

---

# A Psychosocial Approach to Smoking Prevention for Urban Black Youth

GILBERT J. BOTVIN, PhD  
HORACE W. BATSON, PhD  
SYLVIA WITTS-VITALE, MA  
VALERIE BESS, MS  
ELI BAKER, PhD  
LINDA DUSENBURY, PhD

All the authors are with Department of Public Health, Cornell University Medical College. Dr. Botvin is an Associate Professor in that department and in the Department of Psychiatry as well as Director of the Laboratory of Health Behavior Research. Dr. Batson is a Senior Research Associate, Ms. Witts-Vitale and Ms. Bess are Research Assistants, and Dr. Baker and Dr. Dusenbury are Assistant Professors.

This research was supported by Contract No. N01-CN-65408 from the National Cancer Institute.

Tearsheet requests to Dr. Gilbert J. Botvin, Cornell University Medical College, 411 East 69th St., Room KB 201, New York, NY 10021.

## Synopsis .....

*Despite the high rates of smoking-related cancers among black Americans, little is known about the*

*type of smoking prevention program that might be effective with black youth. The current study pilot-tested a promising smoking prevention approach to determine its feasibility, acceptability, and effectiveness. A total of 608 students in nine predominantly black urban junior high schools were stratified by community and randomly assigned to treatment and control conditions. Students in the treatment condition participated in a 12-session smoking prevention program which taught resistance skills and general life skills.*

*Process data indicated that this prevention approach was feasible and acceptable to students, teachers, and administrators. Outcome data indicated that this program reduced the proportion of children who smoked in the past month by 56 percent, and it increased knowledge of the adverse consequences of smoking and normative expectations concerning adult and peer smoking. These results are discussed in terms of their implications for prevention and modifications which might further strengthen the efficacy of this approach for urban black adolescents.*

---

**B**LACKS COMPRISE THE LARGEST ETHNIC minority group in the United States and, as a group, have the highest overall age-related cancer incidence and mortality rates. Age-adjusted incidence and mortality rates for adult blacks and whites in the United States show large racial-ethnic differences among the cancer sites that are linked with smoking and drinking patterns; these differences are most pronounced between black and white men. Blacks, in general, and black men in particular, have higher age-adjusted incidence and mortality rates of cancer of the lung, esophagus, larynx, and buccal cavity than whites.

Given these differences in the rates of smoking-related cancers, it is not surprising to find similar differences between blacks and whites in the rates of smoking. Thirty percent of deaths from cancer are attributable to tobacco and, while blacks are reportedly lighter smokers than whites, the proportion of black men who smoke is dramatically higher than that of white men. Specifically, 45

percent of black men smoke compared with 37 percent of white men. Racial differences in terms of smoking rates among women are not as clear, however; 31 percent of black women and 30 percent of white women smoke.

Smoking usually begins during adolescence. Although it is clear that smoking differences exist between black and white men, these differences are not evident in adolescence; that is, black and white adolescents have essentially the same smoking prevalence rates. However, there may be differences in the pattern of onset, with black youth beginning to smoke somewhat later than white youth.

Effective approaches for decreasing the proportion of blacks who smoke cigarettes are of great importance because they would reduce the incidence and mortality attributable to smoking-related cancers (for example, cancer of the esophagus, larynx, and lung). Attempts to develop effective methods to help adults quit smoking have been only moderately successful (1-3). As a conse-

Table 1. Percentage distribution of the baseline and matched pretest—posttest samples, by sex and race

Variable	Pretest sample (N = 608)	Pre- and posttest sample (N = 520)
Sex:		
Males .....	46	46
Females .....	54	54
Race:		
Black .....	87	86
White .....	1	1
Hispanics .....	10	12
Other .....	2	1

Table 2. Percentage distribution of certain characteristics of black students in the matched pretest-posttest sample, treatment and control groups

Variable	Treatment (N = 159)	Control (N = 281)	Combined (N = 440)
Male .....	40	50	46
Female .....	60	50	54
Father attended college .....	41	45	43
Mother attended college .....	41	47	45
Academic performance (As) <sup>1</sup> ...	3	5	4

<sup>1</sup> Percentage of students who usually received As.

Table 3. Rates of parental consent (in percentages) for seventh graders to participate in a smoking prevention program

Condition	Overall return rate	Positive	Negative
Treatment .....	84	94	6
Control .....	88	95	5
Combined .....	87	95	5

NOTE: Excludes students who were unavailable for the study (for example, transferred, truant, wrong grade, and so forth) whether or not they returned consent forms before they became ineligible. Positive and negative consent rates were computed on students who returned consent forms.

quence, increasing emphasis has gradually been placed on the development of effective prevention strategies. Because the onset of cigarette smoking typically occurs during adolescence, the optimal time to implement prevention programs would appear to be early adolescence.

Traditional prevention approaches that focus solely on providing information concerning the adverse health consequences of smoking have consistently been demonstrated to be ineffective. However, the efficacy of smoking prevention approaches that target the psychosocial factors promoting cigarette smoking has recently been demonstrated (4,5). Researchers have developed and tested interventions based on the pioneering work of Evans and his associates (6) that are

designed to increase adolescents' resistance to social influences to smoke (7-9). Other researchers (10,11) have utilized cognitive-behavioral techniques to teach both smoking refusal skills and general life skills. Both approaches have been found to reduce cigarette smoking significantly, with reductions ranging from 35 percent to more than 80 percent when compared with controls.

A major limitation of this research is that these approaches have been tested almost exclusively on white, middle-class adolescents. Little is known concerning the efficacy of these approaches for urban black populations. Moreover, since there is a paucity of research concerning the etiology of smoking among minority populations, little empirical data exist that might guide efforts to refine either current prevention models or develop new models suitable for black youth. Consequently, additional research is needed to increase our understanding of the factors promoting cigarette smoking among black adolescents and the efficacy of promising prevention approaches.

The purpose of this study, therefore, was to provide an initial test of a promising prevention approach to determine its feasibility and acceptability to urban black junior high school students as well as the appropriateness of the curriculum materials and evaluation questionnaires. In addition, the practical issue of implementing the curriculum within urban minority schools was examined. Although not intended as a definitive test of the effectiveness of this intervention, outcome measures were included to assess the impact of this approach on smoking and smoking-related variables. Thus, this study was intended to obtain information which would be used to refine further a recently developed preventive intervention, the curriculum materials, and data collection protocols.

## Methods

**Subjects.** This study was conducted in nine urban junior high schools in northern New Jersey with predominantly black students. A total of 608 seventh grade students participated in the pretest. Of these, 221 were in the treatment group and 387 in the control group. The sample was 87 percent black, 1 percent white, 10 percent Hispanic, and 2 percent other. Furthermore, 54 percent of those in the sample were girls, and 46 percent boys; 47 percent of the students lived in two-parent families, and 43 percent lived only with their mother.

Table 1 presents the characteristics of the baseline (pretest) sample and the matched pretest-

posttest sample. The samples were virtually identical despite the fact that the matched sample with 520 students was smaller than the initial pretest sample. Both samples were predominantly black students and had slightly fewer boys (46 percent) than girls (54 percent).

Table 2 presents the characteristics of the 440 black youths in the treatment and control groups. As was true for the overall sample, there were slightly fewer boys (46 percent) than girls (54 percent). Approximately 43 percent of the students' fathers and 45 percent of their mothers had at least attended college. Both groups were roughly comparable in terms of indicators previously found to be associated with cigarette smoking (for example, parent's education and child's academic performance). However, the treatment group of 159 contained fewer students than the control group of 281, and the percentage of males (40 percent) was lower than that of the control group (50 percent).

**Parental consent.** Unlike many previous smoking prevention studies which have used passive consent, a conventional active parental consent procedure was used. Obtaining active parental consent was both difficult and complicated in this study. A 7-step procedure was followed:

1. distribution of parental consent packets to all eligible students by teachers,
2. periodic reminders from teachers,
3. periodic re-distribution of consent packets,
4. group incentives (for example, pizza parties) for the classes having the highest return rates,
5. individual incentives in which all students returning consent forms (either positive or negative) were eligible to participate in a drawing with \$200 worth of prizes,
6. personal appeals by project staff members to classes with low return rates, and
7. group meetings with nonresponders to determine why individual students had not return consent forms (either positive or negative) and to further encourage them to do so.

Overall, an 87 percent return rate was achieved over roughly a 2-month period (table 3). Of forms returned, there was a 95 percent positive response from parents who gave permission for the children to participate in this research project. Although the positive and negative rates were essentially the same for the treatment and control groups, the overall consent return rate was slightly higher in the control group (88 percent) than in the treatment

group (84 percent). However, given the similarity in both the overall return rates and in the positive and negative consent rates, no bias appeared to have been introduced into this sample as a result of the consent procedure.

**Study design.** The research design for this study consisted of a straightforward pretest-posttest control group design as follows:

<i>Condition and number of schools</i>	<i>Number of students</i>	<i>Design</i>
Treatment, 3 schools .....	221	$O_1 X O_2$
Control, 6 schools .....	387	$O_1 O_2$

$O_1$  represents the pretest and  $O_2$  the posttest data collection points.  $X$  represents the smoking prevention intervention. In the treatment schools, the seventh grade students received the prevention curriculum and all relevant materials. In control schools, students experienced only existing educational activities. Assignment of schools to treatment and control conditions was conducted randomly, within each of the three participating communities. This resulted in one treatment school and two control schools per community for a total of three treatment and six control schools.

**Smoking prevention program.** The program that was tested in this study is a broad-spectrum prevention strategy called life skills training (LST). Its main purpose is to facilitate the development of skills and knowledge specific to smoking prevention as well as to facilitate the acquisition of generic personal and social skills. As such, the LST Program uses several cognitive-behavioral techniques found to be effective in clinical settings for changing behavior. However, in this program, these techniques were used educationally to enhance students' ability to, for example, cope more effectively with anxiety or function more competently in social situations.

The general thrust of this intervention model is to provide adolescents with the requisite knowledge and skills to resist social influences to smoke and to reduce potential motivations to smoke. Skills specific to smoking prevention and knowledge were taught to give students the ability to resist social influences to smoke cigarettes. Generic personal and social coping skills were taught to reduce their general susceptibility to social influences to smoke.

It was hypothesized that students who acquired or improved these skills would alter their self-perception and experience an increased sense of

self-esteem, self-confidence, self-mastery, and control. In addition, some skills were taught as positive coping strategies which can serve as alternatives to smoking (for example, alternative ways of coping with anxiety). Although previous research supports this hypothesis, the extent to which this hypothesis is true for black youth has not been evaluated in prior research studies.

Some of the general cognitive-behavioral techniques incorporated into the LST Program follow: (a) cognitive strategies for enhancing self-esteem (for example, goal-setting, behavior change techniques, replacing negative self-statements with positive ones); (b) techniques for resisting advertising appeals (identifying persuasive ad appeals, formulating counter-arguments to these appeals); (c) techniques for coping with anxiety (relaxation training, mental rehearsal, guided imagery); (d) verbal and nonverbal communication skills; (e) social skills; and (f) assertive skills (refusals, requests, expressions of feelings).

These skills were taught by regular teachers using a combination of instruction, modeling, rehearsal, feedback, and reinforcement in a series of 12 class sessions, and in extended practice through homework assignments. The LST Program is composed of three major components which are described in the following sections.

**Smoking-specific component.** The smoking-specific component is similar to that in many of the newer psychosocial smoking prevention programs (6,7,12). The content includes information concerning the adverse consequences of cigarette smoking and the levels of smoking among both adults and adolescents, information about smokers' rights and the declining social acceptability of cigarette smoking, information and class exercises demonstrating the immediate physiological effects of cigarette smoking, material concerning media pressures to smoke and techniques used by cigarette advertisers to promote cigarette smoking, and techniques for resisting direct peer pressure to smoke.

**Personal skills component.** The personal skills component is designed to foster the development of critical thinking and responsible decision-making, provide students with techniques for coping with anxiety (for example, cognitive and behavioral self-control strategies), and teach the principles of personal behavior change and self-improvement.

**Social skills component.** This component aims to improve general interpersonal skills. It offers mate-

rial concerning effective communication; general social skills (for example, initiating social interactions, conversational skills, complimenting); social skills related to boy-girl relationships; and both verbal and nonverbal assertive skills.

**Self-improvement project.** In addition to the material covered in each session, students were given outside assignments to prepare them for future sessions and to reinforce material already covered. Furthermore, all students participated in a semester long self-improvement project. They were asked to choose something about themselves that they would like to improve (for example, losing weight or getting a higher grade in math) and to work toward that goal over the course of the program. Their major goal was broken down into weekly subgoals that would enable students gradually to shape their own behavior in the desired direction. Progress in attaining these subgoals was monitored from week to week on progress report forms.

**Curriculum format and modification.** Each of the 12 intervention sessions lasted approximately 45 minutes, an average class period. There were two intervention sessions per week.

Because this prevention program had been developed and tested primarily with white, middle-class students in suburban schools, the curriculum was reviewed extensively before this study to determine its appropriateness for black adolescents. An internal review was conducted by a committee of black researchers from Cornell's Laboratory of Health Behavior Research, consisting of a psychologist and two health educators. The focus of their review was language and reading level, examples and role play scenarios, and underlying conceptualizations. Its intent was to make certain that the intervention program contained material that was both appropriate and relevant for black youth attending urban schools.

An external review was also conducted. It consisted of (a) a focus group of black seventh grade students who critiqued the student materials and (b) a panel of outside experts with experience and special expertise working with black youth. The outside panel contained both recognized experts (such as academicians, researchers, and curriculum specialists) and junior high school teachers who had extensive experience working with black youth.

The findings of the two curriculum review committees and the student focus group were carefully examined. Differences were reconciled during a

conference of the internal and external committees. Following this meeting, final recommendations for modifications were formulated, and the prevention curriculum and student materials were modified.

**Process evaluation.** Three types of process evaluation data were collected during this study: (a) observations on the program's implementation, (b) questionnaire responses from teachers implementing the smoking prevention curriculum, and (c) questionnaire responses from students concerning the issues related to the implementation.

**Classroom observations.** Members of the project's field staff regularly visited each classroom and completed a detailed teacher monitoring form for each of four observation sessions. Both quantitative and qualitative data were collected. The first concerned coverage of the points, objectives, and activities specified in the intervention protocol. The second type of observational data concerned the quality of the implementation for the session observed (for example, teacher's attitudes, preparation, and maintenance of classroom order; the use of positive reinforcement). Field staff were carefully trained to observe both didactic instruction and practice in the classroom. Interrater reliability was .85.

**Teacher feedback.** Teachers completed 2-page evaluation forms following each lesson to record their reactions to the curriculum. Four kinds of information were collected: the teacher's assessment of points and objectives covered for each session, the percentage of time spent using each of four teaching techniques (lecture, class discussion, demonstration or explanation of skills, and practice and role playing), the teacher's appraisal of student reaction or interest, and an open-ended item to provide an opportunity for additional feedback.

**Student feedback.** Students were asked to complete an evaluation form to assess their reactions to the program and to identify the extent to which they enjoyed the program material and found it interesting and relevant.

**Outcome evaluation.** Although the primary emphasis of this study was evaluation of process data, outcome evaluation data were also collected using a student questionnaire. A variety of independent and dependent variables derived from our conceptual model (13) was assessed. We

Table 4. Mean scores for seven teachers' evaluation of the training workshop

Variable	Mean Score
<i>General evaluation</i>	
Time when workshop was scheduled.....	4.66
Workshop length.....	4.75
Organization.....	4.83
Coordination.....	4.83
Appropriateness of workshop topics.....	4.95
Appropriateness of instructional methods.....	4.75
Personal satisfaction.....	4.75
Commitment-involvement of fellow participants...	4.83
Benefit of informal conversations.....	4.79
Gained new knowledge and insights.....	4.83
Confidence in ability to teach program.....	4.66
Would recommend workshop to others.....	4.91
<i>Instructional critique</i>	
Objectives were clearly defined.....	4.91
Organization was excellent.....	4.91
Content was adapted to audience.....	4.91
Material covered was current.....	4.91
Sessions were interesting.....	4.83
Sessions were of great value.....	4.83
Instructors were superior.....	4.83
<i>Facilities</i>	
Meeting rooms.....	3.25
Refreshment breaks.....	4.50
Group lunch.....	4.33

NOTE: Items are scored on a 5-point scale, with 5 being high.

used items and scales similar to those employed in our previous smoking research (14-17). The outcome evaluation questionnaire in this study contained 96 items and was designed to collect basic demographic data as well as to assess self-reported smoking behavior, the perceived social support for smoking, and smoking related health knowledge. The questionnaire also contained selected psychosocial scales assessing variables either hypothesized to play a role in the etiology of cigarette smoking or hypothesized to be affected by the intervention. Evidence concerning the role of these variables in smoking initiation among black youth is reported elsewhere (18).

**Background information.** Ten items were used to collect basic background information concerning sex, age, race, family structure, parents' educational level, and academic performance (grades).

**Smoking measures.** Seven items assessed the smoking behavior of respondents. Three dichotomous (yes-no) items assessed smoking during the last month, week, and day. Two measures assessed the numbers of cigarettes smoked during the last week and the previous day. A general 10-point scale assessed how often respondents usually

*'Black and white adolescents have essentially the same smoking prevalence rates. However, there may be differences in the pattern of onset, with black youth beginning to smoke somewhat later than white youth.'*

smoked. Response categories ranged from "never" to "a pack or more each day." Intention to smoke in the future (behavioral intention) was measured with a 5-point scale ranging from "definitely will not" to "definitely will."

**Perceived social influences to smoke.** Several social influences to smoke were explored: smoking by significant others in the respondent's environment (friends, siblings, and parents); perceived attitudes of parents and peers toward smoking by the respondent; and perceived prevalence of smoking by peers and adults (normative expectations). Perceived smoking by friends was measured using a 5-point scale ranging from "none" to "all-nearly all." Smoking by older siblings was measured on a 4-point scale ranging from "none" to "three or more." Perceived smoking of parents was assessed using separate items for the respondent's father and mother (Does your father [mother] smoke cigarettes?) with response categories including "have no father-mother," "no," "used to but quit," and "yes." These items were recoded into 3-point scales with the first two categories being collapsed together. The perceived attitudes of respondent's parents and friends concerning whether or not he/she smoked cigarettes was assessed using separate items. Responses were scored on 5-point scales ranging from "strongly against it" to "strongly in favor of it."

**Smoking-related knowledge.** Ten true-false items assessed smoking-related knowledge. Included were questions concerning the immediate or short-term consequences of smoking, smoking prevalence among adults and peers, and the declining social acceptability of cigarette smoking.

**Attitudes and expectations.** Attitudes toward smokers and the benefits of smoking were assessed using 10 items scored on 5-point Likert scales with responses ranging from "strongly disagree" to "strongly agree." Normative expectations toward smoking were assessed using individual items con-

cerning perceived smoking by peers and by adults, with responses scored on a 6-point scale ranging from "none" to "almost all."

**Skills and personal characteristics.** Decision-making was assessed using seven items concerning strategies employed in solving problems (19). Responses for each strategy measured ranged from "never" to "almost always" using 5-point Likert scales. Assertiveness was measured using a shortened (9-item) version of the Assertion Inventory (20) concerning both general assertiveness and refusal assertiveness, including saying "no" when someone tries to get you to smoke. Self-efficacy (21) was assessed using 5 items scored from "disagree" to "agree" using 5-point Likert scales. Self-esteem was measured using a 30-item sphere-specific inventory (.83) developed for black youth by Hare (22).

**Procedures.** In January of 1989, teachers from the treatment schools who were selected for this project attended a 1-day training workshop provided by program staff. In February, students in both the treatment and control schools were pretested. Expired air carbon monoxide (CO) samples and questionnaire data were collected according to a detailed protocol to insure standardization of the data collection process. The collection of CO data was used to enhance the quality of the self-reported smoking data (23). As part of the data collection protocol, students were told that expired air breath samples would be collected along with the questionnaire data and that CO levels can be used to determine smoking status.

Students in the treatment schools received the smoking prevention program; students in the control schools received the smoking education curriculum normally provided by their school. Throughout the prevention program, classroom observation data and teacher feedback were collected. At the end of May, students were posttested with the same questionnaire and procedures that had been used for the pretest. In addition, student feedback was collected by questionnaires to determine their reaction to the prevention curriculum and materials.

**Data analysis strategy.** The final data set used in this study was limited to black students who provided complete data on the smoking variables. The analysis of these data was conducted according to the following plan. First, frequencies, percentages, means, and standard deviations were computed for all of the process and outcome data.

Table 5. Means and scores of individual teachers (A-G) in evaluation of smoking prevention program for seventh graders

Variable	A	B	C	D	E	F	G	Mean
<i>Overall</i>								
Adequacy of training .....	5	5	5	5	5	5	4	4.86
Confident to teach program .....	5	5	5	5	5	5	4	4.86
Teachers manual easy to use .....	5	5	5	5	5	5	4	4.86
Modified prevention program .....	2	1	5	2	3	4	2	2.71
Adequacy of support from staff .....	5	3	5	4	5	5	4	4.43
Relevance of material .....	5	5	5	4	5	5	5	4.86
Appropriateness of reading level.....	5	5	5	4	4	4	4	4.29
<i>Session specific</i>								
Myths and realities .....	5	2	4	4	4	3	4	3.71
Biofeedback .....	2	4	5	4	5	5	—	4.17
Decision making .....	5	3	5	4	3	4	3	3.86
Advertising .....	5	5	5	5	4	4	4	4.57
Resistance media pressures.....	5	5	5	5	4	4	4	4.57
Self-improvement.....	5	5	5	3	4	4	4	4.29
Coping with anxiety .....	5	5	5	5	3	4	5	4.57
Communication skills .....	5	4	4	4	4	5	3	4.14
Social skills.....	5	4	4	5	—	5	3	4.33
Assertiveness .....	5	4	4	4	4	4	3	4.14

Second, a series of general linear model (GLM) analyses were computed for the behavioral and mediating variables with pretest scores, age, social risk for smoking (smoking status of friends), and academic performance (grades) used as covariates. Third, planned comparisons were used to determine differences between the treatment and control groups.

## Results

**Teacher training workshop results.** Table 4 summarizes the evaluation data concerning the teacher training workshop. The participating teachers reported that the workshop had clearly defined objectives, was well organized, adapted the content of the workshop to the audience, and covered material that was current, interesting, and valuable. The workshop trainers were judged to be excellent, and the participants had gained a high degree of personal satisfaction from the formal aspects of the workshop as well as from informal discussions with other workshop participants. They also reported having gained new knowledge and insight, and they left the workshop with a high degree of confidence in their ability to implement the prevention program.

**Teacher evaluations of intervention.** Table 5 presents the means and individual scores for the seven participating teachers in terms of their general reaction to the prevention program and their evaluation of each unit or session. Once again, teachers gave high marks to the training they had

received. They felt adequately prepared to implement the program, had a high level of confidence in their ability to do so, and received adequate support from the project staff throughout the project. With respect to the intervention materials, teachers reported that the "Teacher's Manual" was easy to use, that the reading level was appropriate, and that the material it contained had a high degree of relevance for their students.

Regarding the session-specific evaluation, all 12 sessions were rated in the good to excellent range. The two lowest scores were received for the session containing factual material concerning cigarette smoking (myths and realities) and the session on decision-making. The sessions receiving the teachers' highest assessment were those on advertising— $M = 4.57$ —and coping with anxiety ( $M = 4.57$ ). Also receiving high scores were the sessions on social skills, assertiveness, self-improvement, and biofeedback.

**Student evaluation data.** Overall, the students' reactions were quite positive, although somewhat less so than those of the teachers (table 6). In general, the students liked the prevention program, found the material interesting and useful, particularly in helping them not to smoke; and the student handouts were reported to be easy to read. The students' reactions to specific sessions were also positive, generally falling at least in the good range.

**Classroom observation data.** Each of the seven teachers was observed implementing the prevention

Table 6. Means and standard deviations (SD) in seventh graders' evaluation of a smoking prevention program

Variable	Mean	SD
<i>General evaluation</i>		
Liked prevention program .....	3.59	1.36
Interesting content .....	3.64	1.28
Student materials (easy to read) ....	4.15	1.09
Useful .....	3.78	1.39
Helped to not smoke .....	4.13	1.44
Used information, skills .....	.61	0.49
Will use in future .....	1.42	0.50
<i>Session-specific evaluation</i>		
Myths and realities .....	3.21	1.56
Biofeedback .....	3.19	1.45
Decision making .....	4.17	1.14
Advertising .....	3.49	1.37
Self-improvement .....	3.86	1.35
Coping with anxiety .....	3.76	1.44
Communication .....	3.64	1.38
Social skills, session A .....	3.31	1.44
Social skills, session B .....	4.17	1.39
Assertiveness .....	3.28	1.42

Table 7. Range, means, and standard deviations (SD) for observation data on teachers conducting the smoking prevention program for seventh graders

Variable	Minimum	Maximum	Mean	SD
Quantitative (percentage of points covered) .....	61.50	93.50	79.71	19.12
<i>Qualitative:</i>				
Conformity .....	3.25	4.75	3.96	0.94
Covered all points .....	2.00	4.25	3.30	1.38
Class order .....	1.75	4.50	3.63	1.15
Student questions .....	2.25	4.25	3.70	0.95
Used positive reinforcement .....	1.50	4.50	3.74	1.06
Stimulated discussion ..	1.25	4.25	3.70	1.10
Teacher's attitude (program) .....	3.00	5.00	4.15	0.72
Teacher's attitude (students) .....	3.00	5.00	4.15	0.66
Teacher's attitude (teaching) .....	2.25	5.00	4.15	0.99
Teacher's preparation ..	2.25	5.00	3.89	1.22
Teacher's presentation ..	2.00	4.75	4.04	1.02
Students' reaction (program) .....	2.25	4.50	3.63	0.84
Students' reaction (preach) .....	1.50	3.33	2.44	1.22
Students' reaction (teacher) .....	1.50	4.75	3.44	1.12

program at least four times. Table 7 provides the range, means, and standard deviations for the observational measures. The quantitative measure provides a straightforward assessment of the percentage of points covered (PPC), averaged over observational sessions initially for each teacher and then collapsed across all teachers. The lowest PPC score was 61.50 (indicating that the lowest level of

implementation completeness was 61.50 percent); and the highest PPC score was 93.50 percent. For all teachers and all observation sessions, the mean level of completeness was 79.71 percent. This mean compares favorably with previous prevention studies using this type of intervention strategy (24,25).

In addition to the PPC, 14 measures assessed the quality of implementation. All were rated on 5-point Likert scales, with 5 being the highest possible score. According to these data, the teachers followed the intervention protocol (M=3.96), maintained class order (M=3.63), were responsive to students' questions (M=3.70), stimulated class discussion (M=3.70), and used positive reinforcement (M=3.74). Teachers' attitudes towards the prevention program, their students, and toward teaching in general appeared to be positive (M=4.15).

These data also indicated that the level of teacher preparation, quality of presentation in the classroom, students' enthusiasm for the prevention program, and their observed responsiveness to teachers implementing it were generally lower than what was considered to be desirable. Examination of the classroom observation data indicated that although the quality and completeness of implementation was quite high for some teachers and their classes, a few teachers actually did a rather poor job of implementation.

**Intervention effects: smoking behavior.** A series of GLM analyses were computed to assess the impact of this approach on cigarette smoking. These analyses were conducted for students present at both the pretest and posttest and included only those for whom complete smoking data were available. Pretest scores, age, grades, and social risk for smoking (the smoking status of friends) were used as covariates. Table 8 presents the covariate adjusted posttest means for the treatment and control conditions. There were significantly fewer posttest smokers in the treatment group than in the control group based on smoking status in the past month ( $P < .043$ ), using a one-tailed test. No other comparisons were significant.

**Intervention effects: mediating variables.** The impact of the intervention was also assessed with respect to several hypothesized mediating variables using the same analytic approach described previously. Table 9 presents the covariate adjusted posttest means for the psychosocial mediating variables. Significant treatment effects were found



for knowledge of smoking consequences ( $P < .015$ ), normative expectations regarding adult smoking prevalence ( $P < .005$ ), and normative expectations regarding peer smoking prevalence ( $P < .053$ ). Treatment effects that approached significance were also found for knowledge of smoking prevalence ( $P < .076$ ), the peer dimension of self-esteem ( $P < .064$ ), and knowledge concerning the declining social acceptability of smoking ( $P < .074$ ). No other comparisons approached significance.

## Discussion

This study provides information concerning the feasibility, acceptability, and potential effectiveness of the preventive intervention approach tested. This study also provides information useful for further improving the effectiveness of this approach for black youth attending urban schools.

**School recruitment and parental consent.** The administrators and teachers from the study schools were enthusiastic about participating in this project, and school recruitment was easier than expected. A major issue addressed by this study concerned whether, with the relatively limited resources, parental consent could be obtained from a sufficient number of students without inadvertently introducing a bias into the sample resulting from either a low or a differential consent rate. Although obtaining parental consent was indeed difficult and time-consuming, the procedures used in this study produced an 87 percent total return rate and a 95 percent positive response rate from parents. Throughout the early stages of this study, methods for maximizing the consent return rate were tested. Those involving extrinsic reinforcers (whether group or individual based) were much less productive than expected. In the final analysis, the critical ingredients appear to have been a combination of persistence and personal appeals to students by teachers and black members of the project staff. Increased community contact and more lead time should further facilitate the process of obtaining parental consent.

**Feasibility, acceptability, and appropriateness.** The process evaluation data indicated quite clearly that this intervention is both feasible and highly acceptable to teachers, administrators, and students. The training workshop received consistently high evaluation scores, both for the general evaluation items and those relating specifically to in-

Table 8. Comparison of adjusted posttest means for smoking variables of black seventh graders in treatment and control groups

Variable	Treatment	Control
Last month .....	<sup>1</sup> 0.03	0.07
Last week .....	0.04	0.04
Yesterday .....	0.02	0.01
Current smoking .....	1.44	1.51
Behavioral intention .....	1.46	1.47

<sup>1</sup> $P < .05$ . NOTE: Significant levels are based on 1-tailed test.

Table 9. Comparison of adjusted posttest means for cognitive, attitudinal, skills, and personality variables of black seventh graders in treatment and control groups

Variable	Treatment	Control
<i>Knowledge</i>		
Prevalence .....	0.766	0.663
Consequences .....	<sup>1</sup> 4.150	3.899
Social acceptability .....	1.097	0.957
<i>Attitudes and norms</i>		
Anti-smoking attitudes (full scale) ...	40.070	39.641
Anti-smoking attitudes (factor 1) ...	7.160	7.022
Anti-smoking attitudes (factor 2) ...	29.872	29.649
Normative expectations (adults) .....	<sup>2</sup> 4.887	5.162
Normative expectations (peers) .....	<sup>1</sup> 3.596	3.826
<i>Skills</i>		
Decision-making .....	24.215	24.357
Assertiveness (full scale) .....	33.390	33.196
Assertiveness (factor 1) .....	13.074	13.024
Assertiveness (factor 2) .....	10.586	10.680
<i>Personality</i>		
Self-efficacy .....	9.482	9.333
Self-esteem .....	109.533	110.745
Home .....	39.579	40.341
Peers .....	34.153	34.923
School .....	35.406	35.609

<sup>1</sup> $P < .05$ . <sup>2</sup> $P < .01$ . NOTE: Significance levels are based on 1-tailed tests.

structional methods. Similarly, both teachers and students gave high marks to the prevention program and its materials. The content of the program was generally judged to be interesting, relevant, and useful; and the student handouts were judged to have a reading level that was appropriate. Despite this, the student evaluations suggested that an increased effort is needed to promote greater use of the information and skills taught in the prevention program.

According to the classroom observation data, many teachers implemented the program with a high degree of fidelity and completeness. However, there was a great deal of variability among teachers; some did a less than adequate job. Improving the program's effectiveness may require focusing more attention on selecting high quality teachers

and on training and supporting the teachers to ensure a high degree of fidelity in implementing the program.

**Effectiveness.** The main intention of this study was to examine issues of feasibility and acceptability, to test the appropriateness of the student materials, to test the teacher workshop training model, and to test the data collection protocols. However, this study also provides preliminary support for the potential efficacy of this approach for urban black youth. Smoking during the past month was reduced by 56 percent among students receiving the LST Program. As expected, no effects were found for the measures of more regular smoking (for example, smoking during the past week or day). Treatment effects were also found for several hypothesized mediating variables. However, there was less of an impact attributable to these variables than in previous studies (15-17,24,25). Notwithstanding the generally good implementation data, it appears that the students did not learn some of the material covered in the prevention program.

**Conclusions and future directions.** Additional research is needed to deepen our understanding of the factors promoting smoking among black adolescents and effective methods of preventing it. Larger studies are needed to test adequately this type of prevention approach. Small-scale studies such as this pilot one are useful in refining intervention strategies and materials. However, a major limitation is the obvious constraint on statistical power due to the small sample, which makes it difficult to demonstrate significant effects. Still, these findings are encouraging and should facilitate further development of an effective approach to smoking prevention among black youth.

**References**.....

1. Bernstein, D. A.: Modification of smoking behavior: an evaluative review. *Psychol Bull* 71: 418-440 (1969).
2. Bernstein, D. A., and McAlister, A.: The modification of smoking behavior: process and problems. *Addict Behav* 1: 89-102 (1976).
3. Hunt, W. A., and Matarazzo, J. D.: Three years later: recent developments in the experimental modification of smoking behavior. *J Abnormal Psychol* 81: 107-114 (1973).
4. Botvin, G. J.: Substance abuse prevention research: recent developments and future directions. *J School Health* 56: 369-386 (1986).
5. Flay, B. R.: Psychosocial approaches to smoking prevention: a review of finds. *Health Psychol* 4: 449-488 (1986).
6. Evans, R. I.: Deterring the onset of smoking in children: knowledge of immediate psychological effects and coping

- with peer pressure, media pressure, and parent modeling. *J App Soc Psychol* 8: 126-135 (1978).
7. Hurd, P.: Prevention of cigarette smoking in 7th grade students. *J Behav Med* 3: 15-28 (1980).
8. Luepker, R. V., Johnson, C. A., Murray, D. M., and Pechacek, T. F.: Prevention of cigarette smoking: three year follow-up of educational programs for youth. *J Behav Med* 6: 53-61 (1983).
9. Murray, D. M., Johnson, C. A., Luepker, R. V., and Mittlemark, M. B.: The prevention of cigarette smoking in children: a comparison of four strategies. *J Appl Soc Psychol* 14: 274-288 (1983).
10. Botvin, G. J., Renick N., and Baker, E.: The effects of scheduling format and booster sessions on a broad-spectrum psychosocial approach to smoking prevention. *J Behav Med* 6: 359-379 (1983).
11. Schinke, S. P., and Blythe, B. J.: Cognitive-behavioral prevention of children's smoking. *Child Behav Ther* 3: 2542 (1982).
12. McAlister, A., Perry, C., and Maccoby, N.: Adolescent smoking: onset and prevention. *Pediatrics* 63: 650-658 (1979).
13. Botvin, G. J.: Broadening the focus of smoking prevention strategies. *In Promoting adolescent health: a dialog on research and practice*, T. Coates, A. Peterson, and C. Perry, editors. Academic Press, New York, 1982, pp. 137-148.
14. Botvin, G. J., Eng, A., and Williams, C. L.: Preventing the onset of cigarette smoking through life skills training. *J Prev Med* 9: 135-143 (1980).
15. Botvin, G. J., and Eng, A.: The efficacy of multicomponent approach to the prevention of cigarette smoking. *Prev Med* 11: 192-211 (1982).
16. Botvin, G. J., Renick, N., and Baker E.: The effects of scheduling format and booster sessions on a broad-spectrum psychosocial approach to smoking prevention. *J Behav Med* 6: 359-379 (1983).
17. Botvin, G. J., et al.: A cognitive-behavioral approach to substance abuse prevention. *Addict Behav* 9: 137-143 (1984).
18. Botvin, G. J. et al.: Correlates and predictors of smoking among black adolescents. Paper presented at the annual meeting of the American Public Health Association, Chicago, Oct. 22-26, 1989.
19. Wills, T. A.: Stress and coping in early adolescence: relationships to substance use in urban school samples. *Health Psychol* 5: 503-529 (1986).
20. Gabbrill, E. D., and Richey, C. A.: An assertion inventory for use in assessment and research. *Behavior Ther* 6: 550-561 (1975).
21. Paulhus, D.: Sphere-specific measures of perceived control. *J Pers Soc Psychol* 44: 1253-1265 (1983).
22. Hare, B. R.: Stability and change in self-perception and achievement among black adolescents: a longitudinal study. *J Black Psychology* 11: 29-42 (1985).
23. Evans, R. I., et al.: Deterring the onset of smoking in children: knowledge of immediate psychological effects and coping with peer pressure, media pressure, and parent modeling. *J Appl Soc Psychol* 8: 126-135 (1978).
24. Botvin, G. J., Dusenbury, L., James-Ortiz, S., and Kerner, J.: A skills training approach to smoking prevention among Hispanic youth. *J Behav Med*. In press.
25. Botvin, G. J., Baker, E., Filazzola, A., and Botvin, E. M.: A cognitive-behavioral approach to substance abuse prevention: a one-year follow-up. *Addict Behav*. In press.