romero, 2003).

Stephen Kulis, Ph.D., is Professor of Sociology at Arizona State University, and an Affiliated Faculty member in the School of Social Work, School of Justice and Social Inquiry, and Women's Studies program. He is the Director of Research and Co-Principal Investigator for

the NIH/National Institute on Drug Abuse–funded Southwest Interdisciplinary Research Center. His research has focused on cultural processes in health disparities, such as the role of gender and ethnic identity in youth drug use and prevention interventions; on contextual neighborhood and school level influences on individual level risk and protective behaviors; and on gender and racial inequities in professional careers, and the organizational sources of discrimination. His recent publications as lead author include: “Promoting reduced and discontinued substance use among adolescent substance users: Effectiveness of a universal prevention program,” in *Prevention Science* (2007); “Social contexts of drug offers among American Indian youth and their relationship to substance use: An exploratory study,” in *Journal of Cultural Diversity and Ethnic Minority Psychology* (2006); “Mexican/Mexican American adolescents and *keepin’ it REAL*: An evidence-based substance use prevention program,” in *Children & Schools* (2005); and “Majority rules: The effects of school ethnic composition on substance use by Mexican heritage adolescents,” in *Sociological Focus* (2004). He can be reached through e-mail at kulis@asu.edu.

Flavio Francisco Marsiglia received his Ph.D. in 1991, from the Mandel School of Applied Social Sciences at Case Western Reserve University. Since 1994, he has been a member of the faculty of the Arizona State University School of Social Work where he is currently the Distinguished Foundation Professor of Cultural Diversity and Health and Director of the Southwest Interdisciplinary Research Center, funded by the National Institutes of Health/ National Institute on Drug Abuse (NIH/NID). His research topics focus on investigating the risk and protective factors associated with health outcomes among Mexican/Mexican-American and American-Indian youth and their families. Dr. Marsiglia and his SIRC colleagues have published numerous articles and presented their research findings at

conferences across the nation and at international conferences. Two of his current studies are being conducted in partnership with Mexican and Spanish universities.

Estrella Romero, Ph.D., is a tenured lecturer of Personality, Assessment and Psychological Treatment in the Department of Psychology at the University of Santiago. She has been co-investigator of many projects on drug use and antisocial conduct, financed by the Spanish and Galician governments. Currently, she is principal investigator of the Project BSO2003-01340, of the Spanish government, whose object is to develop and evaluate a multicomponent intervention program for parents, teachers, and children for the prevention of behavior problems in infancy (Romero, Villar, Luengo, Gómez Fraguela, & Robles, 2005). Another primary interest is the identification of factors and mechanisms of risk and protection implicated in behavior problems (Romero, Luengo, & Gómez-Fraguela, 2000; Romero, Luengo, & Sobral, 2001; Romero, Sobral, Luengo, & Marzoa, 2001; Romero, Gómez-Fraguela, Luengo, & Sobral, 2003).

José Antonio Gómez Fraguela, Ph.D., is associate professor of Personality, Assessment and Psychological Treatment of the University of Santiago de Compostela. His research centers on the prevention of adolescent conduct problems and program evaluation. His doctoral thesis consisted of the evaluation and adaptation of Botvin's Life Skills Training in Spain. Since that project, he has participated in diverse studies on the evaluation and dissemination of this adapted program (Luengo, Gómez-Fraguela, Garra, Romero y Lence, 1999; Gómez-Fraguela, Luengo y Romero, 2003). Gomez Fraguela has also participated as an investigator on diverse projects on the development and evaluation of prevention programs for families (Gómez-Fraguela, Villar, Luengo y Romero, 2002; Villar, Luengo, Gómez-Fraguela y Romero 2004) and for at-risk populations. Currently, he is the principal investigator of a study investigating weekend alcohol abuse and prevention program promoting alternative leisure time activities.

Paula Villar, Ph.D., is an investigator in the Department of Clinical Psychology and Psychobiology at the University of Santiago de Compostela. She is a part of the research team led by Dr. Luengo. As such, she is responsible for the implementation and evaluation of adolescent and family prevention projects and has published many of the key findings from that work (Villar, Luengo, Gómez-Fraguela, & Romero, in press; Gómez-Fraguela, Luengo, Romero, & Villar, in press; Gómez-Fraguela, Luengo, Romero, & Villar, 2004; Villar, Luengo, Gómez-Fraguela & Romero, 2003).

Tanya Nieri, Ph.D., is an assistant Professor of Sociology at the University of California, Riverside. She holds a doctorate in sociology. Her research interests include cultural identity (acculturation and ethnic identity), the relationship between culture and health, particularly among Latinos, and intervention research.

Glossary

Linguistic acculturation, A person's utilization of Spanish and English, ranging from Spanish-language use only to equal use of both English and Spanish to English-language use only.;
Refusal confidence, The extent to which a person feels confident that he or she could refuse an offer of substances..

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Figure 1.
Mean lifetime alcohol, cigarette and cannabis use, by gender and ethnicity/acculturation.

Figure 2.
Mean recent alcohol and cigarette use, by gender and ethnicity/acculturation.

Table 1
Prevalence (percentages) of lifetime use of selected substances and recent use of alcohol and cigarettes among adolescents in Arizona and Spain, by gender

	Boys	Girls	OR	95% CI
Arizona sample				
Lifetime alcohol use	66.5%	61.7%	0.812	0.713, 0.924
Lifetime cigarette use	43.4%	36.7%	0.757	0.666, 0.859
Lifetime marijuana/cannabis use	25.6%	19.6%	0.705	0.608, 0.820
Last 30 days alcohol use	22.6%	20.3%	0.860	0.739, 1.001
Last 30 days cigarette use	12.2%	9.9%	0.795	0.651, 0.970
Spain sample				
Lifetime alcohol use	60.3%	52.3%	0.722	0.609, 0.856
Lifetime cigarette use	40.1%	37.1%	0.884	0.743, 1.051
Lifetime marijuana/cannabis use	3.4%	1.1%	0.320	0.163, 0.626
Last 30 days alcohol use	26.1%	14.3%	0.499	0.371, 0.672
Last 30 days cigarette use	14.9%	14.4%	0.962	0.758, 1.220

Table 2

Regression predicting lifetime alcohol, cigarette, and marijuana/cannabis use

	Lifetime Alcohol Use					Lifetime cigarette use						
	I	II	III Less acculturated Latinos	III More acculturated Latinos	III Non Hispanic Whites	III Spanish Whites	I	II	III Less acculturated Latinos	III More acculturated Latinos	III Non Hispanic Whites	III Spanish Whites
Less acculturated Latinos	0.223**	-0.67					0.209*	-0.105				
More acculturated Latinos	0.727***	0.379**					0.511***	0.111				
Non-Hispanic Whites	0.487***	0.314*					-0.276*	-0.513**				
Age	0.140*	0.033	-0.136	0.217	0.098	0.030	0.356***	0.253**	0.249	0.172	0.540*	0.218
Usual grades	-0.157**	-0.085	-0.312*	-0.077	0.453	-0.061	-0.253***	-0.176**	-0.325*	-0.118	-0.689*	-0.111
Gender: $F = 0; M = 1$	0.241***	0.239**	0.144	0.316	0.263	0.247**	0.187**	0.195**	0.240	0.307	0.761**	0.033
Drug use by peers		1.038***	1.043***	1.405***	0.993***	0.914***		1.469***	1.122***	1.206***	1.450***	1.674***
Refusal confidence		-0.034	-0.027	-0.748*	-0.290	-0.218		0.134	-0.273	-1.248***	-0.901*	-0.325*
School satisfaction		-0.307***	-0.316*	-0.313	-0.175	-0.337***		-0.213**	-0.292*	-0.027	-0.281	-0.185
Family relations		-0.101	-0.059	-0.018	-0.210	-0.112		-0.189***	-0.150	0.143	-0.100*	-0.370***
Intercept	-1.239	1.931	4.595*	0.559	0.415	1.948	-4.437***	-1.073	-0.634	-0.973	-3.488	0.968
N	3,976	3,976	913	786	394	2,021	3,965	3,965	915	788	395	2,008
Cox & Snell R^2	0.024	0.092	0.081	0.123	0.069	0.075	0.033	0.147	0.106	0.136	0.188	0.177

* $p < .05$

** $p < .01$

*** $p < .001$

Table 4

Regression predicting recent alcohol and cigarette use

	Last 30 Days' Alcohol Use					Last 30 Days' Cigarette Use					
	I	II	III Less acculturated Latinos	III More acculturated Latinos	III Non Hispanic Whites	I	II	III Less acculturated Latinos	III More acculturated Latinos	III Non Hispanic Whites	III Spanish Whites
Less acculturated Latinos	0.387**	0.291				0.015	-0.615**				
More acculturated Latinos	0.546***	0.306				-0.050	-0.811***				
Non-Hispanic Whites	-0.042	-0.071				-0.678**	-1.210***				
Age	0.339***	0.211*	0.056	0.119	0.063	0.629***	0.498***	0.554*	0.385	0.244	0.530**
Usual grades	-0.345***	-0.251***	-0.313*	-0.187	-0.062	-0.344***	-0.254***	-0.300	-0.270	-0.667	-0.181*
Gender: F =0; M =1	0.208*	0.178	-0.316	0.069	0.404	-0.005	-0.005	-0.050	0.224	0.405	-0.129
Drug use by peers		1.802***	1.581***	1.379***	0.783***		2.369***	1.649***	1.839***	2.390**	2.824***
Refusal confidence		-0.325**	-0.482*	-1.491***	-1.271**		-0.009	-0.809**	-1.010***	-1.383**	-0.761***
School satisfaction		-0.227**	-0.328*	0.017	0.143		-0.195*	-0.089	-0.080	-0.298	-0.213
Family relations		-0.060	-0.012	0.028	0.108		-0.308***	-0.073	-0.216	-0.231	-0.405***
Intercept	-5.020***	-1.817	1.072	-0.679	-1.645	-8.929***	-4.764**	-6.416*	-3.923	5.368	-4.911
N	3,046	3,046	916	786	394	3,982	3,982	918	790	394	2,021
Cox & Snell R ²	0.026	0.126	0.0106	0.142	0.119	0.027	0.118	0.079	0.090	0.091	0.171

*
p < .05

**
p < .01

p < .001