

Communicating Prevention: The Effects of the *keepin' it REAL* Classroom Videotapes and Televised PSAs on Middle-School Students' Substance Use

Jennifer R. Warren, Michael L. Hecht,
David A. Wagstaff, Elvira Elek, Khadidiatou Ndiaye,
Patricia Dustman & Flavio F. Marsiglia

This study sought to determine if exposure to two communication-oriented activities, videotapes and public service announcements, accounts for changes in substance use among adolescents participating in the Drug Resistance Strategies Project's keepin' it REAL adolescent substance use prevention curriculum. Middle-school students (4,734, 72% Latino) responded to questionnaires related to these analyses. An analysis of covariance (ANCOVA) model was fit separately to six substance use outcomes. The results suggested that intervention students who saw four or five videos engaged in less substance use in the past month than did students who saw fewer videos. Having seen the PSAs one or more times did not predict the reported change in substance use.

Keywords: Communication-Based Activities; PSAs, Videotapes; Substance Use Prevention; Adolescents

Jennifer R. Warren is a Doctoral Candidate in Communication Arts and Sciences at The Pennsylvania State University. Michael L. Hecht is Liberal Arts Research Professor in Communication Arts and Sciences at The Pennsylvania State University and Principle Investigator on the NIDA-funded Drug Resistance Strategies Project. David A. Wagstaff is Project Associate with the HHD Methodology Consulting Group at The Pennsylvania State University. Elvira Elek, Ph.D., works as the Project Director of the Drug Resistance Strategies Project (DRS) and a Research Associate with the Social Responsibility and Prevention Project (SRP), both at The Pennsylvania State University. Khadidiatou Ndiaye is a Doctoral Candidate in Communication Arts and Sciences at The Pennsylvania State University. Patricia Dustman is Implementation and Development Director with the Southwest Interdisciplinary Research Consortium, College of Public Programs, School of Social Work at Arizona State University. Flavio Francisco Marsiglia, Ph.D., is Professor and Director of the Southwest Interdisciplinary Research Center (SIRC), School of Social Work in the College of Public Programs at Arizona State University. Correspondence to: Jennifer R. Warren, Pennsylvania State University, 234 Sparks Building, University, PA 16801, USA. E-mail: jr302@psu.edu. This research was supported by a National Institute on Drug Abuse Grant R01 DA 05629.

Having developed a number of multi-component programs that effectively reduce, delay, or prevent adolescent alcohol, tobacco, and other drug (ATOD) use, prevention researchers devoted more of their efforts to identifying the specific components that account for their programs' success (Tobler et al., 2000). A meta-analysis conducted by Tobler et al. (2000) identified many of the characteristics and communication-based components of effective adolescent ATOD prevention programs. Among the school-based programs, the most effective incorporate multiple components, maintain high interaction among participants, provide interpersonal skill components that focus on increasing refusal competencies, and seek to change participants' normative beliefs about substance use (Tobler et al., 2000). Other research found the use of activities to effectively communicate anti-drug messages integral to substance use prevention programs in school settings (Simons-Morton, Donohew, & Crump, 1997; Skara & Sussman, 2003). Finally, research conducted among high-risk, minority students found that prevention messages that reflect each group's cultural elements and norms appear effective in reducing gateway substance use (Hecht et al., 2003). The present study focuses on communication-based elements related to successful substance use prevention.

Past school-based, substance use prevention interventions used videotape and public service announcements (PSAs) to support other intervention components and as part of booster campaigns (Gottfredson & Wilson, 2003; Skara & Sussman, 2003). The use of videotapes and PSAs confers a number of advantages. As mediated messages, they allow program developers to use a standardized format and to present consistent information to a large audience. This enhances treatment integrity, a key factor in the successful implementation of a program (Simons-Morton et al., 1997). Moreover, in the more visually oriented culture of the United States, the use of videotapes and PSAs communicates prevention messages more effectively by capturing audience attention (Steinke, 2001), enhancing identification (Solomon & DeJong, 1986), and providing better access for low-literacy communities (Primm, Cabot, Pettis, Vu, & Cooper, 2002). Televised PSAs and videotapes appear effective with adolescents (Clark & Lester, 2000; Flynn et al., 1994; Roye & Hudson, 2003)

Narrative Theory, Communication Competence, and Prevention

In conceptualizing prevention messages disseminated through PSAs and videotapes, narratives can serve as an impetus for encouraging behavior change among adolescents (Botvin, Schinke, Epstein, Diaz, & Botvin, 1995). The conception and organization of human thought and behavior through narratives lie at the center of narrative theory (White, 1981). Research has shown that narratives play an important role when studying adolescents since they allow adolescents to conceptualize and express their individuality and ultimately communicate this individuality to the world (Johnson & Ettema, 1982; McAdams, 1993). As social learning theory provides, adolescents are more likely to be receptive to models with which they can identify (Bandura, 1977, 1982). The narrative form offers this connection, which can serve as an impetus for encouraging behavior change among adolescents.

The *keepin' it REAL (kiR)* curriculum builds on a dual theoretical understanding: the importance of narratives for communicating with/about adolescents and the opportunity for behavior change modeling by building on adolescents' personal experiences. The videos and PSAs evolved from the initial narrative research on drug offers and the adolescent experience of drug use (Holleran, Reeves, Dustman, & Marsiglia, 2002). In addition, pilot tests of narrative-based prevention programs have shown significant results (Hecht, Corman, & Miller-Rassulo, 1993), with success even more pronounced in minority schools (Botvin, Schinke, Epstein, & Diaz, 1994; Botvin et al., 1995; Costantino, Malgady, & Rogler, 1988).

The *kiR* videos and PSAs also utilize communication competence theory in conceptualizing messages for resisting drug offers. A theoretical model of communication competence (Spitzberg & Cupach, 1984; Spitzberg & Hecht, 1984) posits competence as a relational phenomenon with three necessary components: knowledge, skills, and motivation. In the curriculum, the narratives represented the salient knowledge structures; skills consisted of resistance skills and decision making; and substance use norms provided motivation. In the context of an adolescent facing drug offers from peers, a competent communicative interaction is one that allows him/her to express his/her desire to refuse the offer while maintaining his/her relationship with his/her peers (Hecht et al., 2003). The *kiR* videos and PSAs did just that by motivating resistance through norms and enacting strategies that would allow students to make decisions to resist drug offers competently. The videos presented narrative models of resistance skills and norms, the central features of the curriculum, and these narrative models were reinforced through repetition via the PSAs.

The *keepin' it REAL* Curriculum

The Drug Resistance Skills Project's (DRS) *kiR* curriculum utilizes communication-based components and has proven effective in reducing middle-school students' substance use (Hecht et al., 2003). With the overall effectiveness of the program established and the program now listed as a federal model program (see Substance Abuse & Mental Health Services Administration, 2004), further analyses need to examine the components that account for its success. The study reported here seeks to determine if exposure to the curriculum's videotapes and PSAs produced an impact on students' substance use.

DRS designed, implemented, and evaluated the *kiR* curriculum as a school-based, substance use prevention program for a culturally diverse group of urban, middle-school students. The curriculum emerged from previous work that demonstrated the efficacy of teaching communication and life skills through school-based prevention (Hecht et al., 1993; Tobler & Stratton, 1997; Tobler et al., 2000). Begun in 1989, DRS was among the first to study the communicative processes involved in adolescent drug resistance (i.e., how adolescents refuse drug offers), describe ethnic similarities and differences in substance use and resistance, and study the implications of ethnicity for prevention. The curriculum extended resistance and life skills models (Botvin, Griffin, Diaz, & Ifill-Williams, 2001) by using a culturally grounded narrative and

performance framework (Gosin, Marsiglia, & Hecht, 2003; Hecht et al., 1993) to enhance anti-ATOD norms and attitudes and to facilitate the development of risk assessment, decision making, and resistance skills. From its inception, the *kiR* curriculum was designed as a culturally grounded intervention using a cultural resiliency model, incorporating traditional ethnic values and practices that promote protection against drug use (Castro, Cota, & Vega, 1999; Gosin, Marsiglia, & Hecht, 2003).

The intervention emphasized the teaching of four resistance skills identified in past substance use research (Miller-Rassulo, Alberts, Hecht, Krizek, & Trost, 2000). The first letter of each resistance skill formed the acronym REAL: Refuse, Explain, Avoid, and Leave. Refuse consists of simple statements of “no” to substance use offers, whereas explanations provide more elaborate reasons for refusing. Avoid involves the skills adolescents use to keep away from situations known to involve ATOD or their offers, and leave consists of exiting once they encounter substance use.

The curriculum’s developers used narrative material obtained from members of the target audience to develop each of the curriculum’s 10 lessons. Among the instructional elements, the media components consisted of the class videos and PSAs. The videotapes formed the core focus of five of the ten classroom lessons; television PSAs, a neighborhood billboard campaign, and in-school booster sessions implemented during the follow-up year reinforced the messages presented in the classroom lessons. Close proximity of both treatment and control schools meant that students in all conditions received exposure to the media campaign.

Classroom Videotapes

While some lack of clarity exists regarding the program components that actually build skills and modify behavior (Skara & Sussman, 2003), research has demonstrated the effectiveness of videotape in changing knowledge, skills, and behavior for over 20 years (Steinke, 2001). Videotapes have been utilized in HIV and sexually transmitted disease prevention (DeLamater, Wagstaff, & Havens, 2000; Roye & Hudson, 2003; Rye, 1998; Solomon & DeJong, 1986), smoking cessation (Sussman, Dent, Burton, Stacy, & Flay, 1995), patient care (Clark & Lester, 2000), health education for young children (Levin, Martin, McKenzie, & Delouise, 2002), and adolescent substance use prevention (Flay et al., 1989; Hecht et al., 2003; Holleran et al., 2002). Most of these studies found desirable overall program effects.

In the past, videotapes typically relied on fear appeals to change attitudes and behaviors regarding perceived risk and self-efficacy, with limited effectiveness (Roberto, Meyer, Johnson, & Atkin, 2000; Rye, 1998). Fear-based prevention messages, where the source of fear concerns negative consequences such as physical harm or social isolation, often successfully increase knowledge but, generally, do not change actual substance use behavior (Barnett, Far, Mauss, & Miller, 1996; Peeler, Far, Miller, & Brigham, 2000; Werch et al., 2000). As a result, DRS selected a narrative approach which presents communicatively competent resistance scenarios without reference to negative consequences of use or moral judgments. Narrative not only

avoids problems associated with fear appeals, but also has proven an effective form of evidence (Allen et al., 2000).

Prior to *kiR*, other prevention programs effectively utilized videos that integrated cultural norms into prevention messages and included members of the target audience (O'Donnell, Doval, Duran, & O'Donnell, 1995; Solomon & DeJong, 1986) while presenting the information in a narrative format (Hecht et al., 1993). Realistic imagery enhanced the credibility of both the communicator and the content of a video (Clark & Lester, 2000; Roye & Hudson, 2003). For example, O'Donnell et al. (1995), Solomon and DeJong (1986), and Hecht et al. (1993) utilized peers or near peers (people of a similar but older age group and actors simulating peers) in a peer-to-peer approach in videotapes. The prevention messages integrated both the beliefs and values of the target audience and everyday language. The videotapes demonstrated a positive effect on substance use resistance skills and the recommended safer sex behaviors among African American and Hispanic participants.

In developing the *kiR* classroom videotapes, DRS adopted a "from kids to kids through kids" approach that used peer narratives as the source material and employed near peers (i.e., slightly older individuals) in all aspects of video production (Hecht et al., 1993). Additionally, to enhance realism the videotapes utilized students from the participating communities as actors along with well-known locations within the community. The first video introduced all four refusal skills while each of the other videos addressed one of the specific skills. After showing the videotape, the instructor guided discussion based on findings from pilot work demonstrating the need for discussion to focus thinking on specific content rather than the video itself (Hecht et al., 1993).

Televised Public Service Announcements

Public service announcements provided yet another channel for disseminating the project's core prevention messages. Since the 1960s, health campaigns have used PSAs to encourage lay audiences to adopt a variety of healthy behaviors (Atkin, 2001). By the 1980s, PSAs addressed health topics from heart disease to drug abuse. Many of the campaigns addressed smoking (Atkin, 2001; Atkin & Schiller, 2002), with some utilized as part of school-based prevention programs (Pentz, 2003). Although PSAs developed into one of the leading communication-based activities used to present prevention messages to a large audience, their effectiveness remains questionable (Atkin & Schiller, 2002).

Variability in PSA effectiveness seems at least partially linked to message design (Donohew, Palmgreen, & Lorch, 1998; Harrington et al., 2003; Stephenson, 2003). Messages that fit adolescents' needs for sensation enhance effectiveness (Donohew, Lorch, & Palmgreen, 1991; Morris, 2004). In addition, proponents of culturally sensitive prevention suggested that messages should truly respond to the needs, cultural context, and local reality of the audience (Kar, Alcalay, & Alex, 2001; U.S. Department of Health and Human Services, 1991). The *kiR* PSAs considered each of these issues, incorporating high sensation value through visually dramatic,

“sensational” graphics, and quick cuts, and culturally grounded narrative prevention messages. In addition, the televised DRS PSAs reinforced the program’s content by excerpting from the classroom videos (Hecht & Miller-Day, in press). Each PSA included the content from one classroom video edited for PSA format to induce more conservative norms and teach resistance skills.

In summary, this article focuses on the classroom videotapes and PSAs of the *kiR* middle school drug prevention curriculum. Previous research demonstrated the efficacy of the overall program (Hecht et al., 2003) and related that prevention research has demonstrated the efficacy of other types of program components (Gottfredson & Wilson, 2003; Skara & Sussman, 2003; Tobler et al., 2000). In addition, a similar video component developed from adolescent narratives and teaching the four REAL resistance skills reduced the use of illicit substances (drugs other than alcohol and tobacco) at posttest 30 days following implementation in a pilot study (Hecht et al., 1993).

However, it is unclear whether the videos make an independent contribution when embedded in a more comprehensive prevention program, nor do we know the role PSAs play in reinforcing program content. Furthermore, while prevention scientists studied the necessary length of effective programs with varying results, less research examined the minimum exposure needed to ensure a particular component’s effectiveness (Dusenbury, 2000; Yeaton & Sechrest, 1981). As a result, we posed the following hypotheses about the videotapes and PSAs used with the *kiR* curriculum:

- H1: Intervention students who report seeing PSAs at least once will demonstrate smaller increases in substance use than those who did not.
- H2: Intervention students who report seeing at least four videos will demonstrate smaller increases in substance use than will intervention students who report seeing fewer videos. In turn, the latter will report less substance use than will control students.

We propose that four or more videos serve as the threshold for the second hypothesis based on the idea that this level of exposure ensured that the students were taught all four refusal skills. Since the REAL system represents a repertoire of communication skills, we reasoned that there should be a threshold effect dependent on exposure to the entire group of skills. However, we also expect any amount of video exposure to appear more effective than exposure to none of the videos.

Methods

Participants

The present study reports findings based on data obtained from 4,734 middle-school students who participated in the parent project’s pretest (fall 1998) and/or its fourth and final posttest 14 months after the end of the *kiR* implementation (spring 2000). Students in the seventh grade of the participating schools who were present on the day of either of those two survey administrations formed the sample for this study. Slightly more than 47% of the students were female; 55% self-identified as Mexican American, Mexican, or Chicano; 17% as Other Latino (Puerto Rican, Cuban, etc.);

19% as White; and 9% as African American. Data collected in 2000 by the Arizona Department of Education (2004) indicated that the percentage of females attending the 35 study schools was comparable to the percentage of females attending elementary or middle schools within Phoenix city boundaries (49%). However, the schools recruited for the parent project enrolled a larger percentage of Latino students (72% vs. 40%) and a smaller percentage of White students (19% vs. 49%) than did Phoenix elementary and middle schools in general (Arizona Department of Education, 2004). As an indication of the socioeconomic status (SES) of the sample, at baseline, 71% of the students reported that they received lunch at no cost, and an additional 12% reported that they received lunch at reduced cost.

Curriculum

In the fall of 1997, the project's staff, in partnership with middle-school teachers and students, developed three parallel versions of the 10-lesson *kiR* curriculum. The Mexican/Mexican-American version emphasized values salient to members of Phoenix's growing Mexican and Mexican-American population (e.g., *familismo*, *respeto*, *personalismo*, and *simpatia*). The European-American/African-American version emphasized values salient to members of Phoenix's Anglo (e.g., individualism, planning, respect, directness in communication, and fairness) and African-American (e.g., communalism, purpose, respect, endurance, and creativity) populations. A multicultural version combined five lessons each from the Mexican/Mexican-American and European-American/African-American versions. For additional details about the curriculum, see Gosin, Marsiglia, and Hecht (2003).

Developing the Classroom Videos and PSAs

In cooperation with the DRS research team, students at a local performing arts high school created the curriculum videotapes based both on the principles established in a previous DRS project (Hecht et al., 1993) and on a pilot video produced the year before the study (Holleran et al., 2002). Prior to production, the high school students received instruction about these principles and viewed the pilot video. In addition, they received information about the findings from previous research (Miller-Rassulo et al., 2000) and copies of prototypical narratives for each resistance skill. After reading these narratives, they decided to conduct their own interviews to more fully understand the process. The students took complete charge of the production, casting, music, dance, sets, and post-production, with support from their teacher and two professional video directors (Holleran et al., 2002).

The first video provided an overview of all four resistance skills and explained the process used to identify the skills (through research with previous middle-school students) as well as the videos' creation by high school students for the middle-school students. Each of the remaining four videos focused on a single resistance skill (refuse, explain, avoid, or leave), operationalizing the skills component of communication competence theory (Spitzberg & Cupach, 1984) while illustrating the appropriate injunctive and descriptive norms (Cialdini, Reno, & Kallgren, 1990) that

operationalized the motivation component. The four-to-eight-minute videos used narrative exemplars of the resistance skills (e.g., told a story about refusing a drug offer) set in the contexts in which substance use by Phoenix area students occurs (Cialdini et al., 1990), described the solution to specific problems to increase attention (Pratkanis & Greenwald, 1993), and emphasized the cultures of the main ethnic and racial groups of the city (Holleran et al., 2002). Project personnel read the draft scripts and provided feedback about how to sharpen the prevention message (e.g., avoid moralizing or fear appeals in favor of presenting a resilience-based narrative). The videos were field-tested among middle-school students and modified based on feedback (Gosin, Dustman, Harthun, & Drapeau, 2003). The resulting videos, which incorporated music, quick shots, and scene shifts in MTV style, won acceptance by students, teachers, and the professional community and received two regional Emmy awards for student productions.

The PSAs consisted of 30-second spots developed by editing the classroom videos to emphasize the prevention message in a short portion of the story. Then, a narrator summarized the plot. Each PSA ended with the project logo and a voice-over reminding viewers to assess the risk, make decisions, and take control: key messages from the curriculum. Local mainstream and Spanish-language television stations aired the four English and/or four Spanish versions of the PSAs at various times during the day, evening, and night for a six-month period immediately following the end of the implementation. The PSAs also received two regional Emmy awards for student productions.

Study Design

In 1998, 35 Phoenix middle schools agreed to participate in the parent study with 25 schools randomly assigned to one of the three intervention conditions and 10 schools to the control condition. The schools included in the study were distributed over a number of school districts geographically spread out across the city. While the students may have interacted with each other, this geographical dispersment likely resulted in little actual contact between the intervention and control group students (and thus little chance of contamination between treatment and control).

Control schools received the local, regularly administered ATOD programming. In the fall of 1998, the students' regular classroom teachers taught the *kiR* curriculum. These teachers received training prior to teaching the curriculum (see Hecht et al., 2003). In addition, to accommodate the substantial proportion of native Spanish-speaking students, the teachers could utilize both English and Spanish versions of the instructional materials.

A group-randomized study with a pretest and three follow-up assessments was conducted over a two-year period from fall 1998 through spring 2000. Trained proctors administered questionnaires during the students' regular science, health, or homeroom class period in fall 1998, spring 1999, fall 1999, and spring 2000. The questionnaires asked no more than 82 questions and collected information on students' demographic characteristics, substance use behavior in the 30-day period

preceding administration, selected psychosocial determinants of substance use behavior (norms, expectancies, and intentions), and resistance skills used in response to substance use offers in the past month. Hecht et al. (2003) reported additional details about the parent project and its evaluation.

Measures

Demographic characteristics. Six “yes/no” items were used to collect data on the students’ racial/ethnic backgrounds. The six items asked if students were Mexican American, Mexican, or Chicano; other Latino (Puerto Rican, Cuban, etc.); White; African American (Black); American Indian (Pima, Yaqui, Navajo, etc.); or Asian or Pacific Islander. Students were instructed to mark “yes” to all of the response choices that applied. For this study, the Mexican/Mexican-American category consisted of those students who only marked “yes” to Mexican American, Mexican, or Chicano. The other Latino category consisted of those students who (a) marked “yes” to Other Latino or (b) marked “yes” to Mexican American, Mexican, or Chicano and “yes” to another race/ethnicity. The African-American category consisted of the remaining students who marked “yes” to African American (Black), and the non-Hispanic White category consisted of the remaining students who marked “yes” to White. Separate items collected data on the students’ gender and grade.

Classroom video and PSA viewing. On the fall 1999 questionnaire (about eight months after program implementation began), students responded to two items which asked about their viewership of the classroom videos and the PSAs. The first question asked: “How many of the keepin’ it REAL videos did you watch in your classroom last year?” with responses scored 1 = *I have never seen any of these videos*, 2 = *one video*, 3 = *two videos*, 4 = *three videos*, 5 = *four videos*, and 6 = *five videos*. The second question asked: “How many times have you seen the keepin’ it REAL ads on TV?” with responses scored 1 = *I have never seen any of these ads*, 2 = *one time*, 3 = *two times*, 4 = *three times*, 5 = *four times*, 6 = *five times*, and 7 = *more than five times*.

Alcohol, cigarette, and marijuana use. At both baseline and at the final assessment, the same six items assessed the amount and frequency of alcohol, cigarette, and marijuana use in the past 30 days. The three amount items consisted of “How many drinks of alcohol have you had in the past 30 days?” “How many cigarettes have you smoked in the past 30 days?” and “How many hits of marijuana have you had in the past 30 days?” The Likert-scale responses utilized values from 1 = *none* to 9 = *more than 30* for the number of drinks consumed, 1 = *none* to 8 = *more than 2 packs* for the number of cigarettes smoked, and 1 = *none* to 8 = *more than 40 hits* for the number of marijuana joints smoked. The three frequency items consisted of “How many days in the past 30 days have you had alcohol to drink (do NOT count for religious services)?” “How many days in the past 30 days have you smoked cigarettes?” and “How many days in the past 30 days have you smoked marijuana?” All three items were assessed using a Likert scale that ranged from 1 = *none* to 6 = *16 to 30*.

Analyses

We used multiple imputation as implemented in the software package NORM (Schafer, 2000) to address the missing data due to the use of a planned missingness design (Graham, Taylor, & Cumsille, 2001) and participant nonresponse. Specifically, we used NORM to produce a central EM (expectation-maximization) dataset and 10 multiply imputed datasets. We then used Stata version 8.0 (Stata Corporation, 2003) and its complex survey sample routines to fit regression models that addressed the intraclass correlation, inflated standard errors, and liberal p values which result from having randomized schools and not individual students (see Cornfield, 1978; Korn & Graubard, 1999) to study conditions. The complex survey sample approach exploits the theory and methods that survey statisticians developed to address the statistical challenges that arise when the sample design involves the selection and/or assignment of stratified and/or clustered units (LaVange, Koch, & Schwartz, 2001). These methods share many of the strengths and weaknesses attributed to the more widely used regression methods based on generalized estimating equations (Diggle, Liang, & Zeger, 1995).

To test the video hypothesis, we performed six separate regressions, and fit a simple analysis of covariance (ANCOVA) model (Huitema, 1980; Milliken, & Johnson, 2002) to each imputed dataset, and used Rubin's rules to obtain a combined estimate, standard error, t statistic, and p value (Rubin, 1987). Specifically, for the classroom videotape hypothesis, we formed raw change scores for each substance use outcome and then regressed each raw change score on two 0/1 dummy variables and the baseline substance use report. The first dummy variable contrasted intervention students who reported that they had seen four or five of the classroom videos with control students; the second dummy variable contrasted intervention students who reported that they had seen fewer than four of the classroom videos with control students. We then used linear contrasts and t tests to compare the two groups of intervention students. As Huitema (1980) and Milliken and Johnson (2002) noted, using the change score as the dependent variable with the pretest measure as a covariate provides test statistics and p values for the dummy variable and covariate that are identical to those provided by the analysis of covariance model that regresses the posttest score on the dummy variable and the pretest score. To test the PSA hypothesis, we again fit separate ANCOVA models, regressing each substance raw change score on the baseline substance use report and a single 0/1 dummy variable that contrasted students who reported seeing the PSAs one or more times with the students who did not recall having seen PSAs at least once.

Results

Intervention students comprised 70% (3,335) of the 4,734 middle-school students who completed a baseline and/or follow-up assessment. Approximately 54% (1,789) of the intervention students reported that they had seen four or five of the five classroom videotapes. The remaining intervention students (1,546) reported that they had seen zero to three of the videotapes. Finally, 62% (2,081) of the intervention

students and 44% (2,081) of all students reported that they had seen one or more of the televised PSAs. Compared to the students who reported that they had seen three or fewer of the classroom videotapes, the students who reported that they had seen four or five of the videotapes were more likely (OR = 1.4) to be female than male, $F(1, 22) = 17.55, p = .0004$. The group that saw four or five videotapes did not differ significantly from the control group in the proportion of females. The two intervention groups appeared homogeneous with respect to students' self-reported racial/ethnic backgrounds, $F(1.79, 39.30) = 1.1169, p = .3319$. Compared to the students who reported that they had not seen the PSAs, the students who reported that they had seen the PSAs at least once were as likely (OR = 1.01) to be female as male, $F(1, 32) = .02, p = .89$. The two PSA groups were homogeneous with respect to students' self-reported racial/ethnic backgrounds, $F(1.55, 49.68) = .1931, p = .77$.

Table 1 presents baseline and follow-up means and their standard errors as well as the covariate-adjusted mean change for the groups of students whose change scores

Table 1 Baseline and Follow-up Mean Substance Use and Covariate Adjusted Change in Substance Use for Intervention Students who Reported Viewing Four or More, Fewer than Four Intervention Videos, and Control Condition Students

Variable	Student Group	Baseline		Follow-up		Covariate-adjusted change score	
		Mean	SE	Mean	SE	Mean	SE
Alcohol – # of drinks							
	Control	1.88063	0.09353	2.57391	0.09737	1.74538	0.08340
	0–3 videos	1.98722	0.08670	2.51522	0.11550	1.63947	0.09896
	4–5 videos	1.86976	0.04801	2.36717	0.06023	1.54353	0.06511
Alcohol – # of days							
	Control	1.41522	0.04361	1.82073	0.04218	1.27143	0.03530
	0–3 videos	1.52585	0.04977	1.74504	0.05750	1.15264	0.06363
	4–5 videos	1.45264	0.03142	1.66814	0.03278	1.10444	0.03778
Cigarette – # of cigarettes							
	Control	1.36705	0.03918	1.60965	0.04183	1.05566	0.05208
	0–3 videos	1.42515	0.04911	1.66243	0.06320	1.08502	0.06873
	4–5 videos	1.32071	0.02641	1.50380	0.05093	0.96871	0.05398
Cigarette – # of days							
	Control	1.25954	0.02824	1.41680	0.03038	1.05193	0.03700
	0–3 videos	1.33055	0.03668	1.44684	0.04006	1.06138	0.04382
	4–5 videos	1.24393	0.01885	1.34022	0.03363	0.97994	0.03414
Marijuana – # of hits							
	Control	1.53939	0.08759	2.12080	0.09197	1.18748	0.08802
	0–3 videos	1.66920	0.07519	2.09560	0.10315	1.08334	0.07765
	4–5 videos	1.51415	0.05276	1.83867	0.06567	0.92063	0.06163
Marijuana – # of days							
	Control	1.34417	0.05383	1.67684	0.06061	0.90582	0.06445
	0–3 videos	1.39749	0.03997	1.67889	0.06807	0.87695	0.06340
	4–5 videos	1.32063	0.03046	1.52054	0.03944	0.76298	0.05161

Table 2 Adjusted Differences in Substance Use for Intervention Students who Reported Viewing Four or More, Fewer than Four Intervention Videos, and Control Condition Students

Variable	Comparison	Adjusted group mean difference	SE	<i>t</i>	<i>df</i>	<i>p</i>
Alcohol – # of drinks	0–3 videos versus control	–0.10588	0.12985	–0.82	59	0.418
	4–5 videos versus control	–0.20186	0.09234	–2.19	647	0.029
	0–3 videos versus 4–5 videos	–0.09598	0.11703	–0.82	43	0.417
Alcohol – # of days	0–3 videos versus control	–0.11897	0.06157	–1.93	76	0.057
	4–5 videos versus control	–0.16705	0.04406	–3.79	425	0.000
	0–3 videos versus 4–5 videos	–0.04808	0.06066	–0.79	72	0.431
Cigarette – # of cigarettes	0–3 videos versus control	0.02948	0.07057	0.42	49	0.678
	4–5 videos versus control	–0.08705	0.05784	–1.51	795	0.133
	0–3 videos versus 4–5 videos	–0.11652	0.07074	–1.65	36	0.108
Cigarette – # of days	0–3 videos versus control	0.00956	0.04912	0.19	76	0.846
	4–5 videos versus control	–0.07202	0.04390	–1.64	232	0.102
	0–3 videos versus 4–5 videos	–0.08157	0.05222	–1.56	26	0.130
Marijuana – # of hits	0–3 videos versus control	–0.10394	0.11509	–0.9	63	0.370
	4–5 videos versus control	–0.26690	0.08077	–3.3	178	0.001
	0–3 videos versus 4–5 videos	–0.16296	0.09727	–1.68	71	0.098
Marijuana – # of days	0–3 videos versus control	–0.02878	0.07630	–0.38	132	0.707
	4–5 videos versus control	–0.14288	0.05269	–2.71	428	0.007
	0–3 videos versus 4– 5 videos	–0.11410	0.06543	–1.74	100	0.084

Note. Rubin's (1987) rules for multiply imputed data sets were used to calculate the combined estimates, their standard errors, and the degrees of freedom associated with the *t* distribution.

were contrasted to test the video hypothesis. Table 2 presents the adjusted mean differences between those groups. Differences between control students and the group of intervention students who recalled seeing four or five classroom videos were statistically significant for four of the six outcomes: the amount of alcohol consumed in the past 30 days, the number of days on which the student had consumed alcohol in the past 30 days, the number of hits of marijuana in the past 30 days, and the number of days in the past month on which the student had taken one or more hits of marijuana. Inspection of the means presented in Table 1 shows that the change in alcohol and marijuana use from the time of the baseline assessment until the time of the follow-up assessment can be described as follows. At baseline, only the two video groups reported significantly different amounts of substance use, specifically on both smoking items and the number of marijuana hits. The levels of substance use reported by the control group and the two video groups were not significantly different. At the follow-up assessment, the control group reported more substance use than did the two intervention groups. When the follow-up substance use levels are

adjusted for differences in baseline substance use levels, it is clear that all three student groups reported more substance use during the course of the study. However, the increase in the amount and frequency of alcohol and marijuana use was least for the students who reported that they had seen four or five of the classroom videotapes while the greatest increase was demonstrated by control group students who had not seen any of the videotapes.

The adjusted mean difference between control students and the group of intervention students who recalled seeing fewer than four of the classroom videos was only borderline statistically significant for one outcome: the number of days on which the student had consumed alcohol in the past 30 days. Moreover, the difference between the two groups of intervention students was not statistically significant for any outcome. These two findings partially reflect the fact that the substance use reports of control students and of intervention students who reported seeing fewer than four videotapes exhibited more variability about the group means than did the reports of the intervention students who reported seeing four or five videos. With the increase in variability (and a decrease in the sample size of the target group), the likelihood of finding group mean differences decreased.

With respect to changes in the amount and frequency of alcohol, cigarette, or marijuana use in the 30 days preceding an assessment, we did not find any statistically significant differences between the students who reported seeing PSAs one or more times and the students who reported that they had not seen any PSA.

Discussion

The findings suggest that the classroom videos exerted an effect on adolescent substance use but that the PSAs did not. Intervention students who reported that they had seen four or five of the five videos experienced smaller increases in alcohol and marijuana use during the study period than intervention students who saw zero to three videos and the control students. However, study participants who reported seeing the PSAs on television one or more times did not exhibit different subsequent substance use experiences from those who reported not seeing the PSAs. The PSAs demonstrated no meaningful impact on middle-school students' use of alcohol, tobacco, or marijuana during the study period.

The effectiveness of the classroom videos supports the utility of this medium for delivering prevention content (Hecht et al., 1993). This was established among students who viewed videos covering all four of the resistance skills. Since the introductory video gave an overview of all four skills, those exposed to either the four resistance skill videotapes or the introductory videotape and three others appear to have received the necessary dosage or coverage. The fact that no differences emerged between control students and students who saw fewer than four videotapes suggests that students may derive little benefit if they do not receive information on how to use all four resistance skills. Differences became apparent between the control students and the intervention students who saw four or five videotapes, suggesting

that receiving information on how to use each resistance skill plays an integral role in achieving program impacts.

Limitations

The limits of the design do not support drawing definitive conclusions about the importance of having seen four or five videotapes because of a lack of student randomization to the two videotape groups. Students' school attendance patterns and educational aspirations (and correlates of those aspirations) probably played a large role in determining how many videotapes they saw. The difference among these students may be due to self-selection into two cohorts: the group of students who attend school and the group of students who do not. Hence, students in the first group (four or five videos) may have had greater probability of seeing all of the videotapes, whereas students in the second group (zero to three videos) may have been more likely to skip and, as a result, had the greater probability of seeing fewer videotapes. Research has shown that students who are less likely to attend school every day are less "bonded" to school, less likely to succeed academically, and more likely to engage in disruptive or delinquent behavior (including substance abuse) (Finn, Willert, & Marable, 2003; Steinberg, 1996). This difference among the students was not tested and may have contributed to the effects.

The PSAs did not appear to impact student substance use significantly. It may be that the DRS PSAs did not use sufficiently strong messages or that students did not view the PSAs with adequate frequency. In particular, the threshold of seeing the PSAs one or more times may not represent adequate exposure to provide benefits, and no measure existed to ascertain whether students viewed PSAs representing all four resistance skills. Additionally, the television stations donated the air time and/or accepted reduced fees for the PSAs. Consequently, DRS personnel could not exert a lot of control over their placement at particular times or in particular programs. Our design does not allow us to determine if these limitations manifested. However, this study suggests that PSAs may not provide added benefit over a school-based intervention which utilizes videotapes.

In addition to the above limitations, as students were not randomly assigned to the videotape or PSA groups, the reader is reminded that any of the observed group differences may actually reflect the impact of one or more unmeasured factors. Further, the outcomes of the analyses may stem partially from inaccuracies in the students' self-reports. Students had to recall the number of videos they viewed eight months previously. Although the television stations aired the PSAs closer to the time that students reported on viewing them, the fact that students in the intervention condition reported seeing the PSAs more often than the students in the control condition provides reason for concern. Students may have confused the terms PSAs and videos. The attempt to gather an independent measure of PSA exposure among control and experimental students did not clarify this issue. English/Spanish cards were distributed to all students with a dedicated phone number for them to call to report viewing the PSAs. The toll-free *kiR* number was also printed on all student

prizes distributed before the airing of the PSAs. Even though students could earn prizes for their calls, none called the number. A current DRS study of the *kiR* curriculum addresses these measurement concerns by keeping accurate records of students' attendance for each program lesson and providing a more accurate description of the *kiR* PSAs in the questionnaires.

In conclusion, this paper reports on follow-up analyses of the Drug Resistance Strategy Project's *keepin' it REAL* curriculum focusing on the mediated or video components. Our results support the efficacy of the classroom videos as vehicles for communicating prevention messages that impact adolescent substance use. However, we were unable to identify a similar effect for the PSAs designed to reinforce program content. These findings suggest that the content of the classroom lessons, including the videos, may have overridden any potential benefit of the PSAs. Future research needs to identify whether PSAs provide any value addition as a component of comprehensive campaigns and continue to refine our understanding of how prevention videos work to impact substance use. While previous research suggests that adolescents identify with these narrative-based videotapes and this identification mediates their effects on ATOD norms and use (Miller, Hecht, & Stiff, 1998), further research needs to specify these effects. The present study, however, provides evidence of their overall efficacy.

Practical Applications

These findings suggest several practical applications for successful prevention intervention design as well as for general classroom curriculum design. First, the addition of a media-driven message in which students readily picture themselves doing and practicing the presented skills can act as a valuable addition to any curriculum segment geared toward skill building (Miller-Day & Hecht, 2004). Another aspect of practical application relates to the importance of seeing skills put into action. Modeling behavior forms an essential element of successful instruction. Whether teachers provide modeling through direct instruction or students who already learned or are practicing the skill model it, the dual activities of visualization and imitation foster new skill acquisition. The use of familiar visual representations also benefits the learning process (Holleran et al., 2002). The reinforcement of "familiar" surroundings in which to demonstrate expectations for behavior within realistic settings enhances retention. Transfer is also more easily accomplished when learners can visualize themselves in a setting where the skill is appropriately used. For both prevention programming and the range of traditional academic instruction, these findings suggest that media-driven messages and demonstrations are an appropriate and effective vehicle for improved learning results, allowing students to retain easily the information and skills being taught, as well as transfer them to new settings.

The videos and PSAs validated the applicability of the message for the targeted population. The media component facilitated the realization by the students that local youth designed the intervention for other local youth. As schools now use the

intervention nationally and internationally, implementers may need to make an effort to re-create the “local flavor” of the students’ area. Replication and adaptation studies are needed as a means to maintain the unique, culturally grounded contribution made by *keepin’ it REAL* to the field of prevention research.

Conclusion

The *keepin’ it REAL* curriculum is a nationally recognized, communication-based, and culturally grounded substance use prevention intervention. Previous research has demonstrated its overall efficacy (Hecht et al., 2003). Prevention research has stressed the need for comprehensive programs as well as an understanding of the efficacy of individual components and their dosage. The present study explored the role of two key communication components—classroom videos and PSAs. This study contributes to prevention theory by demonstrating the efficacy of the classroom videos within the program and questioning the role of PSAs as part of this particular prevention campaign. It also suggests that the videos are a key component when the program is disseminated, a process that is ongoing with its selection as a federally recognized model program.

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