

# Acculturation Status and Substance Use Prevention with Mexican and Mexican-American Youth

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**SUMMARY.** This study examined whether language preference, as an indicator of acculturation, moderated the effects of a culturally grounded substance use prevention intervention for Mexican and Mexican American middle school students (N = 2,146) in Phoenix, Arizona. The main hypothesis was that levels of program effectiveness would vary based on

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the language preference of the students and the specific culturally grounded version of the intervention they were assigned. Findings show that matching language preference to particular versions of the intervention did not influence substance use related program outcomes, but that overall program effects (intervention versus control) did vary by language preference. English-language dominant participants, the most at risk sub-group, responded more positively to the intervention, while Spanish dominant, who had low substance use rates at baseline, and bilingual participants did not demonstrate significant differences between the intervention and control groups. Implications for school social work prevention interventions and prevention science in general, are discussed. [Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <<http://www.HaworthPress.com>> © 2005 by The Haworth Press, Inc. All rights reserved.]

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### **INTRODUCTION**

Studies show that the use of illicit drugs among teenagers in the United States declined significantly from 2001 to 2002, making 2002 the sixth year in a row such decreases have occurred (National Institute of Drug Abuse, 2003). Despite this encouraging news, differences in substance use among ethnic groups remain. African-American youth show substantially lower rates of overall use than Whites, while Latino youth show rates of use between these two other groups. However, for some regions of the country and for some substances, such as crack and ecstasy, Latino youth show the highest rates of use among all three groups (Johnston, O'Malley & Bachman, 2001). Rates of substance use for Latino youth may be depressed due to a school dropout rate much higher than that for African-Americans and Whites, since those who have left school before the 12th grade and not represented among survey respondents may be more at risk for substance use (Johnston et al., 2001). Substance use among Mexican and Mexican-American youth is especially troubling considering the growth of the Latino population,

now approaching 13 percent of the U.S. population (Bureau of Census, 2000). In Phoenix, Arizona, where the present study was conducted, Latinos now constitute over one-third of residents, and the Latino population statewide grew from 1990 to 2000 at more than double the overall rate (U.S. Census, 2001).

While there has been increasing attention to ethnic differences in the delivery of prevention programs, few programs have been specifically grounded on the cultural characteristics of Mexican and Mexican-American youth (Polansky, Buki, Horan, Ceperich, & Burrows, 1999). Researchers have argued that prevention programs are more successful when they include elements of culture and ethnicity of the target population (Castro, Proescholdbell, Abeita, & Rodriguez, 1999). Although the importance of culturally appropriate messages in prevention efforts is increasingly acknowledged, tests of the effectiveness of such messages among minority cultures show mixed results. Supporting studies include those examining the effectiveness of television ads, where minority youth were more able to support messages when they could find in them reflections of their own culture (Dorr, 1982). Similar research has shown that youth and their parents respond more positively to drug prevention messages in the media that appear culturally specific (Teinowitz, 2001).

Prevention messages are considered culturally grounded when participants can recognize the messages as being about them and as applying to their lived experience (Marsiglia, Cross, & Mitchell, 1998). Questions remain regarding whether culturally grounded messages in prevention programs affect attitudes toward substance use, and whether the degree of cultural grounding influences the effectiveness of prevention interventions for Mexican American youth.

### ***DEVELOPING CULTURALLY GROUNDED INTERVENTIONS***

Despite growing acceptance of the principle that prevention programs have a greater chance of participant acceptance when the interventions are compatible with their culture, the development of a truly culturally grounded approach to drug resistance can prove challenging. Often in an attempt to include culturally relevant material, programs may settle for untested or simplistic themes that may not in fact be culturally appropriate (Collins, 1995; Trimble, 1996). In addition to acknowledging sub-groups within larger umbrella cultural groups, such as Latinos/Hispanics or Asian Americans, research needs to recognize

the heterogeneity existing within subgroups due to, among other factors, acculturation. If these factors are not considered, a program can run the risk of imposing stereotypical approaches, creating program content that does not resonate with the culture of the participants. In the prevention program that is the basis for the current study, The Drug Resistance Strategies Project, culturally grounded interventions were developed based on narratives of Phoenix, Arizona, middle school students regarding their situational encounters with drug offers and the students' refusal strategies (Hecht, Marsiglia, Elek, Wagstaff, Kulis, Dustman, & Miller-Day, 2003). Previous research affirmed that curriculum put in narrative form holds the attention of adolescent participants better than a simple discursive format (Botvin, Schinke, Epstein, & Diaz, 1994). The effort to cast the narratives into program curricula was informed by research which identified four major strategies of adolescents' drug resistance: Refuse, Explain, Avoid, and Leave (Miller-Rassulo, Alberts, Hecht, Krizek, & Trost, 2000). These strategies formed an acronym that students and project administrators used to coin the program: *keepin' it REAL* (*Manténte REAL* in Spanish).

Students from a high school in the same area as the participating middle schools were recruited to develop scripts and enact the scenarios from the narratives, which were then used to produce videotapes for the curriculum intervention in the study (Holleran, Dustman, Reeves, & Marsiglia, 2002). The videos included scenes from local neighborhoods that were readily identifiable by the study participants and were, at times, enacted by students known to the participants.

The resulting videos were an integral part of a ten session classroom curricula that was presented in three different versions. A Latino version represented scenarios from Mexican/Mexican American students, who formed a numerical majority in the participating schools. A non-Latino version of the curriculum contained scenarios derived from students who were African-American and European-American. These non-Latino students were in the numerical minority in all but a few of the participating schools. A third version of the curriculum combined an equal number of lessons and videos from each of the first two versions to form the Multicultural version (see Gosin, Marsiglia, & Hecht, 2003, and Holleran et al., 2002, for details on the curriculum and its development).

This study examines only the experiences of the Mexican and Mexican-American youth who took part in a larger study involving over 6,000 middle school students from an array of ethnic backgrounds. Previous analysis of outcomes for all participants in the randomized trial

demonstrated the overall efficacy of the *keepin' it REAL* program in delaying or reducing substance use and in strengthening anti-drug norms and attitudes (Hecht et al., 2003). However, limited support emerged for the hypothesis that strictly matching the ethnicity of the students with the curriculum content significantly improves program outcomes, possibly because the students were so ethnically diverse as to raise questions about the degree of cultural match to particular program versions. Additional research on the efficacy of the intervention specifically for students of Mexican descent showed that, compared to controls, these students also demonstrated smaller increases in substance use and stronger anti-drug norms over time when participating in the two versions of the curriculum derived from their own cultural experience, the Latino and the Multicultural versions. This article further examines the efficaciousness of *keepin' it REAL* for Mexican origin students by considering how variations in acculturation status may have influenced both substance use outcomes and the effectiveness of the intervention.

### ***ACCULTURATION AND SUBSTANCE USE***

Acculturation refers to individual-level as well as community-level changes in values, behaviors and preferred modes of expression that occur as a result of contact between two cultures (Berry, Poortinga, Segall, & Dasen, 1992). Especially for recent immigrants, acculturation involves a kind of socialization into mainstream conceptions of ethnicity and a reorientation that balances two conflicting needs—to preserve the culture of origin and yet become part of the new culture.

Research connecting acculturation to substance use has focused on protective social and personal factors that may stem from continued attachment to the culture of origin, and their weakening through acculturative processes that expose youth to risk behaviors through more acculturated peers, declining parental and family influence, and increasing acculturation-related stress. Aspects of traditional Mexican culture like *familism*, a cultural orientation that gives primacy to the family of origin even after marriage, have been associated with greater resilience to substance use. Mexican and Mexican-American families have been shown to have stronger family pride, family closeness and respect for parents, mutual obligation, trust, and cohesion than European American families (Chandler, Tsai, & Wharton, 1999). Traditional Mexican norms such as parental monitoring and involvement with children and the stress on geographic proximity of extended family members may also act protectively

as they provide children with more attention from caring adults, and situate children in more cohesive communities (Chandler et al., 1999; Denner, 2001). On the other hand, migration can dislocate families and seriously limit their ability to rely upon relatives, *compadres* (ritualistic relatives) and friends (Menjivar, 2000; Patterson & Marsiglia, 2000). These protective aspects of culture can be weakened by acculturation and acculturation stress, resulting in greater vulnerability to substance use (De La Rosa, 2002).

Research has linked acculturation processes with higher levels of substance use as well as lowered educational aspirations for children of Mexican descent, both among immigrants and U.S.-born children (Samaniego & Gonzales, 1999; Vega & Gil, 1999). Language figures prominently in explanations for this connection. Some adolescents who are Spanish dominant appear sheltered from a developmentally driven expansion of their social networks that enables them to access the broader community and enter new situations where substances are offered, putting them at higher risk for substance use (Escobar, 1998; Gil and Wagner, 2000; Marsiglia & Waller, 2002; Marsiglia, Kulis, Hecht, & Sills, 2004). Because adults learn English more slowly than children do, acquisition of and preference for English by children in non-English proficient families can lead to an erosion of protective family ties and communication, and reinforce behaviors of the mainstream culture that cause value conflicts with the culture of origin (Marsiglia, Miles, Dustman, & Sills, 2002; Vega, Zimmerman, Warheit, Apospori, & Gil, 1997).

### ***PREFERRED LANGUAGE AS AN INDICATOR OF ACCULTURATION***

Acculturation can be a difficult concept to measure and one that needs to be approached multi-dimensionally (Weigers & Sherraden, 2001). Much of the existing research and scale development on acculturation has focused on adults. The challenge in addressing the comparative lack of valid and reliable measures of acculturation for children and adolescents is to recognize the complexity of acculturation while at the same time considering youths' ethnic identity development (Serrano & Anderson, 2003; Unger, Gallaher, Shakib, Ritt-Olson, Palmer, & Johnson, 2002). In the absence of developmentally appropriate measures that assess acculturation across affective, behavioral, and cognitive domains, generation status and language use continue to be the most commonly

used measures of acculturation. Although preferred language has been criticized as an oversimplified measure of acculturation, it has been demonstrated to be a good proxy for more sophisticated and multi-dimensional measures, accounting for up to 65% of the variance on acculturation status (Rogler et al., 1991; Samaniego & Gonzales, 1999). Language use measures have also been useful in alerting us to the existence of acculturation stress and the subsequent presence of substance use (Cuellar, Arnold, & Maldonado, 1995). Recent mediational research predicting Latino adolescents' substance use has employed measures of "linguistic acculturation" based on preferred language use (Epstein, Doyle, & Botvin, 2003).

Language preference continues to enter into investigations of substance use. Recent household surveys of alcohol use across several groups of Latino youth—Cuban, Mexican-American, Puerto Rican, South American and Central American—showed little difference among the various Latino groups, but large and consistent differences in alcohol use across all groups by language use. The more respondents used English language, the more likely they were to drink alcohol (Nielsen & Ford, 2001). Similarly, students using Spanish at home reported significantly less marijuana use than students who speak English with their parents (Epstein, Botvin, & Díaz, 2001), and bilingual Hispanic youth were found at greater risk of alcohol use than Spanish monolingual youth (Epstein, Botvin, & Díaz, 2000). A study conducted with Mexican-American middle school students in the Southwest found that students who spoke only Spanish used significantly less alcohol and other drugs than bilingual students or students who preferred to use English (Marsiglia & Waller, 2002).

The relationship between acculturation, ethnic self-identity, and substance use for youth is consistently highlighted by the specialized literature, but the multi-faceted impacts of acculturation and ethnic identity on substance use are just beginning to be understood. One way that a drug prevention program might be effective with this population is by slowing the erosion of traditional Mexican cultural norms regarding the family and drug involvement. Through a process called additive acculturation, culturally grounded and multicultural interventions may help children deal with acculturation issues by encouraging successful integration into the new culture without losing the identity-enhancing and protective aspects of the old culture (Gibson, 1995). The present study aims at advancing knowledge about the impact of acculturation on the efficacy of the *keepin' it REAL* substance use prevention program for a

sample of Mexican and Mexican-American youth in the Southwest borderlands region.

### ***HYPOTHESES OF THE STUDY***

This study examines whether language preference, as a proxy for acculturation, moderates the effects of *keepin' it REAL* among Mexican and Mexican-American youth. It tests for differences in program effects between more and less acculturated students, generally expecting that those who are more acculturated will be more "at-risk" of onset of substance use and therefore more likely to show desired program effects.

*H1*: Desired program outcomes, as indicated by relatively less substance use and stronger anti-drug norms in intervention groups compared to control groups, will be stronger among English dominant than among bilingual and Spanish dominant students.

In addition, we expect that the different versions of the *keepin' it REAL* curriculum will be differentially effective for students in different acculturation statuses. If so, program outcomes will be influenced by interaction effects between language preference, as a proxy for acculturation, and curriculum version.

*H2a*: Spanish dominant students will report less substance use and stronger anti-drug norms when participating in the Latino version than in the Multicultural or Non-Latino versions of the curriculum.

*H2b*: Bilingual students will report less substance use and stronger anti-drug norms when participating in the Multicultural than in the Latino or Non-Latino curriculum versions.

*H2c*: English dominant students will demonstrate less substance use and stronger anti-drug norms when participating in the non-Latino than in the Multicultural or Latino versions of the curriculum.

### ***METHOD***

#### ***Research Design***

The present study employed a pretest-posttest experimental design with three intervention conditions and one control condition. Self-re-

port data were collected at the two time periods from students enrolled in 35 public middle schools in the central corridor of the Phoenix metropolitan area. The schools were stratified by size of enrollment and ethnicity (% Latino) and then randomly assigned to one of four conditions—Latino, Non-Latino, Multicultural, or Control—with 8 to 10 schools in each condition. In Fall 1998, all 7th graders in the study schools were administered a baseline or pretest questionnaire. In Spring 1999, their regular 7th grade classroom teachers delivered the assigned curriculum version to intervention students. During that summer, a bilingual radio/television PSA and billboard campaign was fielded. During the following school year (1999-2000), the intervention schools implemented school-based booster activities with their 8th grade students. Finally, in Spring 2000, approximately 14 months after completing the classroom-based curriculum in the intervention schools, a posttest questionnaire was administered to all 8th grade students who were then enrolled in the 35 study schools, including some students who had not completed the pretest. During the period that elapsed between the pretest and posttest, students in the control condition participated in the existing substance use prevention programs chosen and instituted by their school or school district personnel to meet state mandates for prevention programming (see Hecht et al., 2003, for more detailed information).

### *Participants*

The reported findings are based on data provided by 2,146 students in the study schools who completed the pretest questionnaire during 7th grade and/or the posttest questionnaire in 8th grade and reported their race/ethnicity solely as “Mexican American, Mexican, or Chicano.” This sample was 52% male. Over three-quarters of the study schools had majority Latino enrollments, overwhelmingly comprised of students of Mexican descent.

### *Questionnaires*

The questionnaires (each up to 82 items) utilized a three-form design (Graham, Hofer, & MacKinnon, 1996) that employed planned missingness to limit the number of questionnaire items each individual student answered, while maximizing the total number of items included for analysis. Project-trained proctors rather than regular teachers administered the 45-minute questionnaires that were printed in English on one

side and in Spanish on the other side. The questionnaires were completed during regular school hours, typically in science, health, or homeroom classes. Students were given written and verbal guarantees of confidentiality, and told that their participation was voluntary.

## ***MEASURES***

### ***Demographic Characteristics***

The questionnaires identified the Mexican descent students through six yes or no items that asked if they were: (a) Mexican American, Mexican, Chicano/a; (b) Other Latino (Puerto Rican, Cuban, etc.); (c) White (Anglo); (d) African American (Black); (e) American Indian (Pima, Yaqui, Navajo, etc.); or (f) Asian or Pacific Islander (Chinese, Japanese, etc.). Students could report mixed ethnic backgrounds. The current analysis is restricted to those who only marked “yes” to the first item at baseline or at posttest. Students reported their gender by marking male or female, their age by indicating their birth date, and their federal school lunch participation (a proxy for socioeconomic status) by selecting whether or not they received a free or reduced price school lunch.

### ***Acculturation Status***

The students’ preferred language was used as a proxy measure for acculturation. Students who indicated they spoke “Spanish only” or “Spanish mostly” with friends, as well as those who opted to complete the posttest questionnaire in Spanish were assigned to the “Spanish dominant” group. Of the remaining students, those who indicated they spoke “both English and Spanish, about equal” with friends were assigned to a “Bilingual” group; and students indicating they spoke “mostly” or “only” English with friends were assigned to the “English dominant” group. Table 1 shows the breakdown of the participating students by their language preference and study condition.

### ***Substance Use Outcomes***

The questionnaire included self-reports of how much and how frequently students drank alcohol, smoked cigarettes, and smoked marijuana in the past 30 days. Up to 95% agreement has been reported

TABLE 1. Language Preference by Condition Breakdown of Mexican and Mexican American Respondents

Language Preference	Condition			Control
	Latino Version	Non-Latino Version	Multicultural Version	
Spanish	15% (70)	22% (88)	26% (161)	21% (142)
Bilingual	39% (181)	32% (126)	37% (229)	36% (241)
English	46% (213)	45% (178)	38% (235)	42% (282)
Total	100% (464)	100% (392)	100% (625)	100% (665)

NOTE: The proportion of students indicating each language preference differs significantly by condition ( $\chi^2 = 22.75$ ,  $df = 6$ ,  $p < .01$ ) with a somewhat smaller proportion of Spanish preference in the Latino condition, and a larger proportion of Spanish preference in the Multicultural condition.

between saliva samples and drug use self-reports (Ellickson and Bell, 1990). Evidence supporting the validity of self-report data is especially strong when, as in the current study, analyzing reports on drug use activities during the last 30 days (O'Malley, Bachman, & Johnston, 1983; Johnston, 1989), and comparing self-reports over time and across treatments (Smith-Donals & Klitzner, 1985). The study's substance use items were modeled after Likert scales used by Flannery, Williams, & Vazsonyi (1999) with a similar age population. To assess the amount, students indicated number of drinks (1 = *None* to 9 = *More than 30*), cigarettes (1 = *None* to 8 = *More than two packs*), and hits of marijuana (1 = *None* to 8 = *More than 40*). Frequency of each of the three types of substance use was measured in terms of the number of days of use in the last month (1 = *None* to 6 = *16 to 30*). The responses on amount and frequency were averaged, both separately for each substance as well as all together across substances to obtain an additional measure of overall recent substance use, which demonstrated high internal consistency (Cronbach's  $\alpha = .86$ ).

### ***Refusal Confidence***

This three-item measure assessed students' confidence (1 = *Not at all sure* to 5 = *Very sure*) in saying no to alcohol, tobacco, and other drug offers from "a friend (they) really liked," "someone (they) don't know well," or "a family member (parents, brothers, sisters, aunts, uncles,

etc.).” The measure was based on Kasen, Vaughan, and Walter’s (1992) self-efficacy scale, and was formed by averaging the three item scores; larger scores indicated greater confidence in ability to refuse drug offers. Internal consistency ( $\alpha$ ) was .74.

### ***Intentions to Accept Substance Use Offers***

This measure assessed intentions to accept hypothetical offers of “alcohol to drink (beer, wine, hard liquor),” “a cigarette,” or “marijuana” (1 = *Definitely no* to 4 = *Definitely yes*). The three item scores were averaged; larger scores indicated stronger intentions to accept offers. Internal consistency ( $\alpha$ ) was .81.

### ***Positive Substance Use Expectancies***

This six-item measure assessed students’ perceptions of the positive consequences of substance use. Three alcohol items (Hansen & Graham, 1991) asked if drinking alcohol makes it easier “to be part of a group,” “to have a good time with friends,” or “makes parties more fun.” Two cigarette items asked if “smoking cigarettes makes people less nervous” and if smoking makes “it easier to concentrate.” One item asked if smoking marijuana makes “food taste better.” The response choices for all six items, scored from 1 (*Never*) to 5 (*Most of the time*), were averaged to form a scale score; larger scores indicated more positive substance use expectancies. Internal consistency ( $\alpha$ ) was .74.

### ***Personal, Injunctive, and Descriptive Norms***

The Focus Theory of Norms (Cialdini, Kallgren & Reno, 1990) guided the selection of measures of three distinctive types of drug related norms: personal (what the individual thinks is right or wrong), injunctive (what the individual believes that others think is right or wrong) and descriptive (how many of their peers use drugs). Based on Likert items used by Hansen and Graham (1991), anti-drug personal norms were assessed by asking: “Is it OK for someone your age to . . .” “drink alcohol,” “smoke cigarettes,” or “use marijuana.” Possible responses ranged from 1 (*Definitely OK*) to 4 = (*Definitely Not OK*). The three item personal norms measure demonstrated high internal consistency of  $\alpha = .86$ . The items related to anti-drug injunctive norms focused on important reference groups for youth (parents and best friends) and were based on those used by Hansen and Graham (1991) and

Hansen, Johnson, Flay, Graham, and Sobel (1988). The items asked how angry students' parent(s) would be if they found out that the student "smoked marijuana," "smoked cigarettes," or "drank alcohol" (three individual items scaled 1 = *Not angry at all* to 4 = *Very angry*), and how their best friends would react if they engaged in these actions (three additional items on scales of 1 = *Very friendly* to 4 = *Very unfriendly*). Internal consistency ( $\alpha$ ) was .71 and .81 respectively for the parent injunctive norms and best friend injunctive norms measures. Lastly, to assess descriptive norms, two items asked the respondents to estimate how many students in their schools had tried alcohol, tobacco, and other drugs at least once, and how many students in their schools use drugs regularly (both on scales of 1 = *Hardly any* to 4 = *Most*;  $\alpha$  = .72).

#### ***Variables Used Only for Missing Data Imputation***

Multiple imputations was used to handle missing data. In addition to the variables above, the imputation model included measures of current grades (1 = *Mostly F's* through 9 = *Mostly A's*), and how far the students expected to get in school (1 = *Finish 8th grade* through 5 = *Finish 4 years of college*).

### **STATISTICAL ANALYSES**

The analysis proceeded in three stages. To address the planned missingness and the missing data due to wave and item non-response, the software package NORM (Schafer, 1997; Schafer & Olsen, 1998) was used to generate ten multiply imputed data sets. To preserve potential interaction effects with study condition, the imputations were performed separately for each of the four conditions of the randomized design (three versions of the intervention, one control). Next, for each imputed data set, students' change scores on given outcomes were regressed on baseline scores and a dummy variable for study condition (e.g., for comparisons of the intervention versions, we regressed the change score on students' baseline scores and two dummy-coded intervention version variables). Thus, the dependent variable is a change score adjusted for baseline differences. This model is equivalent to an analysis of covariance on posttest scores (see Huitema, 1987). In this second stage, adjusted mean differences among study condition groups and the variance of each mean difference were written to a data file. Fi-

nally, Carlin, Li, Greenwood, and Coffey's (2002) implementation of Rubin's rules (1987) was used to combine the ten sets of estimates and test the hypothesis that the mean change reported by certain study condition students equaled that reported by comparison students.

All of the analysis models accounted for school-level randomization with the accompanying nesting of students within school. With group assignment to a study condition, responses of students from the same school are expected to be more similar to each other than are the responses of any two students chosen at random. The number of participants from the 35 study schools (i.e., the cluster size) ranged from 30 to 460, with Latino students being the majority group in over three-fourths of the schools. Each of the analysis models tested four sets of variables with simultaneous regression models. These sets consisted of (a) overall substance use; (b) separate alcohol, cigarette, and marijuana use; (c) personal, descriptive, and parents' and friends' injunctive norms; and (d) refusal confidence, intentions to accept substance use offers, and positive expectancies about substance use.

The first analysis model compared outcomes among different versions of the curriculum with each other and did not include the control group. Additionally, this model tested for the main effects of acculturation status (Spanish, bilingual, or English language preference, with English as the omitted reference group) and the interaction of intervention version by language preference. A second analysis model was used to compare the three versions of the intervention combined together against the control condition, and assess the interaction of language preference with whether or not the student received the intervention. The third analysis model examined the intervention versus control difference separately for Spanish dominant, bilingual, and English dominant students.

## **RESULTS**

### ***Interaction of Language Preference and Version of the Intervention***

The first model (see Table 2) used dummy coding to contrast the three intervention versions, test the language preference main effect, and test the interaction between intervention version and language preference. The dummy variables permitted a test for adjusted mean differences associated with two of the intervention versions (Latino and non-Latino), two of the language preference groups (Spanish and bilin-

TABLE 2. Main Effects of Intervention Version and Language Preferences and the Interaction Effects of Language Preference and Version of the Intervention on Substance Use and Substance Use Related Outcomes

Outcome Variables	Intervention Version versus Grand Mean		Language Preference versus Grand Mean		Interaction	Covariate
	Latino Version	Non-Latino Version	Spanish Dominant	Bilingual		
	Est./SE	Est./SE	Est./SE	Est./SE	Est./SE	Est./SE
Overall Substance Use	-.01/.06	.00/.08	-.04/.05	-.03/.04	NS	-.42/.06***
Alcohol Use	.02/.10	.03/.13	-.04/.08	-.04/.08	NS	-.56/.05***
Cigarette Use	-.02/.06	-.04/.06	.01/.05	-.03/.04	NS	-.69/.05***
Marijuana Use	-.05/.08	.04/.10	-.11/.06	-.02/.05	NS	-.39/.06***
Refusal Confidence	.04/.07	-.06/.08	.14/.05**	.00/.05	NS	-.65/.04***
Intentions to Accept	-.04/.05	.00/.05	-.08/.04*	-.01/.02	NS	-.58/.03***
Positive Expectancies	.01/.06	.00/.05	-.12/.05*	.01/.03	NS	-.53/.03***
Personal Anti-Drug Norms	.05/.06	-.04/.06	.05/.03	.00/.03	NS	-.61/.04***
Parent's Injunctive Norms	.07/.05	-.08/.05	.00/.04	.02/.03	NS	-.56/.06***
Friend's Injunctive Norms	.04/.06	.00/.05	.18/.04***	-.03/.03	NS	-.58/.05***
Descriptive Norms	-.09/.08	.01/.08	-.03/.04	.01/.03	NS	-.71/.03***

<sup>a</sup> Represents four specific dummy variable interaction contrasts: Spanish dominant and in Latino version (Y/N); bilingual and in Latino version (Y/N); Spanish dominant and in Non-Latino version (Y/N); bilingual and in non-Latino version (Y/N).

NS indicates non-significant at  $p < .05$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

gual) and their four multiplicative interaction terms. The reference group in these comparisons is English dominant students in the Multicultural version of the intervention. The tests of the interaction effects explicitly examine the primary hypotheses that acculturation, as assessed by language preference, moderates the effects of particular versions of the intervention. Any such effects would support the idea of matching the version of the intervention to the language preference of the students. This analysis was limited to the 1,481 intervention students; it excluded students in the control condition since it was concerned only with which version of the intervention worked best for

students of a given language preference (i.e., it compared the versions to each other and not to the control group).

Table 2 reports main and interaction effects of intervention version and language preference on eleven substance use related outcomes. Results show that the three intervention versions did not differ significantly from one another in predicting posttest outcomes when controlling for language preference and baseline differences on those outcomes. In addition, as none of the interaction contrasts were statistically different from 0, there was no support for the interaction between intervention version and language preference. However, there were some significant differences associated with language preference as a main effect, showing more desirable outcomes for Spanish dominant students. Table 3 illustrates the nature and direction of these effects more clearly by reporting mean differences from baseline to posttest for students in each language preference category, and separately for intervention students (all versions combined) and controls. Specifically, among the intervention students, refusal confidence and friend's injunctive norms increased more, intentions to accept substance use offers increased less, and positive expectancies

TABLE 3. Unadjusted Mean Difference and Standard Errors from Pre-Intervention to 14-Month Follow-Up for the Intervention Versions Together and the Control Condition by Language Preference

	Intervention Condition			Control Condition		
	Spanish Dominant	Bilingual	English Dominant	Spanish Dominant	Bilingual	English Dominant
	Est./SE	Est./SE	Est./SE	Est./SE	Est./SE	Est./SE
Recent Substance Use	.18/.07	.15/.06	.18/.07	.10/.07	.29/.09	.53/.08
Alcohol	.28/.10	.22/.09	.27/.10	.19/.14	.43/.10	.66/.16
Cigarettes	.12/.07	.04/.05	.06/.06	.00/.07	.14/.09	.26/.09
Marijuana	.14/.09	.19/.07	.23/.08	.10/.09	.28/.13	.66/.13
Refusal Confidence	.22/.11	.14/.07	.01/.08	.04/.13	.03/.11	-.30/.10
Intent to Accept	.08/.05	.12/.04	.12/.04	.02/.08	.15/.08	.31/.05
Positive Expectancies	-.09/.07	.00/.05	.05/.06	-.01/.11	.06/.10	.22/.06
Norms						
Personal Anti-drug	-.07/.07	-.08/.06	-.05/.05	.01/.08	-.16/.10	-.32/.06
Parents' Injunctive	-.03/.05	-.04/.05	-.06/.05	-.03/.08	-.06/.05	-.11/.05
Friends' Injunctive	.05/.06	-.12/.05	-.14/.06	.05/.11	-.25/.08	-.29/.07
Descriptive	.31/.08	.10/.09	.02/.06	.24/.10	.18/.08	.29/.08

tancies of substance use decreased more for Spanish language dominant students than for English dominant and bilingual students. Because similar patterns could also be observed among the control students, we examined the main effect of language preference further in analyses that included both intervention and control students.

### ***INTERACTION OF LANGUAGE PREFERENCE AND RECEPTION OF THE INTERVENTION***

The second model, like the first model, used dummy coding to examine the main effects of the intervention (with control students included in the sample and used as the reference group), the main effects of language preference, and the interaction of the intervention with language preference. This model collapsed the three versions of the intervention into one intervention group because analyses of the first model indicated no significant differences in program outcomes among the different versions of the intervention. The tests of the interaction effects explicitly examined whether acculturation, as assessed by language preference, moderated the effects of the intervention, i.e., whether the intervention appeared more beneficial for students of one language preference than for students of another language preference group. In summary, dummy coding permitted us to estimate and test in models the adjusted mean differences associated with the intervention effect, two of the language preference groups (Spanish and bilingual), and two contrast interaction terms formed by multiplying the dummies for condition and language preference. This particular set of analyses included all 2,146 students (see Table 4).

As shown by Table 4, when controlling for language preference and baseline differences, the intervention only affected positive substance use expectancies. There was a significant main effect for language preference for most outcomes, following the pattern of differences in Table 3. Overall substance use, alcohol use, marijuana use, intentions to accept substances, positive expectancies of substance use, and descriptive norms, all increased less for Spanish language dominant students than for English dominant and bilingual students. Refusal confidence, personal anti-drug norms, and friend's anti-drug injunctive norms on average all decreased less for the Spanish dominant students than for the English dominant and bilingual students. On the other hand, the bilingual students did not demonstrate significantly different outcomes from the Spanish and English dominant students. In contrast to the model

TABLE 4. Main Effects of Intervention and Language Preference and the Interaction Effects of Language Preference and Reception of the Intervention on Substance Use and Substance Use Related Outcomes

Variables	Intervention versus Control	Language Preference versus Grand Mean		Interaction	Covariate
		Spanish Dominant	Bilingual	Intervention X Language Preference <sup>a</sup>	Baseline (W1) Value
		Est./SE	Est./SE	Est./SE	Est./SE
Overall Substance Use	-.06/.03	-.14/.04**	-.02/.03	.10/.04* & -.01/.03	-.39/.05***
Alcohol Use	-.07/.05	-.17/.06**	-.01/.05	.12/.06 & -.02/.05	-.53/.04***
Cigarette Use	-.02/.03	-.06/.04	-.02/.03	.07/.04 & .00/.03	-.63/.05***
Marijuana Use	-.07/.04	-.20/.06**	-.04/.04	.09/.05 & .02/.04	-.39/.05***
Refusal Confidence	.09/.04	.15/.05**	.04/.04	-.02/.04 & -.03/.04	-.63/.03***
Intentions to Accept	-.02/.02	-.14/.03***	-.01/.02	.06/.03* & .00/.02	-.57/.02***
Positive Expectancies	-.05/.03*	-.13/.04**	-.01/.03	.02/.04 & .01/.03	-.52/.03***
Norms					
Personal Anti-Drug	.04/.03	.13/.03***	.00/.03	-.07/.03* & .00/.03	-.64/.03***
Parent's Injunctive	.02/.03	.02/.03	.02/.02	-.02/.03 & .00/.02	-.56/.04***
Friend's Injunctive	.06/.03	.23/.04***	-.04/.03	-.05/.03 & .01/.03	-.56/.04***
Descriptive	-.03/.03	-.11/.04**	.03/.03	.09/.03* & -.02/.03	-.70/.03***

<sup>a</sup>Two dummy variable estimates and standard error are presented in this column, the first for Spanish dominant Intervention students (Y/N) and the second for Bilingual Intervention students (Y/N). \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

which looked at language preference within intervention version, this model, which compared the three versions combined together to the control, did produce significant interaction effects on some of the outcomes, specifically overall substance use, intentions to accept substance use offers, personal anti-drug norms, and descriptive norms. Students reporting different levels of language preference reacted to the intervention differently on some of the outcomes. This supported further testing of some related simple effects to better describe what was going on with the interventions.

As shown by Table 4, when controlling for language preference and baseline differences, the intervention only affected positive substance use expectancies. There was a significant main effect for language preference for most outcomes, following the pattern of differences in Table 3. Over-

all substance use, alcohol use, marijuana use, intentions to accept substances, positive expectancies of substance use, and descriptive norms, all increased less for Spanish language dominant students than for English dominant and bilingual students. Refusal confidence, personal anti-drug norms, and friend's anti-drug injunctive norms on average all decreased less for the Spanish dominant students than for the English dominant and bilingual students. On the other hand, the bilingual students did not demonstrate significantly different outcomes from the Spanish and English dominant students. In contrast to the model which looked at language preference within intervention version, this model, which compared the three versions combined together to the control, did produce significant interaction effects on some of the outcomes, specifically overall substance use, intentions to accept substance use offers, personal anti-drug norms, and descriptive norms. Students reporting different levels of language preference reacted to the intervention differently on some of the outcomes. This supported further testing of some related simple effects to better describe what was going on with the interventions.

### *Examination of Interaction Effects*

A third model made extensive use of single-degree-of-freedom contrasts to compare the three intervention versions combined together to the control within each language preference group, as well as to contrast program outcomes for the English language dominant students with those of the Spanish dominant and the bilingual students (see Table 5). This particular set of analyses included all 2,146 students.

Table 5 shows the results of the analyses utilizing this covariate-adjusted model. The intervention demonstrated significant effects only for the English language dominant students. These effects reflect the appreciable pretest to posttest changes in undesirable directions for most outcomes that were exhibited by the English dominant students in the control group, those who preferred to speak English with their friends, and completed the questionnaire in English (see Table 3). In comparison, English dominant students in the intervention condition reported significantly smaller increases in overall substance use, recent cigarette use, recent marijuana use, intentions to accept substance use offers, positive substance use expectancies, and descriptive norms. The intervention clearly appeared to be of some value to the English dominant students. The lack of significant differences between the intervention and control conditions for the other two language preference groups

TABLE 5. Comparison of Intervention to Control Within Each Language Preference Group, Along with Comparisons of Among Language Preference Groups on Substance Use and Substance Use Related Outcomes

Outcome Variables	Intervention versus Control Simple Effects Test Within Language Preference			Spanish Dominant or Bilingual vs. English Dominant	English Dominant or Spanish Dominant vs. Bilingual	Covariate Baseline (W1) Value
	Spanish Dominant	Bilingual	English Dominant			
	Est./SE	Est./SE	Est./SE	Est./SE	Est./SE	Est./SE
Overall Substance Use	.04/.04	-.06/.05	-.15/.05**	-.16/.04***	.02/.03	-.39/.04***
Alcohol Use	.04/.07	-.10/.06	-.16/.09	-.18/.06**	.01/.05	-.53/.04***
Cigarette Use	.04/.04	-.03/.04	-.09/.05*	-.08/.04*	.02/.03	-.63/.05***
Marijuana Use	.02/.05	-.05/.06	-.18/.08*	-.24/.05***	.04/.04	-.43/.04***
Refusal Confidence	.07/.07	.05/.05	.14/.05*	.19/.04***	-.04/.04	-.63/.03***
Intentions to Accept	.04/.03	-.02/.03	-.09/.03**	-.15/.02***	.01/.02	-.57/.02***
Positive Expectancies	-.04/.05	-.04/.04	-.08/.04*	-.14/.03***	.01/.03	-.52/.03***
Norms						
Personal Anti-Drug	-.04/.04	.04/.04	.11/.04**	.13/.03***	.00/.03	-.64/.03***
Parent's Injunctive	-.01/.04	.02/.03	.04/.03	.03/.02	-.02/.02	-.56/.04***
Friend's Injunctive	.00/.05	.07/.04	.10/.05	.19/.04***	.05/.03	-.56/.04***
Descriptive	.06/.05	-.06/.04	-.10/.04*	-.08/.03**	-.03/.03	-.70/.03***

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

provides some evidence that a lack of acculturation may be acting as a protective factor for the Spanish dominant (and possibly bilingual) students. In other words, in the absence of the intervention, Spanish dominant students would not move in undesirable directions on the substance use related variables as much as English dominant students would. Therefore the intervention does not appear effective for them because there is less of a problematic substance use trajectory to influence. In fact, a comparison of the English dominant students to the Spanish dominant and bilingual students in the study (Table 5, column 4) demonstrated significantly worse outcomes for the former on each of the outcomes, except for parental anti-drug injunctive norms.

The elevated risk associated with acculturation appeared in baseline mean scores showing that English dominant students actually reported the highest rates of substance use and intentions to accept substance use offers, the most positive expectancies of substance use, and the weakest

anti-drug personal norms and friend injunctive norms at the outset of the study (see Table 6). The Spanish dominant students reported the lowest rates of substance use and intentions to accept substance use offers, the strongest refusal confidence, the least positive expectancies of substance use, and the strongest anti-drug friend and personal norms and perceived that fewer of their peers were experimenting with or using substances regularly at the outset of the study.

### DISCUSSION

Overall, youth of Mexican descent who participated in the program showed more favorable outcomes in substance use and in attitudes toward drug use than their counterparts in the control condition. This study demonstrated that identification and use of culturally grounded drug prevention interventions for middle school students is feasible and can have an impact on the use of substances by Mexican and Mexican-American youth. Participants who preferred to speak Spanish used substances less at both the beginning and at the end of the intervention

TABLE 6. Unadjusted Baseline Means for the Intervention (Combined) and Control Conditions by Language Preference

Outcome Variable	Intervention Condition			Control Condition		
	Spanish Dominant	Bilingual	English Dominant	Spanish Dominant	Bilingual	English Dominant
	Est./SE	Est./SE	Est./SE	Est./SE	Est./SE	Est./SE
Recent Substance Use	1.37/.07	1.47/.06	1.63/.07	1.40/.07	1.46/.11	1.53/.06
Alcohol	1.57/.09	1.73/.08	1.87/.09	1.58/.10	1.69/.13	1.75/.10
Cigarettes	1.25/.06	1.33/.05	1.37/.03	1.31/.07	1.26/.09	1.33/.06
Marijuana	1.29/.08	1.36/.07	1.68/.09	1.28/.10	1.42/.15	1.51/.07
Refusal Confidence	3.64/.08	3.56/.07	3.56/.08	3.72/.12	3.57/.08	3.61/.08
Intent to Accept	1.62/.04	1.67/.04	1.83/.05	1.56/.07	1.70/.07	1.81/.05
Positive Expectancies	2.09/.06	2.15/.06	2.24/.06	2.07/.10	2.20/.12	2.24/.07
Norms						
Personal Anti-Drug	3.42/.05	3.35/.05	3.22/.04	3.42/.09	3.35/.10	3.28/.06
Parents' Injunctive	3.45/.05	3.50/.04	3.48/.03	3.47/.07	3.48/.05	3.44/.06
Friends' Injunctive	3.00/.06	2.92/.05	2.75/.06	2.99/.10	2.92/.09	2.67/.07
Descriptive	2.21/.08	2.55/.10	2.69/.07	2.16/.07	2.60/.07	2.57/.07

compared to participants who preferred to speak English, confirming that Spanish language preference serves as a protective factor against substance use for this population (Epstein, Doyle, & Botvin, 2003; Marsiglia & Waller, 2002). However, English dominant Mexican and Mexican-American participants, considered the most at risk, demonstrated more desirable outcomes across the intervention groups than their counterparts in the control condition. Mexican and Mexican-American youth participating in this study demonstrated significantly more favorable outcomes in any version of the curriculum than their counterparts in the control group.

No support was found, however, for the hypothesis that program outcomes would be moderated by particular matches between intervention version and language preference. Specifically, we expected that English dominant, bilingual, and Spanish dominant students would show stronger desired program effects, respectively, in the Non-Latino, Multicultural and Latino versions of the intervention. The lack of support for matching language preference to program version can be the result of the very low use rate self-reported by Spanish dominant students at baseline. However, English dominant participants demonstrated the strongest desired program effects for both substance use and attitudes toward substance use after participation in any version of the curriculum. The program was able to reach these youth who have been identified in several studies as most at risk of substance use involvement (Epstein, Botvin, & Diaz, 2000; 2001).

This study employed language preference as an unsophisticated proxy for acculturation. It is recognized that acculturation is a multidimensional concept that is not adequately captured in a simple measure of language preference. However, this proxy for acculturation has some advantages. Language preference has been found to account for a substantial portion of variance in the development of more detailed scales for acculturation (Cuéllar, Harris, & Jasso, 1980; Marin & Marin 1991). Language preference is a critical part of students' moves from more to less sheltered social contexts. It captures important elements in acculturation models that allow for competence in more than one culture under different circumstances (Coleman et al., 2001). Such a view of acculturation would fit the experience of Mexican and Mexican-American youth who—through English language acquisition—find their social horizons widening beyond their family and same culture friends. A culturally grounded intervention may have a favorable effect for Mexican and Mexican-American youth who would be exposed increasingly to drug offers and opportunities to use substances that come with a broad-

ening social landscape and new friendship networks disconnected from culture of origin and family control. A multicultural intervention may also provide skills in drug refusal not only for situations taken from Mexican and Mexican-American cultures, but also for drug offer scenarios originating from European-American and African-American peer groups.

It appears that Spanish language as an indicator of lower levels of acculturation has a protective effect against the risk of adolescent substance use. To delay intervention until these protective effects are eroded by higher acculturation may jeopardize the goal of primary prevention. School-based, culturally grounded interventions such as *keepin'it REAL* appear to serve well Mexican/Mexican-American students throughout the acculturation continuum. The lack of significant effects on Spanish monolingual students can be traced to their baseline low or non-existent substance use rates. In order to better estimate the impact of this intervention or similar universal interventions researchers face the challenge of developing and testing alternative measures to the traditional drug use behavioral based measures. Survey data should provide longitudinal profiles of students as they progress through their acculturation process based on multimeasure survey instruments. A lack of significance between baseline and posttest over 14 months may be speaking of an adequate interval for assessing change among students who are initially at low risk, particularly those who are still early adolescents and Spanish dominant. These students, if neglected by prevention interventions, may quickly lose the protective effects of culture of origin and join their substance-using peers.

These findings have important implications for school social workers, other school-based prevention professionals, and for prevention research in general. When is the right time to intervene? Are Spanish monolingual Mexican descent students protected by culture of origin, and if so, do they need to be exposed to a substance use prevention curriculum? Should resources target bilingual and English dominant Mexican-American students more heavily? Answers to the questions must await further research into the dynamics of acculturation and acculturation stress processes.

School social workers can play a key role as cultural mediators between school and home, between majority cultural norms and culture of origin. In the borderlands as in other regions of the nation, social workers can support students of immigrant background to celebrate their cultural heritage and family and stay connected to their protective effects. Students need the support of social workers as they navigate through

multiple transitions. They are not just adolescents but they also need to negotiate at least two cultures and two languages as they develop a sense of self. Racism, xenophobia, and a relentless and generalized push toward complete language and cultural assimilation can be a source of great stress and may lead to self-medication. Social workers can intervene early and through science based programs support our youth to stay in school, to stay healthy, and to be proud of their families and their cultural heritage.

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