Culturally Grounded Substance Use Prevention: An Evaluation of the *keepin' it R.E.A.L.* Curriculum

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This paper reports on the evaluation of a culturally grounded prevention intervention targeting substance use among urban middle-school students. The curriculum consists of 10 lessons promoting antidrug norms and teaching resistance and other social skills, reinforced by booster activities and a media campaign. Three versions were delivered: Mexican American, combined African American and European American, and Multicultural. Thirty-five middle schools were randomly assigned to 1 of the 3 versions or the control. Students completed baseline and follow-up questionnaires over a 2-year period (total 6,035 respondents). Analyses utilizing a generalized estimating equations approach assessed the overall effectiveness of cultural grounding and the cultural matching hypothesis. Support was found for the intervention's overall effectiveness, with statistically significant effects on gateway drug use as well as norms, attitudes, and resistance strategies but with little support for the cultural matching hypothesis. Specific contrasts found the Mexican American and Multicultural versions impacted the most outcomes.

KEY WORDS: substance use; middle-school students; prevention programs; cultural grounding.

INTRODUCTION

Over the past decade, the percentage of U.S. adolescents reporting any substance use has increased (Johnston *et al.*, 2000). This increase reflected the use of both "gateway" and "hard" drugs, and occurred despite the implementation of stand-alone programs, integrated approaches, and "blueprint" messages designed to reduce substance use and abuse among pre-

teens and teens (Johnston *et al.*, 2000). In particular, the sharp spike in use as students move from middle school to high school grades remains a particular concern (Johnston *et al.*, 2000; Wilson *et al.*, 2002).

Ethnic, racial, and cultural influences play a role in the prevalence of substance use and abuse, in developmentally related increases in use, and in the effectiveness of substance use prevention. For example, African American adolescents demonstrate substantially lower rates of alcohol, tobacco, and marijuana use than do non-Hispanic Whites, whereas Latino students generally report rates of use in between the other two groups (Centers for Disease Control and Prevention, 1998). However, in some regions of the country and for some substances such as alcohol, Latino eighth-grade students exhibit the highest prevalence of use (Marsiglia *et al.*, 2001). Even if rates of substance use did not differ among ethnic/racial groups, prevention researchers would still need to consider that culture can play a crucial role in prevention program effectiveness (Castro *et al.*, 1999).

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Culturally Relevant Substance Use Prevention

Researchers have long recognized that the most successful substance use prevention programs reflect aspects of the adolescent's culture and learning style in their content and format (Kandel, 1995). At the most general level this means integrating youth culture into prevention curriculum. Research also has shown that minority youth respond more favorably to programs in which the teachers or characters are members of their own group (Dorr, 1982; Eigen & Siegal, 1991). Despite the fact that culturally oriented prevention messages have successfully reduced adolescent drug use in limited testing (e.g., Botvin *et al.*, 1997, 2001; Marsiglia *et al.*, 2000), few substance use prevention programs are culturally grounded (Roosa *et al.*, in press).

Several obstacles deter attempts to adequately ground prevention programs in the culture of the children and the communities they serve and to evaluate the utility of such programs. Culturally grounded intervention *starts* with the culture and develops the prevention intervention from this point. It requires not only symbolic representations of culture, such as visual images and language reflecting that of the participants, but also a consideration of cultural values, and the variability inherent within any particular cultural group. Some programs rely on overly simplistic or stereotypical representations of culture, and "ethnic glosses" that reflect unfounded assumptions of ethnic homogeneity (Collins, 1995; Trimble, 1992, 1995, 1996). Others modify established prevention programs originally created for use with mostly non-Hispanic White populations (Botvin *et al.*, 2001). Such adaptations sometimes prove effective, but they also risk leaving intact the dominant cultural values that are embedded in the existing curriculum and this may invalidate the day-to-day experiences of minority adolescents (Frable, 1997; Lawrence, 1997). Even when programs do attempt to consider culture, assessments of programs combining elements from multiple cultural groups muddle efforts to ascertain the benefit of orienting prevention programs to a specific cultural group (Botvin *et al.*, 1997, 2001; Epstein *et al.*, 2000).

Prevention science requires an assessment of interventions that thoroughly reflect a specific cultural group (e.g., are targeted to a specific culture). In addition, we need to compare the efficacy of such programs with multicultural interventions to examine the level of cultural specificity needed for success. Multiculturalism is predicated on inclusion of cultural values from all of the groups participating in the prevention program (Green, 1999). It assumes that participants prefer or accept inclusion rather than separation in a targeted curriculum. Because most U.S. public schools enroll students representing many cultural backgrounds, multicultural prevention may prove more effective than selectively targeted or matched interventions (e.g., an intervention culturally specific for African Americans and reaching just that audience). Testing of the effectiveness of both targeted (culturally specific) and multicultural interventions advances a culturally relevant approach to prevention.

The keepin' it R.E.A.L. Curriculum

The Drug Resistance Strategies Project (DRS) designed, implemented, and evaluated the *keepin' it R.E.A.L.* curriculum based on previous work demonstrating the efficacy of teaching communication and life skills to combat negative peer and other influences through school-based prevention (Tobler *et al.*, 2000; Tobler & Stratton, 1997). The curriculum extended resistance and life skills models (Botvin *et al.*, 2001) by using a culturally based narrative and performance framework (Hecht *et al.*, 1993; Holland & Kilpatrick, 1993) to enhance antidrug norms and attitudes, and to facilitate the development of risk assessment, decision making, and resistance skills. The *keepin' it R.E.A.L.* program was designed from its inception as a culturally grounded intervention using a cultural resiliency model that incorpates traditional ethnic values and practices that promote protection against drug use (Castro *et al.*, 1999, p. 520).

DRS utilized three parallel versions of a 10-session classroom curriculum: a Mexican American centered version (Mexican American); a non-Mexican American centered version (Black/White); and a Multicultural version developed by incorporating five lessons each from the first two versions (see Gosin *et al.*, 2002, for more detail on the curriculum). The first version orients itself toward Mexican American culture, the largest subgroup under the Latino umbrella group, now the largest U.S. ethnic minority (Hirschman *et al.*, 2000). Focusing prevention on Mexican American youth responds to the needs of an underresearched community and at the same time provides a useful example of a specific culturally relevant program.

This emphasis on Mexican American culture also fits within the context of the study locale. Phoenix, Arizona, like other Southwestern cities, has

experienced explosive growth, including a growing presence of immigrant populations (Hirschman *et al.*, 2000). As a result of this demographic shift and the proximity to Mexico, Arizona assumes a borderland profile. This profile incorporates many aspects of Mexican American culture including regional Mexican cuisines, Spanish-inspired architectural designs, and the infusion of the Spanish language into everyday life and media (Rodriguez, 2001). These local factors, and the large proportion of Mexican or Mexican American students in Phoenix (approximately 74% by the time of the study), contributed to the choice of Mexican American culture for one curriculum version.

The second version oriented itself to both European American and African American cultures. These are the two largest minority ethnic groups in the target area's schools. Neither group was large enough (i.e., 17% non-Hispanic Whites; 9% non-Hispanic Blacks in the sample analyzed for this study) to support a targeted intervention to test the efficacy of cultural matching. However, including this version of the program provided a comparison not specifically targeted to the majority ethnic/cultural group (Mexican Amer-

icans) as well as allowed DRS to provide versions of the curriculum relevant to 96% of the students.

Culture was infused into the curriculum through a number of techniques. First, the curriculum was constructed from cultural narratives. Narratives or stories were collected from adolescents in each ethnic group and used to create the performance-based elements of the curriculum. In addition, the interventions incorporated values identified and commonly cited as central to Mexican American, European American, or African American cultures (see Table 1; see also Harthun *et al.*, in press). Because they influence how individuals deal with others, affirming these relational and communication values can encourage students to resist substance use in a manner most familiar to them, and subsequently enhance the chances of success of the program (Castro *et al.*, 1999).

Cultural grounding also acted as the fundamental driving force in developing the six core elements of the intervention: (a) communication competence, and ethnic variations thereof (Collier *et al.*, 1986; Hecht *et al.*, 1992; Spitzberg & Cupach, 1984); (b) narrative-based knowledge to enhance identification with the prevention message (Botvin *et al.*, 1994; Fisher, 1987;

Table 1. Values More Commonly Emphasized by Ethnic/Racial Groups

Euro American values[a]	Mexican American values[b]	African American values[c]
Individualism Stress what people are able to do for themselves as honorable; honor individual strengths, goals, victories	Family orientation (familismo) Value in trusting entire network; family/extended family valued as center of social support, solidarity; family not limited to blood relatives	Communalism Interdependence; strong family orientation; role flexibility, sacrificing or adapting one's own wishes/agenda for the good of the group or family; inclusiveness
Planning and goals Having a purpose in life to get ahead and setting priorities accordingly	Action orientation Emphasis on evidence of one's intentions through their actions	Purpose Doing things for a reason; value in hard work in achieving a goal
Respect Valuing people's boundaries	Respect (respeto) Giving deference to persons of status or acknowledging their position, avoiding humiliation of others or direct public confrontation	Respect Respecting the accomplishments of others; honoring the family and elders; taking into account the feelings of others, affective orientation
Directness in communication Being assertive and sure of one's self in communication, direct eye contact	Personal treatment (personalismo) Preference for being treated on a personal basis rather than according to categories, rules, policy	Endurance Value in endurance and persistence in the face of adversity
Fair game Preference not to be singled out, playing by the rules, objectivity valued	Niceness (simpatia) Creating pleasure in others by actions, kindness and grace in personal treatment, regardless of persons' status	Creativity Expressing oneself through music, dance, or other forms of expressive presentation; importance of the oral tradition

[a] Adapted from Katz (1985) and Cavanagh (1990).
[b] Adapted from Mayers *et al.* (1993).
[c] Adapted from Denby (1996).

Hecht et al., 1993; Marsiglia & Zorita, 1996; Miller-Day *et al.*, 1998); (c) different types of social norms (personal, injunctive, and descriptive) as motivators in substance use (Cialdini *et al.*, 1990; Hansen, 1991); (d) social learning of life skills and their key role in risk assessment and decision making (Bandura, 1977; Hawkins *et al.*, 1992; Tobler & Stratton, 1997); (e) drug resistance strategies most commonly and effectively employed by adolescents (Alberts *et al.*, 1991, 1992; Hecht *et al.*, 1992; Miller-Rassulo *et al.*, 2000); and (f) the local social context (Bogenschneider, 1996; Castro *et al.*, 1999; Link *et al.*, 1998). These elements integrated multiple theoretical approaches into a coherent multilevel and multifaceted intervention.

Although each element received consideration during creation of the curriculum, the teaching of resistance strategies received special emphasis. Preliminary research identified four strategies used to successfully resist offers of substance use: refuse/*rechaza*, explain/*explica*, avoid/*apártate*, and leave/*levántate* (Alberts *et al.*, 1991, 1992; Hecht *et al.*, 1992; Miller-Day *et al.*, 1998; Miller-Rassulo *et al.*, 2000; Moon *et al.*, 1999; Trost *et al.*, 1999). The resistance strategies formed the acronym R.E.A.L., later translated by students into *"keepin' it R.E.A.L.,"* or in Spanish *"recuerda…R.E.A.L.,"* as a title for the program at the school level. Refuse consists of simple statements of "no" to substance use offers, whereas explanations provide more elaborate reasons for refusing. Adolescents also use the strategies of avoiding situations known to involve alcohol, tobacco, and other drugs (ATOD) or leaving the environment once they encounter substance use. Although each version of the curriculum included the teaching of all four resistance strategies, some strategies received more stress in one version than in the others on the basis of research cited above and cultural values. For example, "explain" was stressed more in the Mexican American version. Explaining confirms cultural values regarding the importance of dealing with others in a respectful, nonconfrontational manner, whereas outright refusal seems much more direct and, therefore, more disrespectful behavior within the Mexican American culture (see Gosin *et al.*, 2002, for more detail on differences between the versions).

The curriculum designers used the drug resistance narratives and communication styles conveyed by the adolescents during the preliminary research along with the relevant cultural group values to develop lesson content. These resistance stories also shaped the production of videotapes for five of the lessons by students at a local performing arts high school (Holleran *et al.*, in press). The videos provided an overview of the program and taught each resistance skill through enactments or models of successful drug resistance in recognizable locales, by youth similar to the students in age and ethnicity. Classroom-based examples and exercises using culturally appropriate techniques and scenarios provided practice in using the strategies. Thus, narrative theory (Fisher, 1987) guided both the content and form of the curriculum, an approach that proved effective in a pilot test (Hecht *et al.*, 1993).

The curriculum was pilot-tested by teachers and students (Gosin *et al.*, in press). First, seven teachers of varying ethnic backgrounds, years of experiences, and schools examined the preliminary lessons and provided detailed feedback. The lessons were then revised. Two lessons were then field-tested in three seventh grade classrooms. Observers documented student reactions and other delivery qualities. A second revision was then completed.

In addition to the 10 in-class lessons, each version of the intervention utilized the same reinforcing television and radio public service advertisements (PSAs) and billboard campaign, as well as in-school booster sessions implemented during the follow-up year of the study. Because of the close proximity of the schools and their random assignment to conditions, the media campaign was received by students in both treatment and control conditions. This might potentially weaken the apparent effects of the program. However the importance of the media campaign in reinforcing the school-based curriculum by repeating similar messages and utilizing a similar layout and look overwhelmed that concern.

In summary, the intervention drew on the experiences and narratives of adolescents and incorporated this material into the videotapes and classroom role plays, and in the PSAs and billboards. The DRS approach identified and taught key resistance and other social skills while altering social norms and narratives. The fact that ethnicity, race, and culture act as such important influences on each of the core elements as well as on substance use itself, led to the development of culturally grounded interventions for the main ethnic groups in the target audience (see Gosin *et al.*, 2002, for more detail on development of the curriculum).

Hypotheses

The goals of the *keepin' it R.E.A.L.* program included (a) enhancing identification with models of

culturally grounded drug resistance; (b) promoting more conservative substance use norms and attitudes; (c) developing effective drug resistance decision-making, planning, and communication skills to; (d) reduce substance use. Both hypotheses build on the general assumption that the students' recognition of their culture in the content of the curriculum will lead to greater program effectiveness. The following research hypotheses were posed:

H1. Culturally-grounded, school-based interventions positively influence antidrug attitudes and normative beliefs and reduce adolescent substance use.

In other words, each intervention condition (Mexican American, Black/White, and Multicultural versions of the curriculum) was predicted to produce better outcomes for students than the control (standard/existing intervention) condition.

H2. The greater the cultural matching between program content and student background, the stronger the effects of the prevention program.

More complete cultural matching was predicted to result in stronger effects. Matched students (e.g., Mexican Americans receiving the Mexican American version, or African Americans and non-Hispanic Whites receiving the Black/White version) should demonstrate better outcomes than those students in the Multicultural (i.e., half matched) version, whereas matched students and those in the Multicultural version should both demonstrate better outcomes than mismatched students (e.g., Mexican Americans receiving the Black/White version, or African Americans and non-Hispanic Whites receiving the Mexican American version).

METHOD

Research Design

The project was conducted over a 48-month period. During year 1 (1997–98), the research team developed the prevention program and research materials, trained project personnel, stratified the 35 participating public schools according to enrollment and ethnicity (% Hispanic) and then used block randomization to assign each school to one of four conditions (Mexican American, Black/White, Multicultural, and Control; 8, 9, 8, and 10 schools respectively in each condition). During year 2, the

research team focused on the administration of a preintervention questionnaire to all participants (Fall 1998, Wave 1), and implementation of the curriculum in seventh-grade classes in the 25 treatment schools, followed approximately 2 months later by the initial follow-up questionnaire (Spring 1999, Wave 2). The curriculum was delivered by the students' regular classroom teachers who attended a 1-day training session prior to implementation, and a half-day follow-up session during implementation, all conducted by the same professional development specialist. The teachers utilized both English and Spanish versions of the lesson materials in the teaching of each version of the curriculum to accommodate the substantial proportion of native Spanish-speaking students. During the summer of 1999, the research team implemented a bilingual television public service announcement (PSA) and billboard campaign. This was followed in year 3 by school-based booster activities with students in the treatment schools, who were then in the eighth grade. During year 2, additional follow-up questionnaires were administered to students in all study schools, one shortly after the initial booster (Fall 1999, Wave 3, 8 months after curriculum implementation), and the last following all boosters (Spring 2000, Wave 4, 14 months after curriculum completion).

As an estimate of participation in the program, over 91% of the students receiving the curriculum reported having seen at least one of the *keepin' it R.E.A.L* videos during their seventh-grade year, whereas over 30% reported seeing all five. As an estimate of the fidelity of implementation, independent, in-person observations of 37 of the 49 participating teachers rated their average appropriateness in conveying the curriculum at 5.8 on a scale ranging from 1 (*Inappropriately*) to 7 (*Appropriately*). The PSAs consisted of 30-second versions of the four resistance strategy videos, presented in either English or Spanish, and ending with the slogan "keepin' it R.E.A.L.; assessing the risks, taking control." According to questionnaire responses at Wave 3, approximately 57% of the treatment school students reported seeing the PSAs at least once (vs. 30% of the control students), whereas 10% saw the PSAs more than five times. The boosters, developed jointly by project staff, teachers, other school staff, and students, encompassed such activities as school assemblies, poster projects, murals, neighborhood night outs, and essay contests. Each treatment school initiated approximately one booster activity per month throughout the 1999–2000 school year, and over 70% of their eighth-grade students

reported attending some form of booster activity during that time.

During the 2-year period, students in the control condition participated in the existing substance use prevention programs chosen and instituted by their school or school district personnel. This prevention instruction, mandated by the state of Arizona, consisted of other research-based programs, and in some cases programs supported by local professional athletes. In addition, during the time period of the curriculum implementation, the state launched an extensive anti-tobacco campaign that included celebrity endorsements, TV commercials for adults and youth, and billboards. Therefore this study compares the *keepin' it R.E.A.L.* substance use prevention program (and cultural grounding) to standard, existing interventions.

Participants

At Wave 1 (i.e., baseline; preintervention) 4,234 seventh-grade students completed at least some portion of the questionnaire. The participating students represented approximately 87% of the students enrolled in the study schools at that time. Throughout the course of the study, approximately 6,900 students completed at least some portion of at least one of the four questionnaires. Of this number, students who were American Indian, Asian, and Pacific Islander were dropped from the analyses because of their small numbers (about 4% overall), and problematic fit within the cultural matching hypotheses. In addition, the analysis sample also was restricted to those students who indicated they attended seventh grade in the study schools during the 1998–99 school year (i.e., during the prevention curriculum delivery). As a result, the final sample consisted of 6,035 students.

In initial contacts with the schools, most principals objected to the idea of having precoded unique identifiers for the individual students (apparently based on human subjects policies) and indicated they would not participate if such identifiers were used. Therefore the study utilized respondents' school, gender, initials, and birth date to link a student's responses across the four waves of questionnaire data collection. This process linked 24% of the students over all four waves, an additional 22% over three waves, and another 19% between only two of the waves (see Table 2). Altogether, 55% of the respondents had a pretest questionnaire linked to at least one of the posttests.

Table 2. Participation Patterns Across Four Waves of Questionnaires

Wave 1	Wave 2	Wave 3	Wave 4	N	%
1	1	1	1	1444	23.9
1	1	1	0	322	5.3
1	1	0	1	269	4.5
1	0	1	1	502	8.3
0	1	1	1	223	3.7
1	1	0	0	508	8.4
1	0	1	0	156	2.6
1	0	0	1	137	2.3
0	1	1	0	85	1.4
0	1	0	1	69	1.1
0	0	1	1	174	2.9
1	0	0	0	713	11.8
0	1	0	0	827	13.7
0	0	1	0	387	6.4
0	0	0	1	219	3.6

Note. 1 = Participated at Wave, 0 = Did not participate.

Nonlinked questionnaires originated from a number of likely sources. First, two schools did not participate during Waves 3 and 4, resulting in a loss of approximately 250 students in the Mexican American condition. One of these schools also demonstrated a particularly low response rate at Wave 2 (25%). In approximately 10% of the cases, students did not accurately or completely provide their demographic information, which prevented linking. This form of missing information particularly affected 350 students in one Control condition school at Wave 2. Finally, many schools reported substantial transfer-out rates, with an average of 16% of the students leaving each school during the seventh-grade year, and 19% during the eighth-grade year. The 6,748 students attending study schools during 1998–99 (i.e., seventh graders in the study) and the 6,003 eighth graders attending during 1999–2000 compare reasonably well to the overall sample size of 6,035.

The study sample consisted of 3,318 Mexican or Mexican American students (47% female), 1,141 students of other Latino or multiethnic Latino origin (e.g., Mexican and White, Mexican and American Indian; 50% female), 1,049 non-Hispanic White students (48% female), and 527 African American students (44% female). According to student responses, 74% qualified for a free lunch and 8% qualified for reduced price lunch under the Federal program for low-income students. This status differed significantly among the ethnic/racial groups, with 86% of the Mexican/Mexican American respondents, 78% of the African American respondents, 73% of the multi-ethnic Latino and other

Latino origin respondents, and 36% of the non-Hispanic White respondents qualifying for free lunch $\chi^2(6, N = 6035) = 129.33, p < .01$). At Wave 1, the seventh graders averaged 12.53 years of age ($SD = 0.65$ years; overall range of 11–18 years), with little age variability among the racial/ethnic groups. A substantial proportion of the students spoke Spanish as their native language as indicated by approximately 10% of all the students choosing to complete the study questionnaires in Spanish rather than in English, about 10% specifying they speak mostly or only Spanish with their friends, and 13% specifying they speak mostly or only Spanish with their families.

The 35-school sample sizes ranged from 56 to 725 student respondents. The proportion of Mexican, Mexican American, other Latino, and multi-ethnic Latino origin students ranged from 21 to 99%, but over three fourths of the schools enrolled at least a majority Latino students. A large percentage of the students in most schools participated in the free or reduced lunch programs; this averaged 84% over all the schools, and ranged from 14 to 100%.

Because assignment was by school and intact classes, students from each ethnic/racial group participated in each of the three intervention conditions and the control. The attempts to stratify the schools on the basis of ethnicity prior to block random assignment to conditions appeared successful in that Latinos formed a similar percentage of the participants for each condition. However, relatively fewer African Americans and relatively more non-Hispanic Whites participated in the Mexican American curriculum version condition, and relatively fewer non-Hispanic Whites participated in the control condition causing the ethnic/racial composition of the students in the four conditions to differ significantly, $\chi^2(9, N = 6,035) = 80.91, p < .01$. The gender composition of the participants in the four conditions did not differ significantly.

Questionnaires

The questionnaires (each up to 82 items) utilized a three-form design (Graham *et al.*, 1994, 1996, 2001) that employed planned missingness to limit the number of items each individual student received in their questionnaire, while maximizing the total number of items included for analysis. At each wave students responded to the items used to obtain information about their demographic characteristics (nine items); recent alcohol, cigarette, and marijuana use (two items

each); antidrug personal norms (three items); descriptive norms (two items); and intentions to accept substances (three items). The remaining 23 items relevant to this study were distributed across three groups (A, B, and C) with each student receiving all questions from two of the three groups (i.e., A and B, B and C, or C and A).

University trained proctors administered the 45-min questionnaire (written in English on one side and Spanish on the other) during regular school hours in science, health, or homeroom classes; students in a few schools assembled together for questionnaire administration. Students recorded their responses on a separate, scannable form for Waves 1, 2, and 3, and directly on a scannable questionnaire for Wave 4.

Measures

Demographic Characteristics

The students indicated their ethnic/racial background through six *yes* or *no* items that asked if they were Mexican American, Mexican, Chicano/a; other Latino (Puerto Rican, Cuban, etc.); White (Anglo); African American (Black); American Indian (Pima, Yaqui, Navajo, etc.); or Asian or Pacific Islander (Chinese, Japanese, etc.). This scheme allowed students to report mixed backgrounds. For the purposes of this study, the Mexican/Mexican American category consisted of those students who only marked *yes* to item one. The multi-ethnic Latino/other Latino category consisted of any students who indicated *yes* to Item 1 and any of the other ethnicity items, or to Item 2 either alone or with any of the other ethnicity items. The non-Hispanic White and African American categories consisted of those indicating *yes* to Item 3 or 4 respectively, but not to the Mexican American or other Latino items. Students described their language use through responses to two items, one regarding language use with parents and the other with friends (1 = *Spanish only* to 5 = *English only*; 6 = *Other language*). Students indicated gender by marking *male* or *female*, age by penciling in their birth date, and free/reduced lunch status by marking *free lunch*, *reduced lunch*, or *neither*.

Behavioral Variables

The questionnaires assessed both how much (amount) and how often (frequency) students drank alcohol, smoked cigarettes, and smoked marijuana in

the past 30 days. The Likert-scaled items were modeled after those used by Flannery *et al.* (1994). 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 (1 = *None* to 6 = 16–30). The responses on amount and frequency were averaged separately for each substance as well as together to obtain an overall recent substance use measure. The overall recent substance use measure demonstrated internal consistency (Cronbach's α) of .87.

The three resistance strategies measures, created specifically for this study, utilized students' responses to three items for each substance (alcohol, cigarettes, and marijuana). Students received one point for each strategy they indicated as used: turning down an offer by "just saying no" (refuse); by "giving an explanation or some other excuse" (explain); and by "just leaving the situation" (leave). The scores were then summed to create a set of three variables that tallied the number of resistance skills used to resist use of each substance.

Psychosocial Variables

The analyzed scores on each of the following psychosocial variables consisted of an average of the item scores for the relevant measure. Self-efficacy was assessed through three items measuring the students' confidence (1 = *Not at all sure* to 5 = *Very sure*) in saying no to ATOD offers from "a friend (they) really liked," "someone (they) don't know well," or "a family member (parents, brothers, sisters, aunts, uncles, etc.)." This measure was designed using Kasen *et al.*'s self-efficacy scale (Kasen *et al.*, 1992) and demonstrated internal consistency (α) of .79. A three-item measure developed for this study assessed the respondent's intentions to accept offers of "alcohol to drink (beer, wine, hard liquor)," "a cigarette," or "marijuana," on a scale from 1 (*Definitely no*) to 4 (*Definitely yes*). This intent to accept measure also demonstrated high internal consistency with an α of .82. Positive substance use expectancies represented the students' perceptions of the positive consequences of substance use. This expectancies measure consisted of three alcohol items (Hansen & Graham, 1991) that asked whether drinking alcohol makes it easier "to be part of a group," "to have a good time with friends," or "makes parties more fun"; one cigarette item that

asked whether "smoking cigarettes makes people less nervous"; and one marijuana item that asked whether smoking marijuana makes food taste better (all scaled from 1 = *Never* to 5 = *Most of the time*). This measure demonstrated internal consistency (α) of .78.

The Focus Theory of Norms (Cialdini *et al.*, 1990) was used to identify and measure three types of norms: personal (what the individual thinks is right or wrong), injunctive (what the individual believes that others think are right or wrong), and descriptive (how many of their peers use drugs). The questionnaires assessed anti-ATOD personal norms by asking, "Is it OK for someone your age to..." "drink alcohol," "smoke cigarettes," or "use marijuana." The questions were based on those used by Hansen and Graham (1991). Possible responses ranged from 1 (*Definitely OK*) to 4 (*Definitely not OK*). The three-item personal norms measure demonstrated internal consistency of (α) = .86. The items related to anti-ATOD injunctive norms focused on parents and best friends and were based on those used by Hansen and Graham (1991) and Hansen *et al.* (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 on scales of 1 = *Not angry at all* to 4 = *Very angry*), and how their best friends would act towards them if they engaged in these behaviors (three additional items on scales of 1 = *Very friendly* to 4 = *Very unfriendly*). Internal consistency (α) was .75 and .85 for the parent injunctive norms and friend injunctive norms measures respectively. Lastly, two descriptive norms items, developed for this study, asked the respondents to estimate how many students in their schools tried alcohol, tobacco, and other drugs at least once, and how many kids in their schools use drugs regularly (both on reversed scales of 1 = *Hardly any* to 4 = *Most*; α = .74).

The internal consistency (α) of each of the scales described above remained fairly stable throughout the course of the four questionnaire administrations, and the adequacy of the measurement models for each of these psychosocial variables was demonstrated through confirmatory factor analysis (Hecht *et al.*, 2001).

Statistical Analyses

The analyses proceeded in three stages. First, to address the planned missingness and the missing data due to wave and item nonresponse, the software package NORM (Schafer, 1997; Shafer & Olsen, 1998) was

used to generate 10 multiply imputed data sets. Then STATA's (Stata Corporation, 2001) Xtgee module for generalized estimating equations (GEE) was used to obtain parameter estimates of modeled effects. Finally, NORM was used to "average" the estimates across the imputed data sets according to Rubin's rules (Rubin, 1987) and obtain point estimates, interval estimates, and *p* values.

The GEE approach fits marginal regression models to correlated data (see Diggle *et al.*, 1994, and the references therein). Prior to fitting the GEE models, preliminary analyses were conducted to identify an appropriate working correlation matrix. As part of these analyses, we studied the correlation patterns across time and schools. In this study, a student's responses at baseline and the three follow-up assessments exhibited serial correlation, and the responses of students attending the same school exhibited intraclass correlation. If the marginal model is specified correctly, GEE can provide a consistent estimate of the regression coefficients even when an incorrect working correlation matrix is used to obtain an estimate for the variance–covariance matrix of the regression coefficients (Pan *et al.*, 2000). In this study, we used the independence model for the working correlation matrix (Pan *et al.*, 2000; Pepe & Anderson, 1994). As a practical matter, we obtained the same point estimates for the regression coefficients and their standard errors when we used independence, equicorrelated, and unstructured working correlation models.

The models used to assess treatment impacts included condition and time main effects, and the condition × time interaction (when we assessed the matching hypothesis, matching replaced condition). We used simple effects coding $(1, 0, -1)$ to represent all effects (Cohen & Cohen, 1983). Instead of conducting an omnibus test of the interaction, we made extensive use of single-degree-of-freedom contrasts to test mean differences among treatments at each follow-up time point. For example, we used three linear contrasts to determine if the mean change from baseline (Wave 1) to Wave 2, baseline to Wave 3, and baseline to Wave 4 was the same for students in the Mexican American condition and students in the Control condition.

RESULTS

Attrition

The number of students responding to the questionnaires declined over the course of the study. The sample size decreased by 7% at Wave 2, 12% at Wave 3, and 16% at Wave 4. The regression of number of participants on the measurement period indicated that Mexican/Mexican American students left the study at an average rate of 4.6% per year. Other Latino/multi-ethnic Latino, non-Hispanic White, and African American students left the study at average annual rates of 6.3, 5.1, and 5.9% respectively. A test of the Group × Time interaction indicated that the observed differences in attrition rates among the four racial/ethnic groups were not statistically significant, $F(3, 8) = 0.22, p = .88$.

Tests of Program Effects

Intervention Versus Control

The initial set of analyses combined the three versions of the curricula (Mexican American, Black/White, and Multicultural) into one intervention category that was then compared with the control condition. This set of analyses allowed for a clear test of the overall effectiveness of the *keepin' it R.E.A.L.* intervention (i.e., the effectiveness of a culturally grounded intervention disregarding cultural targeting). The Condition × Time interaction was examined by contrasting the mean change from baseline exhibited by the intervention and control groups at Waves 2, 3, and 4. Table 3 presents the mean difference estimates, standard errors, and test statistics associated with these single-degree-of-freedom contrasts, including those that support the following statements regarding significant results. Overall, students participating in the intervention reported better behavioral and psychosocial outcomes related to substance use than did control students.

Use of alcohol, cigarettes, and marijuana increased over time for both the intervention and control students. However, the increase was significantly less for intervention students, a finding seen most clearly in the case of reported alcohol use. With regards to other behavioral outcomes, intervention students reported adopting more strategies used to resist alcohol, cigarettes, and marijuana at Wave 2 than did control students (on average the number of strategies used by control group students decreased from baseline to Wave 2). By Wave 3, intervention students reported adding significantly more strategies from baseline than did the control, but only to resist cigarettes, whereas no significant differences emerged at Wave 4.

The DRS intervention did not demonstrate any significant impact on students' intent to accept ATOD

Table 3. Mean Difference Between Intervention and Control After Accounting for Baseline (Wave 1) Levels

| | Intervention versus control comparison | | | | | |
| | Wave 2 | | Wave 3 | | Wave 4 | |
Variable	Estimate	SE	Estimate	SE	Estimate	SE
Recent substance use	−0.060	0.032	−0.099**	0.035	−0.159***	0.044
Alcohol	−0.148**	0.045	−0.144*	0.061	−0.232***	0.064
Cigarettes	−0.039	0.035	−0.091*	0.042	−0.070	0.057
Marijuana	0.007	0.039	−0.062	0.040	−0.175***	0.048
Resistance strategies						
Alcohol	0.133	0.055	0.071	0.054	0.100	0.064
Cigarettes	0.227**	0.062	0.128*	0.060	0.098	0.066
Marijuana	0.158*	0.066	0.006	0.066	0.098	0.077
Self-efficacy	0.061	0.071	0.052	0.070	0.093	0.069
Intent to Accept	−0.026	0.029	−0.035	0.034	−0.047	0.032
Positive expectancies	−0.049	0.038	−0.071*	0.034	−0.100*	0.046
Norms						
Personal antidrug	0.095**	0.030	0.088*	0.034	0.071	0.038
Parents' injunctive	0.031	0.042	0.037	0.032	0.024	0.034
Friends' injunctive	0.032	0.041	0.066	0.050	0.079	0.048
Descriptive	−0.114*	0.044	−0.105*	0.044	−0.075*	0.032

*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

offers or on student confidence in resisting such offers (self-efficacy). Whereas intervention students in the aggregate reported a small increase in positive expectations regarding alcohol, cigarette, and marijuana use, control students reported significantly greater increases in these expectations at Waves 3 and 4. Overall, there were no significant differences between intervention and control students in the degree of change in reports of their parent's or friends anti-ATOD injunctive norms over the course of the study; both sets of norms appeared to weaken somewhat over time for all students. However, with respect to their own personal norms, intervention students reported significantly less erosion in their attitudes against someone their age using substances than did control students. Furthermore, intervention students expressed perceptions of significantly smaller increases in their peers' substance experimentation and use (descriptive norms). Although students typically reported norms less resistant to substance use over time, the intervention served to mitigate this trend.

Mexican American, Black/White, and Multicultural Versions Versus the Control

The second set of contrast analyses compared each version of the curriculum to the control group. The single-degree-of-freedom contrasts identified statistically significant group mean differences where the means reflected the average change between the baseline score and the score at each subsequent wave (see Table 4). The pattern of findings indicated that the Mexican American and Multicultural versions significantly impacted the most variables over the course of the study whereas the Black/White version produced far fewer significant effects. In these analyses the ethnic/racial labels refer to the cultural grounding, content, and emphasis of the curriculum version, and not to the ethnic/racial background of the student participants (participants in each condition reflected the ethnic/racial breakdown of the study sample as a whole).

Students in each condition reported increased substance use over the course of the study. However, students receiving each separate version of the intervention reported significantly smaller increases than did control students in recent alcohol use at Wave 2 and in recent alcohol and overall recent substance use at Wave 4. Moreover, students receiving the Mexican American or Multicultural versions reported significantly smaller increases in recent marijuana use at Wave 4 than did control students. Students receiving the Mexican American version reported smaller increases in overall recent substance use at Waves 2 and 3, and in recent cigarette use at Wave 3. Although the three versions of the curriculum demonstrated differing impacts on substance use, contrasts with the control regarding student use of resistance strategies did not distinguish

Table 4. Mean Differences Between Each Intervention Condition and the Control After Accounting for Baseline (Wave 1) Levels

	Mean difference between intervention version condition and control (SE)								
	Wave 2			Wave 3			Wave 4		
Variable	Mex Am	Bl/Wh	Mult	Mex Am	Bl/Wh	Mult	Mex Am	Bl/Wh	Mult
Recent substance use	−0.091* (0.041)	−0.053 (0.053)	−0.051 (0.039)	−0.127* (0.048)	−0.060 (0.050)	−0.096 (0.061)	−0.168* (0.064)	−0.149* (0.063)	−0.159** (0.052)
Alcohol	−0.168** (0.062)	−0.157* (0.071)	−0.125* (0.064)	−0.173 (0.087)	−0.083 (0.073)	−0.118 (0.093)	−0.222* (0.095)	−0.232* (0.090)	−0.241*** (0.068)
Cigarettes	−0.027 (0.056)	−0.016 (0.060)	−0.060 (0.044)	−0.113* (0.046)	−0.039 (0.062)	−0.121 (0.070)	−0.092 (0.086)	−0.057 (0.069)	−0.060 (0.054)
Marijuana	−0.077 (0.055)	0.014 (0.056)	0.032 (0.048)	−0.094 (0.060)	−0.058 (0.061)	−0.049 (0.071)	−0.191** (0.070)	−0.156 (0.082)	−0.175* (0.076)
Resistance strategies									
Alcohol	0.158 (0.103)	0.141 (0.072)	0.097 (0.062)	0.122 (0.082)	0.011 (0.072)	0.034 (0.091)	0.085 (0.076)	0.043 (0.072)	0.153 (0.097)
Cigarettes	0.115 (0.073)	0.303** (0.083)	0.186* (0.072)	0.165 (0.084)	0.150* (0.070)	−0.042 (0.080)	0.157 (0.097)	0.035 (0.080)	0.094 (0.083)
Marijuana	0.095 (0.084)	0.173 (0.088)	0.144 (0.083)	0.038 (0.080)	−0.066 (0.084)	−0.023 (0.089)	0.142 (0.101)	0.039 (0.095)	0.103 (0.089)
Self-Efficacy	0.214* (0.089)	−0.016 (0.097)	0.039 (0.077)	0.103 (0.103)	−0.005 (0.076)	0.110 (0.106)	0.067 (0.106)	0.083 (0.084)	0.122 (0.075)
Intentions to accept	−0.080* (0.037)	0.012 (0.037)	−0.029 (0.031)	−0.043 (0.043)	0.021 (0.037)	−0.070 (0.046)	−0.037 (0.048)	−0.054 (0.039)	−0.051 (0.034)
Positive expectancies	−0.039 (0.048)	−0.020 (0.056)	−0.088 (0.049)	−0.030 (0.060)	−0.026 (0.049)	−0.148* (0.066)	−0.034 (0.063)	−0.126 (0.064)	−0.135** (0.049)
Norms									
Personal Antidrug	0.132** (0.046)	0.047 (0.042)	0.096** (0.033)	0.125* (0.056)	0.011 (0.041)	0.133* (0.050)	0.100 (0.055)	0.049 (0.045)	0.062 (0.041)
Parents' Injunctive	0.086 (0.047)	−0.013 (0.060)	0.038 (0.046)	0.008 (0.049)	0.063 (0.039)	0.077 (0.048)	0.045 (0.045)	0.013 (0.038)	0.016 (0.046)
Friends' Injunctive	0.097* (0.047)	−0.046 (0.072)	0.058 (0.045)	0.070 (0.065)	0.004 (0.074)	0.170*** (0.050)	0.089 (0.063)	0.052 (0.073)	0.089 (0.046)
Descriptive	−0.221*** (0.048)	−0.039 (0.056)	−0.088 (0.050)	−0.229** (0.066)	−0.053 (0.054)	−0.087 (0.045)	−0.140* (0.052)	−0.053 (0.048)	−0.038 (0.041)

Note. Mex Am = Mexican American version; Bl/Wh = Black/White version; Mult = Multicultural version.

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

the three versions appreciably from one another. Students receiving the Black/White or Multicultural version of the curriculum reported adding significantly more strategies to resist cigarettes at Wave 2 than did control students. The students in the Black/White condition maintained this significant difference 8 months later at Wave 3, but no other significant effects on the use of resistance strategies emerged from an individual version.

For the remaining psychosocial outcomes, generally only one of the versions of the curriculum—either the Mexican American or the Multicultural—showed a desired impact compared to the control condition. Students receiving the Mexican American curriculum reported significant gains in self-efficacy to refuse ATOD offers and significantly lower increases in intent to accept ATOD offers at Wave 2, compared to the changes reported by control students. The students receiving the Multicultural version of the curriculum were the only intervention group to report significantly lower increases in positive expectancies toward substance use compared to control students; this occured both at Wave 3 and Wave 4. With respect to their own personal norms, students in both the Mexican American and Multicultural conditions reported significantly less erosion in their attitudes against someone their age using substances than did control students at Waves 2 and 3. Although the DRS intervention as a whole did not appear to impact injunctive norms, students in the Mexican American condition (at Wave 2) and students in the Multicultural condition (at Wave 3) reported significantly smaller decreases in friends' anti-drug injunctive norms than did control students. However, only students receiving the Mexican American version of the curriculum expressed perceptions of significantly smaller increases in the prevalence of substance experimentation and use by their fellow students (descriptive norms) than did control group students, an impact that registered in all three follow-up periods.

Test of the Cultural Matching Hypothesis

The third set of analyses used students' ethnic self-labeling to categorize them as matched to the curriculum received (i.e., Mexican, Mexican American, and multi-ethnic Latino origin in the Mexican American condition; non-Hispanic White and African American in the Black/White condition), mismatched (i.e., Mexican, Mexican American, and multi-ethnic Latino origin in the Black/White condition; non-Hispanic White and African American

in the Mexican American condition), or mixed (i.e., any students in the Multicultural condition). Single-degree-of-freedom contrasts were used to identify statistically significant mean differences between the responses of matched, mismatched, and mixed students, when comparing each follow-up assessment to the baseline. The contrasts examined if matching the content of the program to the culture/ethnicity of the student enhanced the outcomes of the program. These tests uncovered very few significant differences and therefore provided little substantial support of the cultural matching hypothesis (results are therefore not presented in tables).

DISCUSSION

This study assessed the effectiveness of a culturally-grounded substance use prevention intervention for middle school students, along with assessing the impact of cultural matching. On the basis of analyses, the intervention provided promising results with substantial and significant effects on personal and descriptive norms, expectations of substance use, use of resistance strategies, and use of the gateway drugs: alcohol, cigarettes, and marijuana. The intervention had its greatest impact on use of alcohol, the substance used by the largest and most rapidly growing number of students. In some instances, the curriculum helped students maintain preexisting, anti-ATOD attitudes and norms; at a minimum, it restricted their transition to greater levels of substance use and toward more prodrug attitudes and norms. Additionally, the *keepin' it R.E.A.L.* curriculum proved effective when tailored to Mexican Americans for which few previous culturally specific prevention efforts have been developed and tested. Clearly, infusing cultural elements and values into prevention programs appears quite beneficial. However, the analyses of the different levels of matching between versions of the program and student's ethnic/racial backgrounds did not demonstrate that such cultural matching efforts add appreciably to program effectiveness.

Although the cultural matching hypothesis received little support, this does not negate the fact that culture influences communication, and that prevention messages incorporating cultural elements will provide a greater impact (Castro *et al.*, 1999). The findings indicated that it is not necessary to ethnically segregate students into narrowly tailored programs to gain effectiveness. Rather, the process of

incorporating a representative level of relevant cultural elements into the prevention message appeared critical. In an integrated school system where Mexican Americans make up the largest percentage of students, this study found that a curriculum tailored to Mexican American culture or reflective of Mexican American culture (in the Multicultural version) reduced the use of all three gateway drugs and beneficially impacted a number of other substance-use-related psychosocial variables.

The Mexican American and Multicultural versions of the curriculum both produced beneficial effects relative to the control (standard/existing intervention) condition. Both versions impacted personal norms, and alcohol, marijuana, and overall substance use in desired directions. However, the Mexican American version performed significantly better than the control condition on cigarette use, self-efficacy, intentions, and descriptive norms, whereas the Multicultural version produced significantly better outcomes than those in the control condition on resistance strategies, positive substance use expectancies, and friend's injunctive norms. The version of the curriculum that focused on African American and European American culture and values did not produce as broad an impact.

This study can provide impetus for the implementation of multicultural prevention curricula in schools with ethnically diverse student populations. Multicultural curricula such as the one proving effective in this study include cultural elements from a variety of cultures and this allows most students to perceive elements of their own culture in the program. Although the program does not target a specific culture, the inclusion of one's own culture within a range of cultural representations (e.g., here Mexican American, African American, and European American) appears to provide adequate cultural grounding and representation. A multicultural prevention program could prove especially relevant and useful in schools with considerable diverse minority populations, as it would be virtually impossible to target and provide a complete match of the intervention to the school population. Additionally, the multicultural version of the curriculum may better address the needs of more acculturated Mexican American youths, a hypothesis that merits testing in a future study.

Limitations and Suggestions for Future Research

A number of limitations may have influenced the results of this study. In an explicit effort to tailor the curriculum to specific cultural values, each version emphasized different resistance strategies and other cultural elements; the different emphasis in content may have influenced the outcomes beyond the effects of cultural grounding. The demographics of the area and its schools limited the ability to develop separate versions of the curriculum for non-Hispanic Blacks and non-Hispanic Whites, leading to the decision to create a combined Black/White version. In future replications of the study in areas with different ethnic distributions, the curriculum versions need to reflect the local ethnic composition. It is not even clear how well this particular intervention will generalize to other Mexican American communities in the Southwest, given the localized nature of the intervention philosophy. The development of the *keepin' it R.E.A.L.* curriculum provides at least a model for the adaptation of similar prevention programs by schools, school districts, and prevention scientists to the local population of interest (see Gosin *et al.*, 2002, for more detail). Our methods for developing the intervention through narratives (e.g., collecting local stories and using them to develop curriculum materials) may provide an adaptation strategy and these methods can be recommended for developing new interventions. In addition, the effectiveness of the multicultural intervention bodes well for developing interventions for use in culturally diverse schools.

The process of matching the version of the curriculum to the individual student depended solely on the student's self-selected ethnic/racial label and not on the salience of the ethnic/racial identification to the individual or the student's level of acculturation. Previous research demonstrated the importance of these factors in substance use prevention (Vega & Gil, 1998). Perhaps future analyses should focus more closely on Mexican Americans to see if those who identify with their ethnic group most strongly more clearly demonstrate cultural matching effects.

The fact that this study focused on only one urban school area, which enrolled a majority of low-income and Mexican American students, also limited the generalizability of the findings. Students of other backgrounds, or in other settings, may not react as favorably to the DRS *keepin' it R.E.A.L.* substance use prevention curriculum. Finally, the use of planned missingness, and issues related to tracking students over the course of the study contributed to the substantial amount of missing data and weakened some of the hypothesis tests. Although the use of multiply imputed data sets allowed for more appropriate statistical tests and the inclusion of all respondents,

these tests produced larger standard errors related to the greater quantities of missingness and therefore behaved conservatively. Since at least 10% of the participating students have missing data on three of the four waves because of the utilized questionnaire linking procedure, and additional data was lost through the lack of follow-up tracking measures, this study definitely supports efforts to decrease the amount of missing data through more comprehensive tracking procedures, such as using unique identification codes and more effective follow-up measures with students.

CONCLUSION

The *keepin' it R.E.A.L.* curriculum provides an alternative approach to culturally grounded prevention because it successfully reduced gateway drug use between the seventh and eighth grades for an understudied and underserved group. Rather than starting with an existing prevention curriculum, DRS developed the *keepin' it R.E.A.L.* curriculum from indigenous sources—the stories or narratives of youth and ethnic culture. It presented an alternative model for creating prevention materials utilizing resiliencies inherent in the culture of the participants. The *keepin' it R.E.A.L.* curriculum succeeded in limiting increases of substance use among seventh- and eighth-grade students in majority Mexican American school districts located in a central city area. The high level of Mexican/Mexican American enrollment in the schools could explain why the Mexican American and the Multicultural versions proved most highly effective even when disregarding the ethnicity of the individual students receiving the curriculum.

The *keepin' it R.E.A.L.* curriculum also provides support for the efficacy of multicultural prevention. Our findings clearly support the assumptions of multiculturalism—that representation and inclusion constitute key elements in successful intervention. In a culture where racially integrated schools are more and more common, especially in urban areas, this is a particularly promising area for prevention science and practice.

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