Development and Evaluation of an Interactive CD-ROM Refusal Skills Program to Prevent Youth Substance Use: "Refuse to Use"

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An interactive CD-ROM program designed to reduce adolescent substance use was developed and evaluated. The program uses video vignettes to teach refusal skills and socially acceptable responses to substance use situations, specifically offers of marijuana. In a randomized pretest-to-posttest experiment with 74 public school students from six classes in three high schools, significant changes were observed at posttest on (1) the adolescent's personal efficacy to refuse the offer of marijuana, (2) the adolescent's intention to refuse marijuana if offered, and (3) the adolescent's perceptions of the social norms associated with substance use and the importance of respecting another's decision to refuse a drug offer. In addition, adolescents in the treatment condition were able to recall approximately 50% of the portrayed refusal strategies. Findings are discussed with regard to the potential benefits of an interactive multimedia approach for conducting substance use interventions.

KEY WORDS: drug; refusal; CD-ROM; interactive; school.

INTRODUCTION

Substance use among our youth is a profound social issue. Although adolescent drug use had generally been in decline since the 1970s, this trend started to reverse in 1993 (Johnston *et al.,* 1994). The lifetime preva-

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lence rates among twelfth graders based on the Monitoring the Future Study for 1997 were as follows: alcohol, 81.7%; marijuana, 49.6%; cigarettes, 65.4%; inhalants, 16.9%; cocaine, 8.7%; LSD, 13.6%; and stimulants, 16.5% (Johnston *et al.,* 1998). In 1993, seniors' use of marijuana in the last year increased for the first time since 1985, with the largest annual percentage increase since the annual surveys of seniors began in 1975. By far, marijuana is the most widely used illicit drug, with 39% of seniors reporting some use in the past year and 24% reporting some use in the past month. Even among eight-grade students, marijuana has been used by almost 23% (Johnston *et al.,* 1998). Data from the National Household Survey on Drug Abuse (NHSDA, 1998) demonstrate similar use patterns. Nearly 10% of surveyed youth ages 12–17 were current marijuana users in 1997, with approximately 1.3 million users in this age group. The prevalence of current marijuana use among youth more than doubled from 1992 to 1997 and increased significantly between 1996 and 1997. Similar trends are evident among boys and girls, whites, blacks, and Hispanics, in all four geographic regions of the country, in both metropolitan and nonmetropolitan areas. These data suggest that drug use among youth continues to be a significant problem, and that adolescents are a particularly important target for interventions designed to reduce substance use.

Research has shown that drug use and abuse is influenced by multiple risk factors in the individual and the environment (Hawkins *et al.,* 1992). Some of the most commonly identified risk factors for adolescent substance use include associations with friends who use drugs, favorable attitudes and norms of youth and parents toward drug use, and early initiation of drug use (Hawkins *et al.,* 1992). A longitudinal study on children's initiation of smoking (Stanton and Silva, 1992) showed that at age 11, 36% of child smokers were in the company of a parent on the occasion when they last smoked, and 24% were with a friend (25% received the cigarette from a parent, 17% received the cigarette from a friend). By age 13, 65% of young smokers were with a friend (49% receiving the cigarette from the friend), as opposed to 10% who were with a parent. These findings clearly demonstrate the growing influences of peers and peer pressure with age (Stanton and Silva, 1992). For many adolescents compliance to peer pressure may be an acceptable price to pay for peer acceptance, especially if an individual sees the other person or persons as able to mediate reward, whether tangible or social (Connor, 1994).

Research supports the efficacy of programs that attempt to influence the youth attitude toward drugs and to provide effective methods of dealing with social influences to use (e.g., Ary *et al.,* 1990; Botvin, 1986; Flay, 1985; Hansen, 1992; Hansen *et al.,* 1988; Murray *et al.,* 1988; Schinke *et al.,* 1988). In a review of prevention studies published between 1980 and 1990, Hansen

(1992) concludes that the most promising strategy for prevention appears to be comprehensive, including multiple components that represent a wide variety of approaches toward prevention. The relationship of these various components to adolescent substance use requires that interventions pinpoint the social situations relevant to substance use and provide the most effective social responses for each situation. Research on related types of social behavior suggests that it is imperative to establish the social validity of skills (Kazdin, 1974, 1976; Minkin *et al.,* 1976) before including them in a skills training program. Moreover, it should also be noted that adults and adolescents differ with regard to the social behaviors they view as socially skilled (Williams *et al.,* 1988). Therefore, the effectiveness of resistance skills training in preventing adolescent substance use requires that we pinpoint the social situations relevant to adolescents with regard to substance use and the most effective social responses for each situation.

The medium used to communicate intervention messages is also important. Video is often used as a medium in interventions with adolescents. Video materials provide many educational advantages over didactic presentation and printed material, including control of the presented material, increased audience interest in the material, and simplification of the instructional task.

Interactive video material can modify the perceived norms of adolescent substance use behavior by showing adolescents discussing their desire to be drug-free, thus producing a normative context that is more desirable than what may have existed previously. In addition, interactive video material can model attitudinal statements that support learning refusal skills. By vicariously experiencing "real-life" drug use situations and the appropriate social norms, attitudes and beliefs that accompany effective refusal skills. The interactive format generally holds audience interest better than typical media or school lecture presentations. Within the interactive video format, the drug-free message can be presented in an appealing and cohesive manner that incorporates interesting and attractive adolescents with music, images, and relevant topics. A unique characteristic of interactive video materials is that they allow the presentation of precisely the information that is most important to promoting substance use prevention without any chance of the information being distorted or omitted by the instructor.

In order to create an intervention to help reduce substance use among adolescents, we developed and evaluated an interactive CD-ROM-based program that would extend beyond existing curricula, especially those that are primarily fact based. We use the interactive CD-ROM format because (1) it provides a unique opportunity to practice decision making and refusal skills relevant to potentially risky substance use situations, (2) it allows the user to dynamically select content areas of particular interest, (3) it focuses

attention and increases time on task compared to passive (noninteractive) media (such as linear video), and (4) it is easily disseminated.

The "Refuse to Use"[3] program was designed to provide the socially acceptable refusal skills needed to effectively deal with substance use situations, specifically, offers of marijuana. Marijuana was chosen because it represents the most widely used illicit drug among older adolescents and is the substance experiencing the largest increases in prevalence of current use. The intent of the program was to provide materials that would extend and amplify the impact of traditional educational programs offered through the home, school, and other social organizations (e.g., health departments, religious organizations).

METHODS

Program Development

The interactive program was developed for a multi-cultural population (three ethnicities: non-Hispanic Caucasian, African-American, and Hispanic) of high school-aged students. An element common to the development of the interactive program for each cultural population was the extensive use of focus groups (using adolescent focus group input for content and language) to identify critical situations and to enumerate key themes.

Participants. Four focus groups were conducted with high school age participants. One focus group involved Hispanic Youth ($N = 14$; 8 males and 6 females) recruited through a transitional program for nonnative English-speaking students from a large metropolitan school district (population >500,000). The second focus group consisted of African-American females ($N = 5$) recruited through an inner city African-American church from the same metropolitan area. The third and fourth focus groups were Caucasian males ($N = 8$) and mixed ethnic female ($N = 9$) high school adolescents recruited through a school-based health clinic from a school district in a medium sized metropolitan area (population >300,000). In addition, two middle-school focus groups were conducted involving a total of 19 Caucasian students (10 males and 9 females) who were recruited via flyers. In order to participate in the focus groups, all students under the age of 18 were required to have signed consent from a parent or legal guardian. In addition to parental consent, all adolescents provided their signed consent prior to the onset of each focus group.

Focus Group Protocol. Each focus group followed the same standard protocol which had been previously approved by a Human Subjects Internal Review Board (IRB). All focus groups were conducted by ethnically and gender appropriate facilitators. Project staff began by presenting focus group protocol which included: tape recording, voluntary participation, payment regardless of level of participation or completion of the focus group, information about our organization, respectful behavior toward other group participants, and anonymity (e.g., no names were to be used during the focus group, and no personal experiences were to be expressed). Following the explanation of the focus group protocol, informed consent was read and discussed to assure that all participants understood relative risks and benefits. After answering any questions, participants were asked to sign the consent and return it to the group facilitator.

The group facilitator proceeded to ask the focus group questions in the order specified in the protocol. A sample of the questions guiding the focus group discussions is given in Table I. Participants who remained silent were invited to share an opinion, yet reminded that it was their right to choose a comfortable level of participation. If a participant decided to leave prior to the end of the focus group, the cofacilitator walked the subject to the door, did a brief "process check" to see how the participant was feeling about the portion of the focus group that he/she had participated in, and paid him/her $15 dollars.

At the end of each focus group, a "process check" was conducted, asking participants how they felt about being in the focus group, comfort, enjoyment, etc. Subjects were paid cash in the amount of $15 dollars, thanked for their participation, reminded that everything said in the focus group was confidential, and sent on their respective ways.

Program Development Activities. Based on the information collected in the focus groups, a set of specific behavioral objectives was developed

Table I. Sample Focus Group Questions

1. What are the most common types of drugs used by your age group?
2. What are the bad things that happen when you do drugs?
3. In what kind of social situations do drug use offers usually occur?
4. What are the bad things that can happen by just being around people who are drinking or doing drugs?
5. What can you do to comfortably decline alcohol or drugs?
6. What can you comfortably say to decline alcohol or drugs?
7. How can you comfortably get out of a situation that is, or is becoming, risky?
8. If you are invited to a party or other social function and know ahead of time that drugs are involved, what can you do to increase your chances of not having to use drugs yourself?
9. What are some of the good things that happen when you don't do drugs?

and prioritized. The goals of the program were (a) to recognize the critical decision points that lead to high-risk situations, (b) to teach the social skills needed to deal effectively with substance use within the adolescent's social context, (c) to promote expectations that substance use behavior is not normative and is socially unacceptable, and (d) to prompt student discussion of substance use behaviors.

Six refusal skill vignettes incorporating these objectives were developed. Each vignette included a realistic and common situation relevant to refusal skills training for resisting offers of marijuana. Figure 1 presents the flowchart of the program illustrating the branching afforded the user by the interactive format. The flowchart shows how the story line connects the various vignettes, as well as the branches available to the user including on screen discussion questions. Rough scripts were then prepared from the designs and flowchart, using content and phrasing generated from the various focus groups.
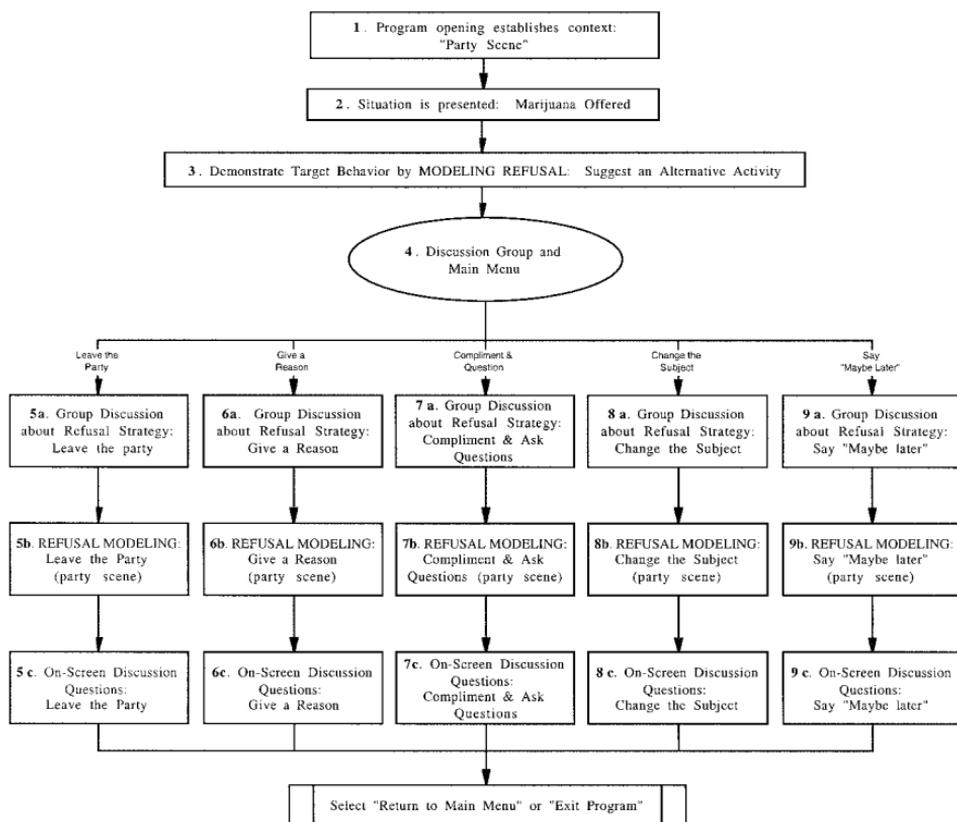

Fig. 1. Example of an interactive scenario flowchart.

In order to assure that the video-vignette scripts would be well received by high-school-aged students, an advanced high school drama class from a local school district was enlisted to review the scripts for each video vignette prior to actual production. These initial scripts were then critiqued by the high school drama class for language and credibility among this age group. Suggested changes in the content of the vignettes were reviewed by project staff and implemented where appropriate. The "Refuse to Use" CD-ROM program was designed to get teens thinking and communicating about the issues of drug use: resisting peer pressure, refusing drugs without rejecting friends, being prepared for the possibility of being asked to participate in drug use, and communicating and respecting personal limits. In choosing strategies for the characters, teens can see their choice modeled and vicariously experience how each strategy might play out in real life.

A curriculum guide including student handouts was produced to accompany the interactive CD-ROM program. The curriculum guide provided the teacher with complete information for using the program, suggestions for classroom discussions, and individual or group activities designed to aid students in developing useful prevention skills that they can apply to real-life situations.

Randomized Experiment to Evaluate Efficacy

The summary evaluation of the interactive refusal skills training program was conducted as a randomized pretest to post-test experiment. A total of $N = 74$ public school students (42 in the control condition and 32 in the experimental condition) from six classes in three high schools participated in the program's evaluation. Approximately 39% of the students were female and 61% were male. Students were from grades 9 through 12, with a mean age of 15.2 years (SD = 1.3 years). One class from each school was randomly chosen (a coin toss) as a control classroom, the other serving as the experimental classroom. Data from 65 participants (38 from control classrooms and 27 from the experimental classrooms) were included in the analyses. Exclusion from these analyses was primarily due to sample attrition, which was approximately 13% from pre to post assessments. The sample loss due to attrition was not different by condition.

Procedures. Following informed consent procedures, students completed a brief 11-item survey (see Table II) immediately prior to use of the program. The survey was completed "confidentially" (with coded numbers to link pretests with posttests). The teacher then presented the program to the class on a large monitor. The class interacted with the program collectively. That is, the class as a group made the decisions requested by

Table II. Questionnaire Items

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1. If someone you didn't know offered you marijuana at a party, how confident are you that you could refuse?
2. If a friend offered you marijuana at a party, how confident are you that you could refuse?
3. If offered marijuana in the next 6 months, how likely is it that you would refuse the offer?
4. If offered any illegal drug in the next 6 months, how likely is it that you would refuse the offer?
4. If a person tries to refuse a drug offer by just saying no thanks or using nonverbal signals, how *reasonable* is it for the person offering the drug to continued pressuring them to use?
6. Adolescents my age should be allowed to make their own decisions about using marijuana.
7. If I don't smoke marijuana I will feel left out of a group.
8. If I use marijuana I will be able to get away from my problems for a while.
9. Regardless of how someone tries to refuse a drug offer, how important is it that his/her decision not to use be respected?
10. If you were at a party, how confident are you that you could refuse the offer of any illegal drug?
11. How confident are you that you could refuse the offer of any illegal drug regardless of the situation?

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the program. On the following day, a brief posttest was administered. All questionnaires were collected by project personnel without the participation of the teacher. Students placed completed surveys in a locked box that only project personnel could open. All students were told that their answers would not be seen by school personnel or parents.

The questionnaire was developed according to the acceptability guidelines of the local school district. Subjects responded to the questions using 5- and 10-point Likert-type scales. Items relating to efficacy and intentions (items 1–5, 10, and 11) were scored on 10-point scales. Questions relating to social norms (items 6–9) were scored on 5-point scales. The posttest questionnaire administered to treatment subjects also asked respondents to identify by name the refusal skills portrayed in the vignettes.

RESULTS

A one-way multivariate analysis of variance (MANOVA) was conducted to examine pretest differences in response patterns for the two conditions. The overall MANOVA was not significant [$F(11,61) = 1.74$, $p = .085$ (the F statistic is an approximation based on Wilks' criterion)], indicating equivalence between experimental and control participants on the outcome measures.

In this study, classroom was the unit of randomization; thus classroom is an appropriate unit of analysis. The analysis of data that has a hierarchical

structure and contains measurements from different levels of the hierarchy requires techniques that are based on assumptions, which are in agreement with the data structure. This paper considers data collected in such a hierarchical fashion. Multivariate modeling of such data are most frequently done as if the data were obtained as a simple random sample from a single population (i.e., individual-level data). Hence, the standard assumption of independent and identically distributed observations is made. However, analyzing the data as a simple random sample ignores the potential interdependence within classrooms or clusters and can lead to inflated test statistics for estimated parameters and overall model fit. A hierarchical approach avoids these distortions. New analytic techniques that are more suited to the hierarchical data structure have recently emerged under the labels of hierarchical or multilevel models.

The differences between treatment and control subjects were compared using generalized estimating equations (GEE). GEE (Zeger and Liang, 1986) offers an approach to analyzing clustered observations that does not require one to specify the joint distribution of the dependent variable as does traditional analysis of variance. The general analytic strategy for using GEE on hierarchically nested data is to view the analysis as a regression model with correlated residuals.

GEE models can handle a variety of assumed correlation structures, usually referred to as the working correlation matrix, given that it is not expected to be correctly specified. Some common correlational structures, which can be handled using GEE, include (a) independence, (b) exchangeable, (c) autoregressive, and (d) unspecified. The exchangeable matrix was specified given the varying number of individuals within clusters. The pretest measure on the dependent variable was included in all model tests in the form of covariate.[4] In addition to the tests of the main effects, the interaction of condition with gender was of particular interest because significant interactions would suggest that the program effects varied across gender in the analysis.

The GEE analyses determined whether treatment classroom means of the outcome variables of interest at posttest were significantly different from the means of the control classrooms (i.e., Did the program have positive effects on the treatment classes?). Significant changes were observed at posttest for three separate outcome measures (1) the adolescent's personal efficacy to refuse the offer of marijuana, (2) the adolescent's intention to refuse marijuana if offered, and (3) the adolescent's perceptions of the social norms associated with substance use and the importance of respecting one's decision to refuse a drug offer.

[4]The analysis as conducted can be considered analogous to a mixed-model ANCOVA.

Efficacy of the Program: Treatment Versus Control

Efficacy (Item 1). The effect of the intervention on the adolescent's personal efficacy to refuse the offer of marijuana was significant ($t = 3.747$, $p < .01$), with adolescents exposed to the intervention having significantly greater self-efficacy about their refusal skills. Achieving statistical significance with a sample size of three classrooms in each condition indicates a large effect size for the intervention. The R^2 in this analysis was .64 (i.e., condition accounted for 64% of the variance in the efficacy measure). Cohen (1988) defines a "large" effect size as one that accounts for about 14% of the variance in the dependent measure.

Intent (Item 3). The effect for intention to refuse marijuana if offered was also significant ($t = 4.935$, $p < .01$). Adolescents in the treatment condition had significantly higher intentions to refuse marijuana than did adolescents in the control condition. The R^2 in this analysis was .66 (i.e., condition accounted for 66% of the variance in the efficacy measure).

Social Norms (Item 5). There was evidence that the intervention also increased adolescents' perceptions of the social norms associated with substance use ($t = -7.003$, $p < .01$). Adolescents in the treatment condition were more likely to agree that if an individual refused a drug offer, it would be unreasonable for the person offering the drug to continue pressuring them to use. The R^2 in this analysis was .35.

Social Norms (Item 9). A significant treatment by gender interaction existed for the perceived importance of respecting another individual's decision to refuse a drug offer. Females exposed to the intervention placed greater importance on respecting the decision to refuse a drug offer than did females in the control condition ($t = 6.102$, $p < .01$). No significant differences were found for adolescent males. The R^2 in this analysis was .27.

Recall of Refusal Strategies. Adolescents in the treatment condition were also asked to identify by name the different refusal strategies that were portrayed in the vignettes. On average, adolescents were able to recall approximately 50% (three of six) of the portrayed refusal strategies ($M = 2.70$, $SD = 1.51$). The most frequently recalled strategies included "change the subject" with 58.8% of the adolescents recalling this strategy, "compliment & question" (58.8%), "leave the party" (55.9%), and "maybe later" (50%).

DISCUSSION

The results of this study suggest that the use of an interactive multimedia approach for conducting substance use interventions was effective in

changing adolescent's personal efficacy, intentions, and perceptions of the social norms associated with marijuana use. The interactive nature of the program allowed participants to branch through different vignettes modeling offers of marijuana and refusal strategies and to branch to discussion questions regarding the different strategies.

Research evidence supports the efficacy of programs that attempt to influence youth attitude toward drugs and to provide effective methods of dealing with social influences to use (e.g., Ary *et al.,* 1990; Botvin, 1986; Flay, 1985; Hansen *et al.,* 1988; Murray *et al.,* 1988, 1989; Schinke *et al.,* 1988). Although the content of effective curriculum programs is quite diverse, there are common focus themes that emerge from these programs, including decision-making, resistance skills, and social competence. The interactive program evaluated in this study addressed these three themes.

Programs that include decision making typically focus on teaching youth how to identify problems, create solutions, and make choices among alternatives. In the case of substance use an individual must be able to identify situations which could lead to such behavior and the ways in which they could respond to those situations. In the "Refuse to Use" program, youth are provided with a common situation in which a drug offer might be made and a number of choices for how they might refuse the offer. With regard to resistance skills, the program teaches youth how to resist drug offers from peers by modeling skills for refusing such offers. This, in turn, is likely to increase perceived self-efficacy for resisting peer-related drug offers and enhance social competence by developing the cognitive skills to select appropriate drug refusal strategies to negotiate drug-related social situations (McFall, 1982).

Despite the positive results obtained in this study, several limitations should be noted. The focus of the interactive program was on refusal of marijuana offers, specifically. The effects for self-perceptions of efficacy and intentions were limited to marijuana use and did not appear to generalize to substance use in general. Thus, the effects of interventions such as these may be somewhat substance specific. The sample of subjects was not a probability sample and was drawn only from schools in Oregon.

Limitations

Although a clear strength of the CD-ROM approach to program implementation is its easy dissemination, the limitations of the approach in comparison to state-of-the art prevention intervention programs should be noted. The best prevention programs include proven skills training components that involve instruction and demonstration of specific skills

and an opportunity for students to practice the skills themselves through behavioral rehearsal scenarios. A trained program provider who reinforces each participant for the positive elements of his or her performance, then provides feedback concerning the strengths and weaknesses of their skills performance. Moreover, extended opportunities for additional practice of the target skills outside the classroom are generally provided for through behavioral ''homework'' assignments.

Although the comparison of the CD-ROM based approach to the more in-depth prevention intervention program was beyond the scope of the present study, clearly there is a need to assess the relative efficacy of the CD-ROM approach compared to more in-depth prevention programs that include skills training, feedback, and peer discussion led by trained professionals. It is hoped that these findings will prompt future studies designed to establish the viability of the CD-ROM approach compared to the more typically implemented prevention program.

A second caveat, with respect to interpretation of these findings, is the overall design of the study. Given the small sample size, the short, 1-day follow-up assessment, and the limited duration of the CD-ROM intervention, we must acknowledge that the effects found here may be short-lived and may not hold over time. In addition, because the sample included only students from grades 9 through 12, the findings are not easily generalizable to all adolescents (e.g., middle or junior high school age). Many prevention programs are delivered during early adolescence at a time when students begin to experiment with tobacco, alcohol, and other drugs. Therefore, caution should be exercised in the generalizability of the results when comparing these findings to those of other prevention efforts.

Summary

Despite these limitations, the interactive CD-ROM paradigm may represent an affordable and widely disseminable intervention approach that is applicable for use in (1) schools [e.g., classroom presentation with teacher guidance, small groups, or individual students], (2) homes [e.g., use by parent and child prompting parent-child discussions of relevant substance use issues], and (3) various community organizations interested in promoting the positive socialization of our youth.

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REFERENCES

Ary, D. V., Biglan, A., Glasgow, R., Zoref, L., Black, C., Ochs, L., Severson, H., Kelly, R., Weissman, W., Lichtenstein, E., Brozovsky, P., Wirt, R., and James, L. E. (1990). The efficacy of social-influence prevention programs vs "standard care": Are new initiatives needed? *J. Behav. Med.* 13: 281–296.

Bandura, A. (1969). *Principles of Behavior Modification,* Holt, Rinehart and Winston, New York.

Botvin, G. J. (1986). Substance abuse prevention research: Recent developments and future directions. *J. School Health* 56: 369–374.

Connor, M. J. (1994). Peer relations and peer pressure. *Educ. Psychol. Pract.* 9: 207–215.

Flay, B. R. (1985). Psychosocial approaches to smoking prevention: A review of findings. *Health Psychol.* 4: 449–488.

Hansen, W. B. (1992). School-based substance abuse prevention: A review of the state of the art in curriculum, 1980–1990. *Health Educ. Res.* 7: 403–430.

Hansen, W. B., Graham, J. W., Wolkensteing, B. H., Lundy, B. Z., Pearson, J. L., Flay, B. R., and Johnson, C. A. (1988). Differential impact of three alcohol prevention curricula on hypothesized mediating variables. *J. Drug Educ.* 18(2): 143–153.

Hawkins, J. D., Catalano, R. F., and Miller, J. Y. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psych. Bull.* 112: 64–105.

Johnston, L. D., O'Malley, P. M., and Bachman, J. G. (1994). *National Survey Results on Drug Use from the Monitoring the Future Study, 1975–1993,* U.S. Department of Health & Human Services, PHS, NIH, Rockville, MD.

Johnston, L. D., O'Malley, P. M., and Bachman, J. G. (1998). *National Survey Results on Drug Use from the Monitoring the Future Study, 1975–1997,* U.S. Department of Health & Human Services, PHS, NIH, Rockville, MD.

Kazdin, A. E. (1974). Effects of covert modeling and model reinforcement on assertive behavior. *J. Abnorm. Psychol.* 83: 240–252.

Kazdin, A. E. (1976). Effects of covert modeling, multiple models, and model reinforcement on assertive behavior. *Behav. Ther.* 7: 211–222.

McFall, R. M. (1982). A review & reformulation of the concept of social skills. *Behav. Assess.* 4: 1–33.

Minkin, N., Braukmann, C. J., Minkin, B. L., Timbers, G. D., Timbers, B. J., Fixsen, D. L., Phillips, E. L., and Wolf, M. M. (1976). The social validation and training of conversational skills. *J. Appl. Behav. Anal.* 9: 127–139.

Murray, D. M., Davis-Hearn, M., Goldman, A. I., Pirie, P., and Luepker, R. V. (1988). Four- and five-year follow-up results from four seventh-grade smoking prevention strategies. *J. Behav. Med.* 11: 395–405.

National Household Survey on Drug Abuse (1997). The Substance Abuse and Mental Health Data Archive (SAMHDA). Preliminary Results From 1997. http://www.icpsr.umich.edu/SAMHDA/

Schinke, S. P., Botvin, G. J., Trimble, J. E., Orlandi, M. A., Gilchrist, L. D., and Locklear, V. S. (1988). Preventing substance abuse among American-Indian adolescents: A bicultural competence skills approach. *J. Counsel. Psychol.* 35: 87–90.

Stanton, W. R., and Silva, P. A. (1992). A longitudinal study of the influence of parents and friends on children's initiation of smoking. *J. Appl. Dev. Psychol.* 13: 423–434.

Williams, S. L., Walker, H. M., Holmes, D., Todis, B., and Fabre, T. R. (1988). Social validation of adolescent social skills by teachers and students, Unpublished manuscript, University of Oregon, Eugene.

Zeger, S. L., and Liang, K. Y. (1986). The analysis of discrete and continuous longitudinal data. *Biometrics* 42: 121–130.