

## **SOCIAL INFLUENCES APPROACH TO SMOKING PREVENTION: THE EFFECTS OF VIDEOTAPE DELIVERY WITH AND WITHOUT SAME-AGE PEER LEADER PARTICIPATION**

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**Abstract** — This study tested the hypothesis that cigarette smoking adoption among adolescents could be suppressed by providing school-based videotape instruction for resisting social influences to smoke. The utilization of same-age peer leaders was also varied to test whether their participation in the classroom would enhance program effects. Seventh grade students ( $N = 540$ ) from one junior high school in Southern California were randomly assigned by classrooms ( $N = 15$ ) to: (a) videotape instruction, (b) videotape instruction plus peer leader involvement, or (c) survey-only. Seventh grade students ( $N = 234$ ) in a second junior high school served as a measurement-only control. Assessments were conducted at the beginning and end of the academic year. Results revealed a marked suppression in the onset of both experimental and regular smoking among those students exposed to the pressure resistance training with peer leader involvement. Pressure resistance training without peer leader involvement produced a more variable and less powerful effect on students' smoking behavior. Data collected on students' use of alcohol and marijuana revealed a generalized suppression effect, albeit weaker than for tobacco, among those students exposed to the social resistance training with peer leader involvement. Results provide further encouraging support for the use of peer-led pressure resistance training in preventing adolescent drug use.

Recently, there has been a major shift toward the development of smoking prevention programs aimed at combating social influences that promote the onset of tobacco use (Flay, 1985; Killen, 1985). The available evidence has demonstrated that smoking prevention programs which teach students to resist pressures from peers and media influences are effective in lowering smoking onset rates (Botvin & Eng, 1980; Evans et al., 1978; Flay et al., in press; Hurd et al., 1980; Luepker, Johnson, Murray, & Pechacek, 1983; McAlister, Perry, Killen, Slinkard, & Maccoby, 1980; Schinke, Gilchrist, & Snow, 1985; Telch, Killen, McAlister, Perry, & Maccoby, 1982). Despite the encouraging results achieved with the social influences approach to smoking prevention, little is known about the specific effects of the individual components that make up these multifaceted programs (McCaul & Glasgow, 1985). Investigations designed to assess the influence of individual program components are needed to help clarify how these programs exert their effects.

This article presents preliminary results on the efficacy of a videotape version of a previously studied peer-led smoking prevention program, that is, Project C.L.A.S.P. (McAlister et al., 1980; Perry, Killen, Slinkard, & McAlister, 1980; Telch et al., 1982). The utilization of same-age peer leaders was varied to test whether their participation in the classroom would enhance program effects. It was hypothesized that the videotape program with same-age peer leader participation would be more effective in lowering smoking onset rates than the videotape program without peer leader participation. It was also hypothesized

Table 1. Demographic characteristics of the study population

Demographic Variable	Experimental Condition			
	Tape Program with Peers (N = 121)	Tape Program without Peers (N = 116)	Control 1 (N = 200)	Control 2 (N = 135)
Sex (%)				
Male	56.2	50.9	54.0	51.9
Female	43.8	49.1	46.0	48.1
Race (%)				
White	18.2	22.4	24.0	31.9***
Black	21.5	18.1	22.0	4.4
Hispanic	19.0	14.7	15.5	28.1
Asian	29.8	29.3	26.0	11.9
Other	11.6	15.5	12.5	23.7
Age				
Mean	12.4	12.6	12.6	12.3
SD	0.8	0.7	0.8	0.6
Parents' education (%)				
Father attended college	35.5	37.9	39.5	26.7**
Mother attended college	38.0	46.0	40.5	36.3*

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

that students exposed to the videotape program, regardless of peer leader participation, would show a lower smoking onset rate than students not receiving the videotape program.

## METHOD

### Subjects

Seventh grade students attending two junior high schools in Southern California took part in the study. Complete pre- and posttest data were obtained on 572 students (81% of the original pretest sample). Demographic characteristics of the study cohort broken down by experimental condition is presented in Table 1.

### Experimental design

Seventh grade students ( $N = 540$ ) enrolled in social studies classes ( $N = 15$ ) in School 1 were randomly assigned by classroom to the following conditions: (a) videotape social pressure resistance training with peer leader involvement, (b) videotape social pressure resistance training alone, or (c) survey-only. To examine the diffusion of program effects to survey-only classes within the intervention school, social studies classes in a second nontreated school served as a measurement-only control. Assessments were conducted at the beginning (October) and end (May) of the 1984–1985 academic year.

### Procedure

At each assessment, subjects were administered a 13-page questionnaire assessing their use of tobacco, alcohol, and marijuana. In addition to drug use, the survey included items assessing: (a) demographic information; (b) psychosocial factors including peer smoking, parental smoking, and participation in extracurricular activities; (c) beliefs concerning tobacco, alcohol, and marijuana; (d) behavioral intentions concerning future use of tobacco, alcohol, and marijuana; and (e) perceived self-efficacy for resisting pressures to use tobacco,

alcohol, and marijuana. Expired air carbon monoxide was collected on all students just prior to questionnaire administration and then analyzed using an Energetics Model 2000 Ecolyzer. Saliva samples were also collected prior to questionnaire completion using a variant of the "bogus pipeline" procedure (Evans, Hansen, & Mittlemark, 1977).

Prior to pretesting, class lists were obtained and all students were assigned a unique identification code. Each student's survey contained the code, thereby enabling the longitudinal tracking of subjects without requiring the submission of questionnaires bearing the students' names.

### *Experimental conditions*

*Social Pressures Resistance Training.* In this condition students received social pressures resistance training as part of their regular social studies classes. The program consisted of a five-session interactive videotape program conducted over a three-week period. Classes were led by the students' regular classroom teachers. A 90-minute teacher inservice was provided to acquaint teachers with the program, and to instruct them on various aspects of program implementation. Each teacher was given a program manual outlining procedural steps for each of the five sessions.

The videotape program, entitled "Resisting Pressures to Smoke" was based on our previous peer-led program Project C.L.A.S.P. (McAlister, Perry, & Maccoby, 1979; McAlister et al., 1980; Telch et al., 1982). In session 1, students learned of the various immediate negative consequences resulting from cigarette smoking and were provided an introduction to the social pressures which influence young people to smoke. In session 2, students viewed a game show ("Don't Be A Sucker") in which examples of pressures to smoke from peers, media, and older role models were presented, and effectiveness resistance strategies were modeled. Following the game show the class was broken into small groups and asked to devise and rehearse their own effective counter arguments to various inducements to smoke.

In session 3, students were presented with three increasingly active types of counterarguing strategies for resisting smoking appeals from peers. These included: (a) simply saying "no"; (b) saying "no" and giving a reason (e.g., I don't want my hair and clothes to smell like smoke); (c) saying "no," giving a reason, and going on the offensive (i.e., attempting to persuade the person who administered the appeal to give up smoking). To enhance skill acquisition, each class was divided into two teams. Representatives from each team were presented vignettes in which they were asked to enact the three types of counterarguing strategies in front of the class. Classmates judged the winning responses to the vignettes by a show of hands.

In session 4, students learned more specifically about pressures from cigarette advertisements and what they could do to resist media appeals. Several well-known ads were presented and discussed. Students also completed a worksheet in which they were asked to write down a specific response to the question "What could you say to yourself to resist this advertising pressure?"

In session 5, the principles from the previous four lessons were reviewed. Students completed a worksheet in which they were asked to list their reasons for and against smoking. Following a brief discussion of their responses on the worksheet, students observed adolescents on the tape being exposed to inducements to smoke. At the decision point, the tape would pause and the teacher would select 3-5 students to give their response to what they would do if they were in that pressure situation.

*Social Resistance Training with same-age peer leaders.* In this experimental condition, students received the videotape social pressures resistance training described above. In addition, same-age peer leaders were used to provide popular role models advocating a

nonsmoking position. The procedure for utilizing same-age opinion leaders was a modification of that reported by the Minnesota research group (i.e., Hurd et al., 1980; Luepker et al., 1983). Students in this condition were asked at the first survey to write down the names of two boys and two girls in their class whom they respected and who would be good at leading classroom discussions on why students should not smoke. The two boys and two girls receiving the most votes in each classroom were selected to serve as peer leaders. Those selected were invited to attend a one-hour meeting after school with a member of the research team to discuss basic information on smoking and group processes. During the latter half of the training session peer leaders were broken into groups of four and given an opportunity to rehearse how they would lead their respective discussion groups on why students should not smoke.

*Intervention school control.* In this condition, students enrolled in randomly selected social studies classes within the treatment school completed the self-report questionnaire and the carbon monoxide and saliva tests but did not receive the smoking prevention curriculum. It was presumed that students in these classes might still be influenced indirectly from the program via normative changes in the school brought about as a result of the smoking prevention program.

*Survey only control school.* Students attending a second school in which the smoking prevention program was not offered, completed the self-report questionnaire and carbon monoxide and saliva tests at the beginning and end of the school year.

## RESULTS

Chi square analyses were performed on the demographic variables to test for pretest differences among the four experimental conditions. No significant differences were found on any of the demographic factors among the three experimental conditions (i.e., tape program plus peers, tape program, measurement control) in the intervention school. Students in control 2 (i.e., reference school control) had a significantly different ethnic and SES profile compared to students in the other three experimental groups. The reference school had a significantly greater percentage of white and hispanic students and fewer asians compared to the intervention school. Significantly fewer parents in Control 2 had attended college compared to the other three experimental conditions (see Table 1).

Student's reported use of tobacco, alcohol and marijuana is presented in Table 2.

At pretest, no significant differences were found on students' reported use of tobacco, alcohol, or marijuana among the first three experimental groups. However, students enrolled in the Control 2 reference school reported a significantly higher prevalence of tobacco and alcohol use at pretest and a lower proportion of students reporting no use of marijuana (See Table 2).

### *Transition from nonsmoking to experimental smoking*

To clarify the effects of the program components on smoking adoption, separate posttest analyses were conducted on the cohort of students ( $N = 441$ ) reporting no smoking at pretest. Results of these analyses are illustrated in Figure 1.

Experimental smoking (defined as smoking less than once per week) onset rates at posttest among the four experimental conditions were as follows: Tape Program with Peers - 2.1%, Tape Program without Peers - 7.4%, Control 1 - 8.0%, and Control 2 - 10.1%. Chi square analyses performed on the proportion of pretest nonsmokers who reported experimental smoking (i.e., less than once a week) at posttest revealed a significantly lower onset rate for Group 1 (tape program plus peers) compared to the other three conditions  $\chi^2(1) = 4.4$ ,

Table 2. Reported drug use broken down by experimental condition

Substance	Tape Program with Peers	Experimental condition		
		Tape Program without Peers	Control 1	Control 2
<b>Tobacco</b>				
Never used (%)				
Pre	77.7	80.2	80.5	58.5***
Post	75.2	70.7	69.5	47.4***
Experimental use (%)				
Pre	22.3	18.1	18.5	34.1**
Post	24.0	24.1	25.0	40.7***
Regular use (%)				
Pre	0.0	1.7	1.0	7.4**
Post	0.8	5.2	5.5	11.9**
<b>Alcohol</b>				
Never used (%)				
Pre	89.3	91.4	91.5	80.8*
Post	81.8	85.3	83.5	67.7***
Experimental use (%)				
Pre	7.4	5.2	6.0	13.3***
Post	13.2	7.8	9.5	22.0***
Regular use (%)				
Pre	3.3	3.4	2.5	5.9
Post	5.0	6.9	7.0	10.3
<b>Marijuana</b>				
Never used (%)				
Pre	97.5	93.9	98.0	91.9*
Post	96.7	88.8	93.0	79.3***
Experimental use (%)				
Pre	0.8	2.6	2.0	4.4
Post	2.5	6.0	3.5	10.4*
Regular use (%)				
Pre	1.7	3.5	0.0	3.7
Post	0.8	5.1	3.5	10.4**

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

$p < .05$ . Experimental smoking onset rates among the other three experimental conditions were not significantly different.

#### *Transition from nonsmoking to regular smoking*

None of the students exposed to the experimental curriculum (with or without peer leader involvement) reported regular smoking (i.e., at least once per week) at posttest. Four students (2.5%) in Control 1 and two students (2.2%) in Control 2 reported no smoking at pretest but regular smoking at posttest. Comparisons between the two intervention groups versus control 1 were significant [ $\chi^2(1) = 4.7, p < .05$ ] as well as the comparison between the two intervention groups versus the two control conditions [ $\chi^2(1) = 4.6, p < .05$ ]. No other comparisons were significant.

#### *Transition from experimental smoking to regular smoking*

To examine the program's effect on the transition from experimental to regular smoking, analyses were conducted on those 131 students who reported some experimentation

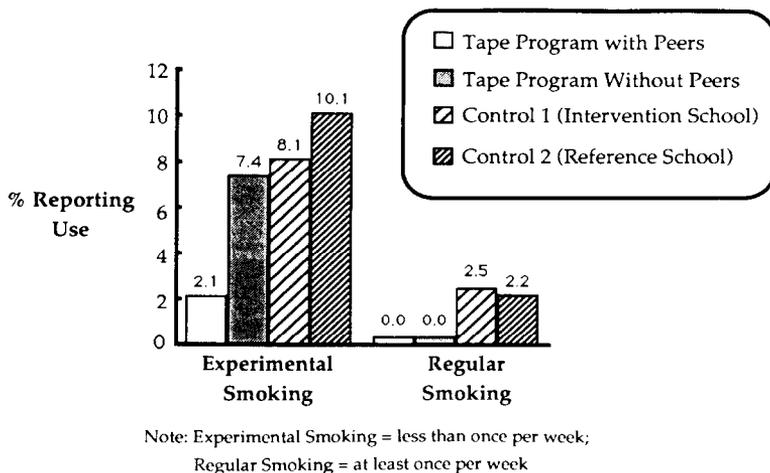


Fig. 1. Onset of experimental and regular cigarette smoking at posttest among students ( $N = 441$ ) who reported never smoking cigarettes at pretest.

with tobacco at pretest but no regular smoking. Rates of regular smoking adoption at posttest were as follows: Tape Program with Peer Leaders - 3.7%, Tape Program without Peer Leaders - 28.6%, Control 1 - 18.9%, and Control 2 - 30.4%. These differences were significant [ $\chi^2(3) = 8.0, p < .05$ ]. Multiple comparisons among the four conditions revealed that students exposed to the Tape Program with Peer Leaders had a significantly lower adoption rate of regular smoking compared to the Tape Program without Peer Leaders [ $\chi^2(1) = 5.9, p < .05$ ]; Control 1 [ $\chi^2(1) = 3.3, p < .10$ ]; and Control 2 [ $\chi^2(1) = 7.5, p < .01$ ]. No other comparisons were significant.

#### *Generalization effects to alcohol and marijuana*

To test the generalization effects of the smoking prevention curriculum, posttreatment adoption rates of marijuana and alcohol use were compared across the four experimental conditions. With regards to alcohol, posttreatment adoption rates among those students ( $N = 478$ ) reporting no use at pretreatment were as follows: Tape Program with Peer Leaders - 7.7%, Tape Program without Peer Leaders - 11.9%, Control 1 - 13.9%, and Control 2 - 21.0%. Differences in alcohol adoption rates between the four conditions were significant [ $\chi^2(3) = 8.0, p < .05$ ]. Both of the social pressures training conditions exhibited a lower alcohol adoption rate than Control 2 [ $\chi^2(1) = 7.4, p < .01$ ;  $\chi^2(1) = 3.5, p < .10$ ]. Moreover, the combined social pressures training conditions showed a significantly lower alcohol adoption rate than Control 1 and Control 2 combined [ $\chi^2(1) = 4.5, p < .05$ ].

With regards to marijuana, posttreatment adoption rates among those students ( $N = 523$ ) reporting no use at pretreatment were as follows: Tape Program with Peer Leaders - 2.6%, Tape Program without Peer Leaders - 4.7%, Control 1 - 3.7%, and Control 2 - 8.8%. Overall differences in marijuana adoption rates between the four conditions approached significance ( $p = .14$ ). None of the multiple comparisons were significant, with the exception that students exposed to the Tape Program with Peer Leaders showed a significantly lower rate

of marijuana use compared to Control 2 [ $\chi^2(1) = 4.1, p < .05$ ].

#### DISCUSSION

Results of the present study lend support for the use of peer-led social pressures resistance training in suppressing the adoption of cigarette smoking among junior high school students. Comparisons between the videotape social pressures curriculum with and without peer leaders consistently yielded superior effects for the peer-led program. Nonsmoking students exposed to the peer-led program exhibited a significantly lower rate of onset for both experimental and regular smoking. Of particular interest was the finding that pretest experimental smokers assigned to the peer-led prevention condition showed a five- to seven-fold reduction in the onset of regular smoking at posttest compared to the other three experimental conditions. These findings are consistent with those of Murray, Richards, Luepker, and Johnson (1987) who found some evidence for an enhanced program effect with the use of same-age peer leaders.

We can only speculate as to the processes by which peer leaders exert their effect. One possibility is that the use of peer leaders increases program credibility, which in turn enhances students' attention to the pressure resistance skills that are being taught. The use of peer leaders may also serve to facilitate normative changes concerning cigarette smoking. Witnessing popular peers lead discussion groups on coping with pressures to smoke may serve to "legitimize" nonsmoking by altering students' perceived consequences for resisting social appeals.

Interpretation of the effects of the smoking prevention curriculum without peer leaders is difficult. On most indices of smoking behavior, the program without peer leaders fared no better than the intervention school control (i.e., Control 1). However, it is not clear as to whether this is due to the failure of the program without peer leaders or because the program's effects were obscured by the potential diffusion effects that may have occurred among students assigned to the intervention school control. Comparisons between the intervention school control and the reference school control (i.e., Control 2) support the diffusion hypothesis. However, despite the consistently higher smoking onset rates found in the reference school control, differences in pretreatment smoking, SES, and ethnicity between the intervention and reference school preclude any meaningful conclusion regarding the diffusion issue. While we cannot rule out the possibility that the randomization by classroom resulted in some level of diffusion, the magnitude of the treatment effects within the intervention school argues against such an explanation.

Several elements of the study design help to rule out potential rival hypotheses that were present in our earlier work (Telch et al., 1982) and the work of other researchers in the field (see Flay, 1985, for an excellent review of the methodological issues in the smoking-prevention literature). First, it is unlikely that the superiority of the peer led condition was due to pretest differences among students. Students within the same school were randomly assigned by classroom to the first three experimental conditions. As a result, the first three experimental groups were equivalent on relevant student characteristics (e.g., pretest level of drug use, SES, ethnicity, etc.) and school factors (e.g., presence of designated smoking area, endogenous health education, etc.). Second, a measurement by treatment interaction or Hawthorne effect can be ruled out, since both social pressures conditions had equal amounts of attention from the teacher and data collection team. Third, individual students were tracked during the study period, thus eliminating the possibility that program effects were due to changes in the make-up of cross-sectional samples.

Several limitations of the study also need to be considered. First, the interventions were implemented in only one school. Despite the random assignment of classes to conditions, it is possible that the suppression of adoption rates among students receiving the peer-led intervention was all or in part a function of factors idiosyncratic to the make-up of the classes receiving that intervention. Second, while the first year posttest data are quite encouraging, the long-term durability of these effects needs to be established. Nevertheless, these data provide encouraging support for the thesis that the onset of drug use among adolescents can be suppressed through an easily transportable videotape delivery of social pressures resistance training with same-age peer involvement.

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