

Immediate and Short-term Effects of the 5th Grade Version of the *keepin' it REAL* Substance Use Prevention Intervention

Michael L. Hecht, Ph.D.  
Elvira Elek, Ph.D.  
David A. Wagstaff, Ph.D.  
Jennifer A. Kam

The Pennsylvania State University, State College, PA

Flavio Marsiglia, Ph.D.  
Patricia Dustman, Ed.D.  
Leslie Reeves  
Mary Harthun

Arizona State University, Phoenix, AZ

This is an in-house document created by SIRC. Formatting and page numbers do not match the published article. For citation and referencing purposes use this published article:

Hecht, M.L., Elek, E., Wagstaff, D.A., Kam, J.A., Marsiglia, F., Dustman, P., Reeves, L., Harthun, M. (2008). Immediate and short-term effects of the 5th grade version of the *keepin' it REAL* substance use prevention intervention. *Journal of Drug Education*, 38(3), 225-251.

\*This publication was supported by Grant Number (RO1 DA005629) from the National Institute on Drug Abuse to The Pennsylvania State University (Grant Recipient), Michael Hecht, Principal Investigator, with Arizona State University as the collaborating subcontractor. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the National Institutes of Health.

---

ABSTRACT

This study assesses the short-term impacts of an adaptation of *keepin' it REAL*, an efficacious, culturally-grounded middle school substance use prevention curriculum for 5th grade students. After curriculum adaptation, 10 schools were randomly assigned to implement the intervention along with a follow-up booster program administered in 6<sup>th</sup> grade; 13 schools were randomly assigned to the control condition and implemented the school's scheduled substance use prevention programming. Participating students (n= 1,566) completed a baseline questionnaire prior to curriculum implementation and follow-up questionnaires toward the end of 5<sup>th</sup> grade and at the end of 6<sup>th</sup> grade. The 5<sup>th</sup> grade curriculum appeared no more effective than the control schools' programming in changing students' resistance or decision making skills, targeted substance use mediators, or self-reported substance use.

Keywords: preadolescent substance use prevention; adaptation; cultural grounding

---

Youth who experiment with alcohol and cigarettes at a young age exhibit a higher likelihood of future substance use (Kandel, Yamaguchi, & Chen, 1992). In light of this, it is unfortunate that many intervention programs appear less effective for adolescents who are already using alcohol, tobacco, or other drugs (ATOD) at an early age (Ellickson, Bell, & McGuigan, 1993; Murray, et al., 1989) and that few prevention programs target elementary-aged children (Finke et al., 2002). Although only a small proportion of elementary students use substances (Andrews, Tildesley, Hops, Duncan, & Severson, 2003), adolescents report an estimated average age of first use of cigarettes and alcohol between 11 and 13 years, and marijuana between 13 and 14 years (National Institute on Drug Abuse, 2003). Waiting until middle school or high school to introduce intervention programs can be too late, since by then adolescents may have developed entrenched substance use expectations and norms (Stipek, de la

Sota, & Weishaupt, 1999).

Providing elementary school students with substance use prevention programming may be an effective strategy for several reasons. First, research suggests that preadolescents may respond with greater willingness to practice ATOD refusal skills (Donaldson, Graham, & Hansen, 1994). Second, despite their young age, some preadolescents develop intentions to engage in high-risk behaviors (Andrews et al., 2003; Falco, 1992) that may be more difficult to change once established rather than prevented from developing in the first place. Finally, 10- to 11-year old youths are about to enter a period in their lives where they may become attracted to and occasionally partake in high-risk behaviors (Stipek et al., 1999). Appearances and peer acceptance become more important, thereby increasing a child's propensity to engage in substance use (Compas, Hinden, & Gerhardt, 1995; Stipek et al., 1999). Early

intervention may refocus these tendencies toward risky behaviors in less harmful directions. In short, since early intervention appears potentially useful, researchers must assess whether elementary school-based prevention will effectively influence children's ATOD expectations, refusal skills, norms, and current substance use, all predictors of future use. Although other prevention researchers have begun to evaluate such prevention programs, this study adds to the literature by assessing the short term outcomes of adapting a successful middle school program, *keepin' it REAL* (Hecht et al., 2003), for use with 5<sup>th</sup> grade students.

#### *Existing Substance Use Prevention Programs for 5<sup>th</sup> Grade Students*

Currently, prevention research provides mixed findings with regard to the effectiveness of elementary school substance use prevention programs and subsequent ATOD use among youths. Although a large number of prevention programs focus on substance use, few of them specifically target 5<sup>th</sup> grade students, and therefore few assessments consider intervention effects on that cohort (Kam, Elek, & Hecht, 2007). In studies that include 5<sup>th</sup> grade students as part of a larger participant sample, prevention researchers often fail to report the effects of interventions for students at different grade levels. Instead they combine students across grade levels into one large homogenous group for purposes of reporting results (e.g., Schinke et al., 2000). Nevertheless, a few intervention research programs have enrolled children in the 5<sup>th</sup> grade and analyzed effects for them separately.

In one study, Donaldson, Graham, Piccinin, and Hansen (1995) established the effectiveness of resistance skills training for 5<sup>th</sup> grade students on their subsequent alcohol use, but only for those who previously believed alcohol consumption was unacceptable. In another study, which evaluated a school-based intervention program tailored to Native American youth (3<sup>rd</sup> through 5<sup>th</sup> grade students), students who received skills training reported lower rates of smokeless tobacco, alcohol, and marijuana use over a 3.5 year period (Schinke et al., 2000).

Although these two studies describe effective interventions with elementary school students, and research evidence supports the effectiveness of school-based interventions in general (Gottfredson & Wilson, 2003; O'Donnell et al., 1995; Skara & Sussman, 2003), other assessments of elementary school intervention programs indicate those programs demonstrated no significant effects on substance use

in six month to three year follow-ups (Donaldson et al., 1994; Farley, 2002; Weiden Consulting, 2000).

An outcomes analysis of the Adolescent Alcohol Prevention Trial (AAPT), which assessed a social influence, skills, and information-based intervention program, found that the 5<sup>th</sup> grade participants reported enhanced resistance skills. The program also "reduced prevalence estimates and strengthened beliefs about the unacceptability" of alcohol, cigarettes, and marijuana by 7<sup>th</sup> grade (Donaldson et al., 1994, p. 211). Nevertheless, the intervention's resistance-skills training did not produce a significant effect on substance use even into 8<sup>th</sup> grade.

More recently, researchers conducted a two-year study on the effectiveness of the substance use intervention program Here's Looking at You (HLAY), in which students practiced social skills, learned how to refuse substances, and built connections with classmates, family, and the community (Farley, 2002). In an evaluation of a 5<sup>th</sup> grade implementation of HLAY, results indicated an increase in the percentage of students who developed a resistance plan at the time of the posttest (6<sup>th</sup> grade); however, developing a refusal plan did not predict 5<sup>th</sup> grade students' enactment of the plan and HLAY did not demonstrate effects on substance use.

The aforementioned provide examples of prevention programs targeting 5<sup>th</sup> grade students in an attempt to enhance resistance strategies and correct misperceptions about peer substance use. These programs appeared successful in changing 5<sup>th</sup> grade students' estimations of how many peers use substances and whether their peers find substance use acceptable, while also helping these 5<sup>th</sup> graders develop refusal plans (Donaldson et al., 1994; Farley, 2002; Weiden Consulting, 2002). Yet, the studies rarely found significant relationships between the intervention program components (e.g., resistance skills or ATOD knowledge) and actual substance use or even intentions to use. In addition, most of the programs ignored cultural factors that predict variations in substance use, even though the AAPT trial in particular examined effects on a sample which was almost one-third Hispanic. In contrast, the researchers behind the Drug Resistance Strategies (DRS) project designed the *keepin' it REAL* (*kiR*) substance use prevention program as a culturally grounded middle-school intervention that addresses salient variables among certain ethnic groups, in an attempt to address their unique needs.

#### *keepin' it REAL*

Originally the DRS researchers designed *kiR*, a

culturally-grounded, Substance Abuse and Mental Health Services Administration (SAMSHA) model program, for 7<sup>th</sup> and 8<sup>th</sup> grade students (Gosin, Marsiglia, & Hecht, 2003; Hecht & Miller-Day, in press; Hecht et al., 2003; Hecht, Graham, & Elek, 2006). The present study evaluates the short-term impacts of a version of *kiR* developed expressly for 5<sup>th</sup> grade students.

The standard, multicultural 7<sup>th</sup> grade version of *kiR* (distributed through ETR Publishing and Discovery Education) consists of 10, 45-minute lessons which incorporate 5 videos and content focusing on enhancing anti-drug norms and refusal self-efficacy, and facilitating the development of decision making and resistance skills (Refuse, Explain, Avoid, and Leave – hence REAL). The program supplements the 7<sup>th</sup> grade curriculum with a selection of boosters at the 8<sup>th</sup> grade level (school assemblies, poster projects, etc.). The original curriculum development drew on the ecological risk and resiliency approach (Bogenschneider, 1996) and communication competence theory (Spitzberg & Cupach, 1984), by incorporating knowledge (narratives), motivation (norms), and skills as keys to prevention. The curriculum utilized a cultural grounding approach (Hecht & Krieger, 2006) that was based, in part, on a narrative and performance framework. Grounding was accomplished by integration of the students' own stories of resisting offers of ATOD, allowing culturally similar students to tell the stories through videos and other aspects of the curriculum, and infusing the lessons with cultural values coming from the Mexican American, European American, and African American communities. These techniques enhance the adolescents' and pre-adolescents' identification with the prevention messages and led to the labeling of the standard version of *kiR* as "multicultural".

*Adapting kiR for 5th grade.* Curriculum development specialists adapted the existing *kiR* 7<sup>th</sup> grade curriculum over a 6-month period to make the lessons developmentally appropriate for 5<sup>th</sup> grade students and to add two lessons to enhance effects. The 5<sup>th</sup> grade version uses the same basic curriculum content as the standard 7<sup>th</sup> grade multicultural version, differing primarily in communication level/format, the concreteness of the presentation of concepts, and the age-based relevance of the examples. Although the core content of the standard curriculum uses several strategies deemed successful with preadolescent children (narrative, participatory modeling, observational learning, and videos; Bandura, 1977, 1982; Botvin, Schinke, Epstein, et al., 1995; Botvin, Schinke, & Orlandi, 1995;

Constantino, Malgady, & Rogler, 1988), developmental concerns necessitated simplification in language and the complexity of presentation of concepts. Limitations in the cognitive abilities of 5<sup>th</sup> grade students, specifically their more restricted ability to engage in abstract thinking, systematic reasoning, and perspective taking (Case, 1985; Piaget, 2000), encouraged changes in presentation format. In particular, the changes focused on personalizing important concepts, making concepts more concrete (e.g., by asking for and providing concrete examples), and drawing more specific conclusions. The 5<sup>th</sup> grade students' limited experience with pressures to use drugs led the curriculum designers to ensure the concrete modeling and/or practice of each skill using other situations with which the majority of 5<sup>th</sup> grade students could relate (e.g., pressure to cheat on an exam; Polich et al., 1984).

In addition to the changes described above, the curriculum development specialists specifically considered other developmentally-related instruction differences between 5<sup>th</sup> and 7<sup>th</sup> grade students. For instance, 5<sup>th</sup> grade students require greater supervision and require more direct instruction and guidance when they perform classroom assignments (Hale-Benson, 1982; Hansen, 1996), although they express more openness to group work (Case, 1985; Garnezy, 1994; Hecht & Driscoll, 1994). The 5<sup>th</sup> grade classrooms allowed for other options regarding plans for instruction (such as potential for more extended visual displays). The scenarios incorporated the more egocentric and family-centered nature of 5<sup>th</sup> grade students, along with their less sophisticated use of language (including eliminating some of the street language used in the curriculum materials), limited experience with "risky situations" (because of less mobility, freedom, and resources) and more limited future goals and understanding of consequences (Bandura, 1977). The curriculum changes focus more of the activities and homework on family rather than peer settings, accounting for the fact that generally 5<sup>th</sup> grade students rely more on their families and adults for help and express less of a peer orientation (Hansen, 1991, 1996).

The curriculum development specialist recruited 13 teachers from the implementation study schools to participate in 4 separate focus group sessions where they suggested additional curriculum modifications. These teachers commented on the language appropriateness and readability levels for the key terms, the complexity and age appropriateness of the concepts and skills presented, and the complexity and age appropriateness of the in-class activities,

examples, scenarios, vignettes, and homework assignments. The curriculum was then pilot tested in three classrooms.

Using the suggestions of focus group members and feedback provided during pilot-testing of the curriculum, DRS personnel also edited the five multicultural curriculum videos to reflect the developmental differences discussed in the preceding paragraphs and made the videos more appropriate for 5<sup>th</sup> grade students. Like the five videos used with the 7<sup>th</sup> grade curriculum, the first video used in the 5<sup>th</sup> grade curriculum introduced students to *kiR*, and the remaining 4 videos showed adolescent models implementing the four resistance skills (refuse, explain, avoid, and leave) identified in previous research (Hecht & Miller-Day, in press). While focus group teachers appreciated the multicultural composition of the videos' casts, the video editors took their suggestions to shorten the videos to between 4 and 8 minutes (by taking out some of the filler/non-action sections), and edited out scenes of substance use that might instruct naïve students how to use substances. Finally, the curriculum developers used the same process of incorporation of developmental considerations and teacher focus group feedback to adapt the 8<sup>th</sup> grade booster series for 6<sup>th</sup> grade students.

This paper reports the short-term impacts (through the end of 6<sup>th</sup> grade) of the 5<sup>th</sup> grade *kiR* curriculum. Given the short-term nature of this evaluation and the low level of use anticipated in this age group (Andrews et al., 2003), we anticipated that the intervention would demonstrate its clearest effects on the skills and resistance elements taught in the 12 lessons: substance use refusal efficacy, the four substance use resistance strategies, and decision making. As the research on other 5<sup>th</sup> grade substance use prevention programs showed, the program also may demonstrate effects on some of its psychosocial target mediators such as intentions, norms, and expectancies. Finally, the evaluation examines program impacts on substance use behaviors, although low use by 5<sup>th</sup> and 6<sup>th</sup> grade students (Andrews et al., 2003) and the lack of impact of other prevention programs, encouraged few expectations of finding significant effects on those behaviors at this time. The analyses test the following hypothesis:

When compared to students in the control condition, 5<sup>th</sup> grade students receiving the new *keepin' it REAL* multicultural curriculum will experience: 1) a greater increase in refusal self-efficacy and the use of resistance strategies and decision making skills; 2) less increase in substance use intentions and more

positive impacts on anti-drug norms and substance use expectancies; and 3) less increase in substance use.

## METHOD

### *Study Design*

Self-report questionnaire data from the first three waves of an ongoing longitudinal study assessing the impact of a substance use prevention intervention for elementary and middle school students were collected over a 2-year period. Students completed baseline questionnaires from September 2004 to January 2005 (wave 1), a second round of questionnaires from February to June 2005 (wave 2) after intervention students participated in the 12 lesson curriculum, and a third round of questionnaires from February to May 2006 (wave 3) after intervention students participated in from 3 to 6 booster activities at their school. At baseline, the 5<sup>th</sup> grade students (n= 1,566) attended one of 23 public middle schools (81 homerooms) in Phoenix, Arizona. Each school was randomly assigned to the multicultural curriculum intervention condition (10 schools) or the control condition (13 schools). Students in 6 additional schools participated in a third condition of the study, in which they received a new version of *kiR* which focused on acculturation issues. Since these analyses address the impact of the more general adaptation of the 7<sup>th</sup> grade substance use prevention curriculum for 5<sup>th</sup> grade students, they excluded students receiving the acculturation enhanced programming.

Lesson observations by study personnel indicated that the teachers in the multicultural condition implemented the *kiR* intervention with both high quality (organization, preparation, student participation, student enjoyment, etc.) and fidelity (of instruction, video presentation, student practice, and homework). Personnel within the control schools implemented their existing substance use prevention programming with their students. In two schools this meant that the students did not receive any substance use prevention programming. On the other hand, project students in seven of the control schools participated in Project ALERT, a different SAMSHA model program (SAMSHA, 2005), during the 5<sup>th</sup> and/or 6<sup>th</sup> grades. Several *kiR* intervention implementation schools also presented additional substance use interventions.

### *Participants*

Parents provided informed consent a few weeks before the baseline assessment, while students

provided their assent just prior to completing each wave of questionnaires. All consent/assent forms were printed in English and in Spanish. Approximately 82% of the students enrolled in the 23 study schools received parental consent; 96% of those students participated in the baseline assessment; 91% of the students who participated in the baseline assessment also participated at wave 2; and 72% of the students who participated in the baseline assessment also participated at wave 3.

Table 1  
*Selected Sociodemographic Characteristics of Students at Baseline*

| Baseline Variable                       | Study Condition |         |          |
|---|-----------------|---------|----------|
|   | Multi cultural  | Control | Combined |
| Sample Size                             | 768             | 798     | 1566     |
| Gender (% Female)                       | 49.1            | 50.4    | 49.8     |
| Race/Ethnicity (%)                      |                 |         |          |
| Latino                                  | 74.1            | 73.1    | 73.6     |
| Black                                   | 7.2             | 11.0    | 9.1      |
| White                                   | 5.7             | 3.8     | 4.7      |
| Native American                         | 2.6             | 2.6     | 2.6      |
| Asian American/Pacific Islander         | 0.5             | 0.1     | 0.3      |
| Other                                   | 1.8             | 2.4     | 2.1      |
| Missing                                 | 8.1             | 7.0     | 7.5      |
| Mean Age (years)                        | 10.4            | 10.4    | 10.4     |
| SE                                      | 0.046           | 0.019   | 0.024    |
| Lunch Program                           |                 |         |          |
| % Free lunch                            | 70.8            | 71.7    | 71.3     |
| % Reduced Lunch                         | 14.2            | 16.0    | 15.1     |
| Participation Patterns <sup>a</sup> (%) |                 |         |          |
| 001                                     | 0.0             | 0.1     | 0.1      |
| 010                                     | 1.2             | 0.6     | 0.9      |
| 011                                     | 1.8             | 1.1     | 1.5      |
| 100                                     | 8.6             | 6.8     | 7.7      |
| 101                                     | 3.4             | 3.1     | 3.3      |
| 110                                     | 22.4            | 20.8    | 21.6     |
| 111                                     | 62.6            | 67.4    | 65.1     |

<sup>a</sup> 0 = did not participate in wave, 1 = participated in wave; e.g. 001 signifies respondents did not participate in waves 1 and 2, but did participate in wave 3.

The present analyses were based on the data provided by 1,566 students who participated in at least one of the three waves (see Table 1). At baseline, the students ranged in age from 7 to 15 years (*M* age = 10.4 years, *SE* = 0.024 years, *n* = 1516). Females were 49.7% of the participants; males were 50.2% (one student did not report gender). As an indicator of low socioeconomic status, 87% of the students reported taking part in the “free or reduced price lunch program.”

Approximately 75% of the students self-identified as Mexican, Mexican-American, or Latino; 9.1% self-identified as Black; 4.9% self-identified as White; 2.6% self-identified as Native American; 0.4% self-identified as Asian American; and 7.8% did not report their race/ethnicity. The fact that Mexican and Mexican Americans formed the majority of this sample contributes to the uniqueness of this study since few interventions address the needs of these populations in the United States. Mexican immigrants and Mexican Americans form an important target for substance use prevention, since by 8<sup>th</sup> grade, the lifetime prevalence rate reported by Hispanic students exceeds the rate reported by Whites and Blacks (Johnston et al., 2005), and Mexican Americans make up 63% of the Hispanic population in the U.S. (Knouse, Rosenfeld, & Culbertson, 1992).

*Data Collection*

At each wave, research team members administered the questionnaire to consented students during a regular, 45-minute, classroom period. These team members emphasized the confidentiality of the data collection, and helped students who encountered any difficulties with the questionnaire items. Students marked their responses on the scannable questionnaire forms. Analyses placed the readability of the questionnaires at a 5<sup>th</sup> grade level.

The questionnaires consisted of from 104 to 128 items (depending on wave) which collected information on sociodemographic characteristics and substance use behaviors, as well as substance use norms, expectancies, resistance skills, and intentions. At each wave, students had the opportunity to complete the questionnaire in Spanish or English; 8.0% completed the questionnaires in Spanish at wave 1, 7.2% at wave 2, and 4.2% at wave 3.

*Measures*

*Sociodemographic characteristics* included assessments of gender (“boy” or “girl”) and age

(from 7 years to 15 years or older). Students used one forced-choice item (“What is your ethnicity?”) to report their race/ethnicity as: “American Indian or Alaskan Native,” “African-American or Black,” “Asian or Pacific Islander,” “White or Anglo,” “Mexican, Mexican-American, or Chicano,” “Some other Latino or Hispanic Group,” and “Other ethnicity.” To obtain an indication of socioeconomic status, students were asked “Do you get a free or reduced lunch at school?” (“Free lunch,” “Reduced cost lunch” and “Neither”).

*Refusal efficacy* was assessed with 3 items adapted from items used by Kasen, Vaughan, and Walter (1992) and measured on a 4-point scale from *Not at all sure* to *Very Sure*. The common stem, “Are you sure you would say no if ...”, was completed in regard to whether “... a family member offered you alcohol?”, “... a close friend offered you marijuana?”, and “...a kid at school offered you a cigarette?” Scale scores consisted of the mean of the item scores, and the scale demonstrated a Cronbach’s alpha at each wave of 0.96, 0.96, and 0.93, respectively.

*Substance use resistance skills* assessed students’ use of the refuse, explain, avoid and leave skills in the last 30 days with 4 items adapted from Hecht et al. (2003). Students received scores of 0 on each of the items if they reported never using the skill or if they never received offers. They received a 1 on each of the items if they reported using the skill at least once. Scale scores were calculated by adding the 4 item scores, with increasing values indicating use of a greater number of resistance skills.

*Students’ active decision making style* was assessed with 3 Likert items modified for age appropriateness from items used by Botvin et al. (1990), and measured on a 5-point scale from *Never to Always*. The common stem for each item was “When I have an important problem to solve, I ...” and was completed with “...get information to make the best choice,” “...think of different ways to solve the problem,” and “...think about what will happen for each choice before doing anything.” Scale scores consisted of the mean of the three item scores, and the scale demonstrated a Cronbach’s alpha of 0.78, 0.78, and 0.69, in waves 1-3 respectively.

*Hypothetical alcohol resistance* was assessed with 5 items developed expressly for the parent study to reflect the fact that many of the students had not yet received substance use offers and to allow them to express their possibility of using the four resistance skills the intervention emphasized. Students responded to the following hypothetical situation: “If

your friend offered you a beer at a party, would you...” with the probability that they would “...say ‘No’ without giving a reason why?”, “...give an explanation or excuse to turn down the beer?”, “...just leave the situation without accepting the beer?” and “...avoid getting into that situation because you think beer might be offered there?”. Each item was scored on a 4-point scale from *Definitely Not* to *Definitely*. Cronbach’s alpha for the hypothetical alcohol use scale was 0.87, 0.87, and 0.89, in waves 1-3 respectively.

*Intentions to use substances* were assessed with 3 items developed for this study and measured on a 4-point scale from *Definitely not, for sure* to *Definitely yes, for sure*. The common stem consisted of “If you had a chance this weekend, would you use...” The stem was completed with “... alcohol,” “... cigarettes,” or “...marijuana.” Scale scores were calculated by taking the mean of the three item scores, and the respective values of Cronbach’s alpha at each wave were 0.92, 0.88, and 0.86.

*Parents’ anti-drug injunctive norms* consisted of the mean of 3 items measured on a 4-point scale from *Not at all angry* to *Very angry*, and which expanded upon an item used by Hansen and Graham (1991). The common stem consisted of “How angry would your parents be if they found out you ...” The stem was completed with “...drank alcohol,” “... smoked cigarettes,” or “...smoked marijuana.” The respective values of Cronbach’s alpha at each wave were 0.91, 0.78, and 0.86.

*Friends’ anti-drug injunctive norms* consisted of the mean of 3 items measured on a 5-point scale from *Very Positively* to *Very Negatively* and adapted from Hansen, Johnson, Flay, Graham, and Sobel (1988). The common stem of “How would your best friend react if you ...” was completed with “...got drunk,” “... smoked cigarettes,” or “...smoked marijuana.” The respective values of Cronbach’s alpha at each wave were 0.97, 0.93, and 0.93.

*Personal anti-drug norms* consisted of the mean of 3 items measured on a 4-point scale from *Definitely OK* to *Definitely not OK* and adapted from items appearing in Hecht et al. (2003). The common stem was “Is it OK for someone your age to ...” The stem was completed with “...drink alcohol,” “... smoke cigarettes,” or “...smoke marijuana.” The respective values of Cronbach’s alpha at each wave were 0.91, 0.88, and 0.87.

*Descriptive norms* were assessed with 2 items measured on a 4-point scale from *Hardly any or*

*None to All or Most* and adapted from Hansen and Graham (1991). The two items were: “About how many kids in your school would you guess have used alcohol, cigarettes or marijuana at least once?” and “Now think about the friends you hang out with. How many do you think have used alcohol, cigarettes, or marijuana at least once?” Scale scores consisted of the mean of the two item scores and the respective values of Pearson’s  $r$  at each wave were 0.46, 0.55, and 0.46.

*Substance use expectancies* consisted of the mean of 3 items measured on a 4-point scale from *Strongly disagree* to *Strongly agree* and adapted from Hansen and Graham (1991) and Hecht et al. (2003). The three items were “Drinking alcohol makes parties more fun,” “Smoking cigarettes makes people less nervous,” and “Smoking marijuana makes it easier to be part of a group.” Increasing values indicated the student expressed more positive substance use expectancies. The respective values of Cronbach’s alpha at each wave were 0.80, 0.77, and 0.74.

*Lifetime prevalence* was assessed with 4 yes/no items. Specifically, students were asked “Which of the following have you tried, even if it was only once or only a little? (Mark all that apply).” The response choices were “Alcohol (beer, wine, liquor),” “Cigarettes or tobacco,” “Marijuana (pot, weed),” “Inhalants (sniff glue or paint),” and “None of these.” Students were coded as 1 = “having ever used a substance” if they reported using any one of the substances; they were coded as 0 = “never having used one of the substances” if they had not selected any one of the 4 substances or they had selected “none of these.”

*Past month’s prevalence* was assessed with 3 items asking students how many “drinks of alcohol (more than a sip of beer, wine, or liquor)” “cigarettes” or “hits of marijuana (pot, weed)” they had in the last 30 days. Since the participating 10-year-old youths reported relatively infrequent substance use in the past month each response on the item’s 7-point scale was coded with 0 indicating no use and 1 indicating any use in the past month. Then, three, wave-specific, binary indicators of any alcohol, cigarette, or marijuana use in the past month were created.

#### *Statistical Analyses*

To obtain summary statistics (e.g., percentages, means, and standard errors), this study used Stata’s svy: mean and svy: tab programs for complex survey samples (Stata Corporation, 2005). These programs helped account for the fact that intact groups of students (23 middle schools) provided the data, by

accounting for the intraclass correlation of students within schools (see Cornfield, 1978; Korn & Graubard, 1999). In the present study, the ICCs of the 10 psychosocial variables ranged from 0.006 to 0.033 and had a mean of 0.014.

To analyze the data from the one-between-, one-within-subject study design, the present study used Stata to fit population-averaged (specifically, generalized estimating equations models) and subject-specific models (specifically, regression models with mixed effects) (see Hardin & Hilbe, 2003). This study fit both because of the relatively small number of schools randomly assigned to study conditions (c.f., Murray, 2001; Murray, Varnell, & Blitstein, 2005). Research shows that the different models are most appropriate when different conditions were present when the data were generated (Murray et al., 1998). As the conclusions drawn from the fit of the GEE models were identical to the conclusions drawn from the fit of the mixed effects regression models, the following results report findings from the latter except where noted.

## RESULTS

### *Attrition Analysis*

Table 1 displays selected sociodemographic characteristics of the 1,566 middle-school students who participated in one or more of the three assessments during the first 2 years of this ongoing study. As noted above, females were roughly half of the participants in both of the study conditions; Latino students were roughly 74% of the participants in each condition; and students participating in their school’s free or reduced lunch program were roughly 85% of the participants in each condition. A test of homogeneity of proportions indicated that the seven student participation patterns did not vary among the two study conditions [ $F(3.58, 78.82) = 0.545, p = 0.684$ ]. Although it is possible that the students in the two conditions differed with respect to unobserved characteristics, the data presented in Table 1 suggests that they did not differ with respect to some observed characteristics that have been shown to be correlated with substance use among adolescents. In short, the test of homogeneity and the comparisons presented in Table 1 indicated that the missing data mechanism was ignorable. This provided confidence that the use of mixed effects regression models would yield estimates with relatively little bias and adequate efficiency. Indeed, using empirical examples, Twisk (2003) showed that GEE and a random coefficients regression model (a type of mixed effects regression model, specifically, a random coefficients model)

behaved equally well compared to an analysis based on the complete data set with an ignorable missing data mechanism and continuous outcome.

*Refusal Efficacy, Resistance Strategies, and Decision Making*

Table 2 displays the cell means and standard errors for students’ refusal efficacy, hypothetical alcohol resistance skills, and use of active decision making by condition and wave. Fitting mixed effects regression models to the data for those three variables showed that the multicultural and control students did not differ with respect to the mean change score from baseline to wave 2 or from baseline to wave 3.

In the case of reported actual use of substance use resistance skills (see Table 2), because students’ resistance skills scores could only assume integer values from 0 to 4, the analyses fit two GEE models to these data: the first assumed that the scores were well described by a Poisson distribution, and the second assumed that the scores were well described by a negative binomial distribution. Additionally, the analyses fit a mixed effects linear regression model to these data despite the fact that the scores were not normally distributed. The results of all three models

led to the same conclusion; therefore, the following describes results from the fit of the mixed effects linear regression model. A single degree-of-freedom linear contrast indicated that the mean number of resistance skills reported by students in the multicultural condition differed significantly from that reported by students in the control condition ( $\delta = .341, SE = .068, z = 5.04, p < 0.001$ ). (Note,  $\delta$  is used to represent the mean difference between students assigned to the multicultural and control conditions; it is also used to represent the mean “difference of differences” when multicultural and control students are compared with respect to their change from baseline to wave 2 or their change from baseline to wave 3.) Moreover, the change from baseline reported by the students in the Multicultural condition exceeded that reported by students in the control condition to both wave 2 ( $\delta = .377, SE = .076, z = 4.93, p < 0.001$ ) and wave 3 ( $\delta = .431, SE = .083, z = 5.21, p < 0.001$ ). The mean number of resistance skills reported by the students in both conditions increased during the study period. However, multicultural condition students demonstrated a greater rate of increase than did control condition students over that time.

Table 2  
*Means and Standard Errors for Refusal Self-efficacy, Substance Use Resistance, and Active Decision Making by Condition and Wave*

| Variable                               | Condition | Wave 1 |       | Wave 2 |       | Wave 3 |       |
|--|-----------|--------|-------|--------|-------|--------|-------|
|  |           | Mean   | SE    | Mean   | SE    | Mean   | SE    |
| Refusal Efficacy                       | CO        | 3.103  | 0.063 | 3.110  | 0.059 | 3.206  | 0.067 |
|  | MC        | 3.171  | 0.055 | 3.201  | 0.061 | 3.286  | 0.054 |
| Hypothetical Alcohol Resistance        | CO        | 2.813  | 0.042 | 2.695  | 0.040 | 2.765  | 0.070 |
|  | MC        | 2.782  | 0.055 | 2.821  | 0.041 | 2.889  | 0.040 |
| Active Decision Making                 | CO        | 3.795  | 0.052 | 3.715  | 0.053 | 3.481  | 0.056 |
|  | MC        | 3.781  | 0.087 | 3.660  | 0.047 | 3.404  | 0.045 |
| Actual Substance Use Resistance Skills | CO        | 0.53   | 1.05  | 0.57   | 0.99  | 0.80   | 1.22  |
|  | MC        | 0.59   | 1.09  | 0.99   | 1.32  | 1.31   | 1.46  |

Note. CO = Control condition; MC = Multicultural condition

*Substance Use Norms, Expectancies, and Intentions*

Table 3 displays the cell means and standard errors by condition and wave for students’ substance use intentions, parents’ and friends’ anti-drug injunctive norms, descriptive norms, personal anti-drug norms, and students’ positive substance use expectancies. Fitting a mixed effects linear regression model to the data for intentions, parent injunctive norms, friend injunctive norms, personal norms, and expectancies showed that none of the mean differences between

multicultural and control students associated with the condition main effect or the condition x time interaction were statistically different from 0.

The same could not be said for fitting a mixed effects linear regression model to the students’ reported perceptions of the substance use of their peers (descriptive norms). Although multicultural and control students participating in any wave did not differ with respect to their descriptive norms ( $\delta =$

.026,  $SE = .070$ ,  $z = 0.37$ ,  $p = ns$ ), the change from baseline reported by students in the multicultural condition exceeded that reported by students in the control condition at both wave 2 ( $\delta = .108$ ,  $SE = .048$ ,  $z = 2.25$ ,  $p < 0.05$ ) and wave 3 ( $\delta = .191$ ,  $SE = .047$ ,  $z$

$= 4.11$ ,  $p < 0.001$ ). These two significant effects suggested that the typical multicultural condition student believed that relatively more of his or her peers were using substances than did the typical control student.

Table 3  
Means and Standard Errors for Substance Use Intentions, Norms, and Expectancies by Condition and Wave

| Variable                            | Condition | Wave 1 |       | Wave 2 |       | Wave 3 |       |
|-------------------------------------|-----------|--------|-------|--------|-------|--------|-------|
|                                     |           | Mean   | SE    | Mean   | SE    | Mean   | SE    |
| Substance Use Intentions            | CO        | 1.245  | 0.017 | 1.281  | 0.029 | 1.329  | 0.027 |
|                                     | MC        | 1.240  | 0.034 | 1.278  | 0.026 | 1.352  | 0.041 |
| Parent Anti-drug Norms              | CO        | 3.686  | 0.042 | 3.839  | 0.022 | 3.707  | 0.029 |
|                                     | MC        | 3.685  | 0.066 | 3.825  | 0.018 | 3.723  | 0.036 |
| Friend Anti-drug Norms              | CO        | 4.064  | 0.061 | 4.452  | 0.056 | 4.181  | 0.060 |
|                                     | MC        | 3.974  | 0.109 | 4.403  | 0.037 | 4.122  | 0.051 |
| Descriptive Substance Use Norms     | CO        | 1.515  | 0.032 | 2.104  | 0.071 | 1.845  | 0.062 |
|                                     | MC        | 1.466  | 0.034 | 2.149  | 0.063 | 1.985  | 0.030 |
| Personal Anti-drug Norms            | CO        | 3.795  | 0.016 | 3.829  | 0.021 | 3.731  | 0.019 |
|                                     | MC        | 3.780  | 0.035 | 3.798  | 0.032 | 3.742  | 0.033 |
| Positive Substance Use Expectancies | CO        | 1.419  | 0.024 | 1.477  | 0.034 | 1.659  | 0.041 |
|                                     | MC        | 1.389  | 0.041 | 1.444  | 0.034 | 1.608  | 0.042 |

Note. CO = Control condition; MC = Multicultural condition

*Substance Use Prevalence Rates*

As Table 4 shows, 38% of the participating middle-school students reported that they had used alcohol, cigarettes, or marijuana at some point in their lives, and 27% reported use in the month prior to an assessment. For students in both study conditions, lifetime and past month prevalence rates increased during the 21-month study period. Fitting a mixed effects logistic regression model (with main and interaction effects for study condition and time) to the data for lifetime prevalence showed that the overall mean difference in lifetime prevalence reported by students in the multicultural condition ( $\mu = 0.30$ ) was not significantly different from that reported by students in the control condition ( $\mu = 0.32$ ) [ $z = -0.81$ ,  $p = 0.420$ ]. However, the mean change in lifetime prevalence from baseline to wave 2 reported by students in the multicultural condition ( $\delta = 0.07$ ) was significantly greater than that reported by students in the control condition ( $\delta = 0.01$ ) [ $z = 2.75$ ,  $p = 0.006$ ]. By wave 3, the difference between multicultural and control students had dissipated. Specifically, the mean change in lifetime prevalence

from baseline to wave 3 reported by students in the multicultural condition ( $\delta = 0.13$ ) was not significantly different from that reported by students in the control condition ( $\delta = 0.10$ ) [ $z = 0.75$ ,  $p = 0.455$ ].

Finally, fitting a mixed effects logistic regression model to the data for past month's prevalence, showed that the mean past month's prevalence reported by multicultural students participating in any wave ( $\mu = 0.20$ ) was not significantly different from that reported by students in the control condition ( $\mu = 0.21$ ) [ $z = -0.57$ ,  $p = 0.570$ ]. However, the mean change in past month's prevalence from baseline to wave 2 reported by students in the multicultural condition ( $\delta = 0.07$ ) was significantly greater than that reported by students in the control condition ( $\delta = 0.00$ ) [ $z = 2.71$ ,  $p = 0.007$ ]. As with lifetime prevalence, the mean change in past month's prevalence from baseline to wave 3 reported by students in the multicultural condition ( $\delta = 0.13$ ) was not significantly different from that reported by students in the control condition ( $\delta = 0.09$ ) [ $z = 1.81$ ,  $p = 0.071$ ].

Table 4  
*Substance Use Prevalence by Study Condition and Wave*

| Variable                   | Condition | Wave  |       |       | Total |
|----------------------------|-----------|-------|-------|-------|-------|
|                            |           | 1     | 2     | 3     |       |
| Lifetime Substance Use     | CO        | 0.29  | 0.30  | 0.39  | 0.32  |
|                            | N         | 783   | 718   | 573   | 2,074 |
|                            | MC        | 0.24  | 0.31  | 0.37  | 0.30  |
|                            | N         | 745   | 676   | 521   | 1,942 |
|                            | Total     | 0.27  | 0.30  | 0.38  | 0.31  |
|                            | N         | 1,528 | 1,394 | 1,094 | 4,016 |
| Past Month's Substance Use | CO        | 0.19  | 0.19  | 0.28  | 0.21  |
|                            | N         | 752   | 696   | 513   | 1,961 |
|                            | MC        | 0.14  | 0.21  | 0.27  | 0.20  |
|                            | N         | 697   | 646   | 481   | 1,824 |
|                            | Total     | 0.17  | 0.20  | 0.27  | 0.21  |
|                            | N         | 1,449 | 1,342 | 994   | 3,785 |

*Note.* CO = Control condition; MC = Multicultural condition

In summary, the self-report prevalence data suggested the following: although students in the multicultural condition reported less favorable substance use outcomes one month after participating in the 12-lesson intervention than did students in the control condition, the differences appeared to diminish one year after participation.

#### DISCUSSION

The 5<sup>th</sup> grade version of the *keepin' it REAL* substance use prevention intervention did not demonstrate a consistent, short-term impact on participating students' substance use behaviors or on the expected mediators of the curriculum's impact on participants' substance use (i.e., participants' substance use norms, expectancies, decision-making style, resistance skills, refusal efficacy, or intentions). Of the three significant differences that emerged between the control and the multicultural conditions, two did not support the effectiveness of the intervention. The standard, multicultural version of the intervention does appear to contribute to greater increases in the variety of resistance skills used to respond to substance use offers. However, students

receiving the intervention also increased in their perceptions of the proportion of their peers who had tried substances more than control condition students, and apparently increased in their prevalence of substance use more than did control condition students.

These findings lead to the consideration of possible explanations for the lack of demonstrated program effectiveness. While *keepin' it REAL* is a social influence intervention that has demonstrated efficacy for 7<sup>th</sup> grade adolescents in a clinical trial (Hecht et al., 2003; Hecht et al., in press) including Mexican Americans (Kulis et al., 2005) and even among adolescents who had tried substances prior to the intervention (Kulis et al., 2007), these effects may not generalize to the adapted form. Changes to the curriculum that addressed developmental issues such as making the examples more concrete and drawing more specific conclusions for the students may reduce the effectiveness of the intervention by failing to stimulate their thought processes. In addition, although the adaptation preserved the core components and the lesson plans, the underlying social influence model may be inappropriate for the

younger cohort, and prevention targeted at this age group may need to address a different set of issues among preadolescents. For example, the increase in descriptive norms, or perceptions of peer use, in the treatment group may mean that demonstrating resistance skills teaches preadolescents about use rather than resistance. The edits to the videos and the curriculum attempted to take this issue into consideration by providing examples of resistance in non-substance related situations. However, the remaining references to substance use may have been enough to raise the salience of such use for the students. The fact that while perceptions of peer use increased more for the multicultural condition students, but that on average, even those students believed that only “some” of their peers used could indicate that the program enlightened them to the fact that some of their peers use as opposed to almost none of their peers. While the ADAPT intervention did decrease descriptive norms, perhaps the narrative nature of the kiR intervention manifested its effects differently for a younger audience who interpreted the stories more literally (e.g., the younger students were unaware of peer use and focused on the message that some of their peers were using substances) rather than more figurative interpretation (e.g., the older students know that some of their peers are using and focused on the resistance message).

Moreover, given the younger children’s more limited cognitive abilities, a focus on impulse control rather than or in addition to decision making may prove more efficacious. While our studies demonstrate that preadolescents who use more active decision making styles are less likely to have used substances (Hecht, Warren, Wagstaff, & Elek, in press), it may be that the preponderance of youths at this age are not ready for an intervention that promotes the more active style unless they can first exhibit greater impulse or self control. Without self control, preadolescents will act before engaging in any form of active decision making. The ability to inhibit or control a behavior develops across a lifespan, where the progression of impulse control may vary among children. For instance, Mezzacappa, Kindlon, and Earls, (1999) found that among 6 to 16 year old boys, cognitive and motivational types of impulse control were positively associated with age; however, impulse control development was delayed for boys with disruptive behavior disorders or attention-deficit/hyperactivity disorder. The success of the PATHES curriculum indicates that younger children can be taught self control (Greenberg, Kusche, Cook, & Quamma, 1995). Thus, future research on substance use prevention should consider variations in youths’ developmental capacities in using impulse

or self control, which in turn, is likely to influence their decision making regarding ATOD use.

However, before drawing the conclusion that a social influence and skills building intervention implemented on students in the 5<sup>th</sup> grade is ineffective in preventing substance use, some mitigating factors need to be considered. One major contributor to the lack of findings in this analysis appears to be the youth of the sample. As seen in Tables 2 through 4, these students demonstrated low rates of substance use (either lifetime or recent), weak substance use intentions, and strong anti-drug norms. These 5<sup>th</sup> and 6<sup>th</sup> grade students still may be too young grade, will track the students through a period of increasing substance use and substance use acceptance, which may allow the program to demonstrate effectiveness in preventing these increases. and have uniformly anti-substance use expectancies and norms for the intervention to demonstrate effects in the short term. Expectations of short-term results of such early interventions may be misguided or may need to focus on variables not assessed in this study. Longer term follow-up, as planned through the end of the 8<sup>th</sup>.

The ethnic makeup of the sample, specifically its high percentage of Mexicans, Mexican Americans, and recent immigrants bears consideration. As previous studies documented (Marsiglia, et al., 2005), recently immigrated Mexican youths with lower levels of acculturation experience a delayed initiation in substance use. Intervening at the 5<sup>th</sup> grade could benefit these youths if they acquired the skills needed to forego substance use, but measuring the impact of the intervention through substance use related outcomes may not be possible at this stage.

Speculation can produce various explanations of the findings; however, competition from other prevention activities in control schools and the community at large may have contributed to the lack of significant differences between the intervention and control conditions. For ethical and practical reasons, the design of this study accepted that control schools would want to implement their existing substance use prevention programming. Most schools implementing prevention programs must now use programs from effective program lists. In fact, most of the control schools participating in this study did use other prevention programming such as Project ALERT (SAMSHA, 2005), Gonzo’s 20 Ground Rules (a local program; Communities in Schools of Arizona, 2007), and Red Ribbon Week (National Family Partnership, 2005)2. In addition, community and nationwide prevention efforts (such as the “Parents the Anti-

drug” media campaign, The National Youth Anti-Drug Media Campaign, n.d.), may have minimized the differences between the conditions by strengthening the anti-drug norms of all of the students.

The current findings suggest that social influence and skill building interventions in the 5<sup>th</sup> grade may not demonstrate an immediate effect in reducing substance use or affecting the precursors of such behaviors. Before drawing such conclusions, longer-term outcomes must be examined. Nevertheless, for interventionists seeking immediate impact, it now appears likely that targeting preadolescents in elementary schools may require a different form of intervention or different outcome measures. Future research should address alternative strategies while waiting for the results of longer-term studies on programs such as *keepin’ it REAL*.

#### REFERENCES

- Andrews, J. A., Tildesley, E., Hops, H., Duncan, S. C., & Severson, H. H. (2003). Elementary school age children’s future intentions and use of substances. *Journal of Clinical Child and Adolescent Psychology, 32*, 556-567.
- Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (1982). *Self-efficacy mechanism in human agency*. *American Psychologist, 37*, 122-147.
- Bogenschneider, K. (1996). An ecological risk protective theory for building prevention programs, policies, and community capacity to support youth. *Family Relations, 45*(2), 127-138.
- Botvin, G.J., Baker, E., Dusenbury, L., Tortu, S., & Botvin, E.M. (1990). Preventing adolescent drug abuse through a multimodal cognitive-behavioral approach: Results of a 3-year study. *Journal of Consulting and Clinical Psychology, 58*(4), 437-446.
- Botvin, G.J., Schinke, S.P., Epstein, J.A., Diaz, T., & Botvin, E.M. (1995). Effectiveness of culturally focused and generic skills training approaches to alcohol and drug abuse prevention among minority adolescents: Two-year follow-up results. *Psychology of Addictive Behaviors, 9*(3), 183-194.
- Botvin, C., Schinke, S., & Orlandi, M. (Eds.). (1995). *Drug abuse prevention with multiethnic youth*. Thousand Oaks, CA: Sage.
- Case, R. (1985). *Intellectual development: Birth to adulthood*. New York: Academic Press.
- Communities in Schools of Arizona (2007). *kids going gonzo for school*. Retrieved January 16, 2007, from <http://www.cisarizona.org/gonzo.htm>.
- Compas, B. E., Hinden, B. R., & Gerhardt, C. A. (1995). Adolescent development: Pathways and processes of risk and resilience. *Annual Review of Psychology, 46*, 265-293.
- Cornfield, J. (1978). Randomization by group: A formal analysis. *American Journal of Epidemiology, 108*, 100-102.
- Costantino, G., Malgady, R.G., & Rogler, L.H. (1988). Folk hero modeling therapy for Puerto Rican adolescents. *Journal of Adolescence, 11*, 155-165.
- Donaldson, S. I., Graham, J. W., & Hansen, W. B. (1994). Testing the generalizability of intervening mechanism theories: Understanding the effects of adolescent drug use prevention interventions. *Journal of Behavioral Medicine, 17*, 195-216.
- Donaldson, S. I., Graham, J. W., Piccinin, A. M., & Hansen, W. B. (1995). Resistance-skills training and onset of alcohol use: Evidence for beneficial and potentially harmful effects in public schools and in private Catholic schools. *Health Psychology, 14*, 291-300.
- Ellickson, P. L., Bell, R. M., & McGuigan, K. (1993). Preventing adolescent drug use: Long-term results of a junior high program. *American Journal of Public Health, 83*, 856-861.
- Falco, M. (1992). *The making of a drug-free America: Programs that work*. New York: Times Books.
- Farley, J. (2002). *Final report: Here’s looking at your curriculum evaluation*. Columbus, Ohio: Farley and Associates. Retrieved October 3, 2006 from [http://www.discoveryeducation.com/ul/images/curriculum\\_programs/HLAY\\_eval\\_full.pdf](http://www.discoveryeducation.com/ul/images/curriculum_programs/HLAY_eval_full.pdf)
- Garnezy, N. (1994). Reflections and commentary on risk, resilience, and development. In R. J. Haggarty, L. R. Sherrod, N. Garnezy & M. Rutter, (Eds.), *Stress, Risk, and Resilience in Children and Adolescents: Processes, Mechanisms, and Interventions* (pp. 1-18). Cambridge, UK: Cambridge University Press.
- Gosin, M., Marsiglia, F.F., & Hecht, M.L. (2003). *keepin’ it REAL: A drug resistance curriculum tailored to the strengths and needs of pre-adolescents of the Southwest*. *The Journal of Drug Education, 33*, 119-142.
- Gottfredson, D.C., & Wilson, D.B. (2003). Characteristics of effective school-based substance abuse prevention. *Prevention Science, 4*, 27-38.
- Greenberg, M. T., Kushe, C. a., Cook, E. T., & Quamma, J. P. (1995). Promoting emotional competence in school-aged children: The effects of the PATHS curriculum. *Development and Psychopathology, 7*, 117-136.
- Hale-Benson, J. (1982). *Black children: Their roots, culture, and learning styles*. Brigham Young University Press.
- Hansen, W. B. (1991). School-based substance abuse prevention: A review of the state of the art in curriculum, 1980-1990. *Health Education Research, 7*, 403-430.
- Hansen, W.B. (1996). Prevention programs: What are the critical factors that spell success? In *National Conference on Drug Abuse Prevention Research: Presentations, Papers and Recommendations*. Washington, DC: U.S. Department of Health and Human Services, NIH/NIDA.
- Hansen, W. B., & Graham, J. W. (1991). Prevention of alcohol, marijuana, and cigarette use among adolescents: Peer pressure resistance training versus establishing conservative norms. *Preventive Medicine, 20*, 414-430.
- Hansen, W. B., Johnson, C. A., Flay, B. R., Graham, J. W., & Sobel, J. L. (1988). Affective and social influences

- approaches to the prevention of multiple substance abuse among seventh grade students: Results from Project SMART. *Preventive Medicine*, 17, 135-154.
- Hardin, J.W., & Hilbe, J.M. (2003). *Generalized estimating equations*. Boca Raton, FL: Chapman & Hall/CRC.
- Hecht, M. L., & Driscoll, G. (1994). A comparison of selected communication, social, situational, and individual factors associated with alcohol and other drugs. *The International Journal of the Addictions*, 29, 1225-1243.
- Hecht, M.L., Graham, J.W. & Elek, E. (2006). The Drug Resistance Strategies Intervention: Program Effects on Substance Use. *Health Communication*, 20, 267-276.
- Hecht, M.L., & Krieger, J.K. (2006). The principle of cultural grounding in school-based substance use prevention: The Drug Resistance Strategies Project. *Journal of Language and Social Psychology*, 25, 301-319.
- Hecht, M.L., Marsiglia, F.F., Elek, E., Wagstaff, D. A., Kulis, S., Dustman, P., & Miller-Day, M. (2003). Culturally-grounded substance use prevention: An evaluation of the keepin' it R.E.A.L. curriculum. *Prevention Science*, 4, 233-248.
- Hecht, M.L., & Miller-Day, M. (in press). The Drug Resistance Strategies Project: A communication approach to preventing adolescent drug use. In L. Frey & K. Cissna (Eds.), *Handbook of Applied Communication*.
- Hecht, M.L., Warren, J.W., Wagstaff, D.A., & Elek, E. (in press). Substance use, resistance skills, decision making, and refusal efficacy among Mexican and Mexican American preadolescents. *Health Communication*.
- Johnston, L. D., O'Malley, P. M., Bachman, G. J., & Schulenberg, J. E. (2005). *Monitoring the future: National survey results on drug use, 1975-2004*. Bethesda, MD: NIDA.
- Kam, J. A., Elek, E., & Hecht, M. L. (May, 2007). *Reviewing the effectiveness of elementary school-based substance use prevention programs*. Paper to be presented at the Society of Prevention Research Convention, Washington, D. C.
- Kandel, D. B., Yamaguchi, K., & Chen, K. (1992). Stages of progression in drug involvement from adolescence to adulthood: Further evidence for the gateway theory. *Journal of Studies on Alcohol*, 53, 447-457.
- Kasen, S., Vaughan, R. D., & Walter, H. J. (1992). Self-efficacy for AIDS preventive behaviors among 10<sup>th</sup> grade students. *Health Education Quarterly*, 9, 187-202.
- Knouse, S. B., Rosenfeld, P., & Culbertson, A. L. (1992). *Hispanics in the workplace*. Newbury Park, CA: Sage Publications.
- Korn, E. L., & Graubard, B. I. (1999). *Analysis of health surveys*. New York: John Wiley & Sons.
- Kulis, S. Marsiglia, F.F., Elek-Fisk, E., Dustman, P., Wagstaff, D., & Hecht, M.L. (2005). Mexican/Mexican American adolescents and keepin' it REAL: An evidence-based, substance abuse prevention program. *Children and Schools*, 27, 133-145.
- Kulis, S., Nieri, T. Yabiku, S., Stromwall, L.K., & Marsiglia, F.F. (2007). Promoting reduced and discontinued substance use among adolescent substance users: Effectiveness of a universal prevention program. *Prevention Science*, 8, 35-49.
- Marsiglia, F.F., Kulis, S., Wagstaff, D.A., Elek, E. & Dran, D. (2005). Acculturation status and substance use prevention with Mexican and Mexican American youth. *Journal of Social Work Practice in the Addictions*, 5, 1/2, 85-111.
- Mezzacappa, E., Kindlon, D., & Earls, F. (1999). Relations of age to cognitive and motivational elements of impulse control in boys with and without externalizing behavior problems. *Journal of Abnormal Child Psychology*, 27, 473-483.
- Murray, D.M. (2001). Statistical models appropriate for designs often used in group-randomized trials. *Statistics in Medicine*, 20, 1373-1385.
- Murray, D.M., Hannan, P.J., Wolfinger, R.D., Baker, W.L., & Dwyer, J.H. (1998). Analysis of data from group-randomized trials with repeat observations on the same groups. *Statistics in Medicine*, 17, 1581-1600.
- Murray, D.M., Varnell, S.P., & Blitstein, J.L. (2005). Design and analysis of group-randomized trials: A review of recent methodological developments. *American Journal of Public Health*, 94, 423-432.
- National Family Partnership (2005). *Red ribbon information*. Retrieved January 16, 2007, from <http://www.nfp.org/redribbon.htm>.
- O'Donnell, J., Hawkins, J. D., Catalano, R. F., Abbott, R. D., & Day, L. E. (1995). Preventing school failure, drug use, and delinquency among low-income children: Long-term intervention in elementary schools. *American Journal of Orthopsychiatry*, 65, 87-100.
- Piaget, J. (2000). Piaget's theory. In K. Lee (Ed.), *Childhood cognitive development: The essential readings. Essential readings in developmental psychology* (pp. 33-47). Malden, MA, US: Blackwell.
- Polich, J.M., Ellickson, P.L., Reuter, P., and Kahan, J.P. (1984). *Strategies for Controlling Adolescent Drug Use*. Santa Monica, California: The Rand Corporation.
- Schinke, S. P., Tepavac, L., & Cole, K. C. (2000). Preventing substance use among Native American youth: Three-year results. *Addictive Behaviors*, 25, 387-397.
- Skara, S., & Sussman, S. (2003). A review of 25 long-term adolescent tobacco and other drug use prevention program evaluations. *Preventive Medicine*, 37, 451-474.
- Spitzberg, B. H., & Cupach, W. R. (1984). *Interpersonal communication competence*. Beverly Hills, CA: Sage.
- Stata Corporation (2005). *Stata statistical software: Release 9.0*. College Station, TX: StataCorp LP.
- Stipek, D., de la Sota, A., & Weishaupt, L. (1999). Life lessons: An embedded classroom approach to preventing high-risk behaviors among preadolescents. *The Elementary School Journal*, 99, 433-451.
- Substance Abuse and Mental Health Services Administration (2005). Project ALERT. Retrieved January 15, 2007, from [http://www.modelprograms.samhsa.gov/template\\_cf.cfm?page=model&pkProgramID=10](http://www.modelprograms.samhsa.gov/template_cf.cfm?page=model&pkProgramID=10).
- The National Youth Anti-Drug Media Campaign (n.d. ). *Parents. The anti-drug*. Retrieved January 16, 2007, from <http://www.theantidrug.com/>.
- Twisk, J.W.R. (2003). *Applied longitudinal data analysis for epidemiology: A practical guide*. London: Cambridge University Press

Weiden Consulting, T. D. (2000). Science, tobacco & you outcome evaluation: Phase 2 report. *Science, Tobacco & You*. Retrieved October 3, 2006 from <http://scienceu.fsu.edu/evaluations/index.html>.

#### Endnotes

<sup>1</sup> The ETR website can be found at <http://www.etr.org/> and the Discovery website can be found at <http://www.discoveryhealthconnection.com/>

<sup>2</sup> Additional analyses compared the intervention students to students in the few control schools which did not implement other SAMHSA model substance use prevention interventions. These analyses did not alter this paper's conclusions. The low number of schools and the low power of these analyses prevented drawing strong conclusions.