Designing and Implementing Project ALERT

A Smoking and Drug Prevention Experiment

Phyllis L. Ellickson, Robert M. Bell,
Margaret A. Thomas, Abby E. Robyn, Gail L. Zellman
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PREFACE

This report describes the design and implementation of Project ALERT, a multisite, multiyear test of a smoking and drug prevention program for adolescents. In it, the authors assess the soundness of their experimental design, determine whether the curriculum was carried out as intended, and gauge how well that curriculum was received in the classroom. The results should prove useful to government officials and researchers who seek to develop and carry out large-scale social experiments as well as to school officials, teachers, and other practitioners who are engaged in the design of prevention programs or in the implementation of such programs in diverse classroom settings.
SUMMARY

Millions of American teenagers report that they currently use cigarettes, alcohol, and marijuana. These figures are alarming in that involvement with such substances not only prolongs a young person's exposure to the substances' harmful effects, but also increases the likelihood that the adolescent will try other drugs.

Recognizing the importance of these issues, the Conrad N. Hilton Foundation asked The RAND Corporation to design, implement, and evaluate a school-based smoking and drug prevention program for adolescents. That program, called Project ALERT, was implemented in 30 California and Oregon schools beginning in 1984. It is designed to curb adolescent drug use both by motivating youngsters to resist drugs and by helping them acquire the skills to do so. In this report, we outline how the curriculum and the evaluation component were designed and implemented.

EXPERIMENTAL DESIGN

Project ALERT is being tested in 30 West Coast schools, each of which was randomly assigned to one of three experimental groups. The schools were statistically matched to attain a balance on previous drug use and encompass a broad spectrum of community environments, ethnic composition, and socioeconomic levels. Nine of the 30 schools have a minority population of 50 percent or more; 41 percent of the participating students come from disrupted family environments.

All seventh-grade students in the 20 treatment schools received the smoking and drug prevention curriculum, which was taught by an adult in ten of the schools and by an adult assisted by teen leaders in the remaining ten. When students in both groups reached the eighth grade, they received three "booster" sessions. Those in the ten control schools received no special resistance training. Student drug use and related characteristics have been monitored in all three groups throughout the study period—from before the program began in grade seven through the tenth grade. That monitoring activity has included the collection of self-report data and of physiological samples aimed at detecting drug use.
THEORETICAL FRAMEWORK

The Project ALERT curriculum builds on and extends the social influence model underlying recent smoking prevention programs. That approach, which views initial cigarette use as a social phenomenon, centers on teaching adolescents to identify and resist direct pressures to smoke. We have strengthened the theoretical base of this approach by elucidating the model of effective resistance behavior implicit in it: that successful resistance requires both the motivation and the skill to resist prodrug pressures. Each curriculum activity is designed to develop the motivation to resist drugs, the skill to do so, or both.

Specific ways in which we have adapted the social influence model for Project ALERT include providing a coherent theoretical framework to guide curriculum content and the process of delivering it; addressing the beliefs and circumstances surrounding initiation into each targeted substance (cigarettes, marijuana, and alcohol); and helping students identify and resist pressures from inside, as well as outside, themselves.

To guide curriculum development and delivery, we have drawn from the health belief model and from the self-efficacy theory of behavior change. The former, which identifies prerequisites for taking preventive action, shaped the curriculum's overall content. The latter dictated our emphasis on promoting resistance self-efficacy—the belief that one can successfully resist drugs—and provided guidelines for delivering the curriculum.

CURRICULUM

Project ALERT is designed to help students:

- develop reasons not to use drugs;
- identify pressures to use them;
- counter prodrug messages;
- learn how to say “no” to external and internal pressures;
- understand that most people do not use drugs; and
- recognize the benefits of resistance.

The seventh-grade curriculum consists of eight lessons. The first two lessons are intended to develop motivation to resist by sharpening students' perception of the seriousness of drug use and by revealing their personal susceptibility to the harmful effects of such use. The next three sessions focus on resistance skills—helping students identify pressures to use drugs, counter prodrug messages, and learn how to say “no” to both internal and external pressures. The final three sessions
reinforce the earlier content and clarify the benefits of resistance. During the eighth grade, students receive a three-session booster curriculum designed to reinforce resistance skills learned the previous year.

The curriculum provides multiple opportunities for student participation—role playing, question-and-answer techniques, small-group activities, individual and group practice in saying “no,” and written exercises. These activities, combined with learning how other teenagers have said “no,” are designed to help students build confidence that they can successfully resist the pressures to use drugs posed by their environments and by their own wishes to belong and appear grown-up.

EVALUATION

The data we have collected allow us to evaluate whether the program was implemented as intended and how well it engages students. Ultimately, the evaluation will permit us to gauge Project ALERT’s effectiveness in curbing adolescent drug use and to determine how the program achieved its effects.

Data Sources

To assess whether the program was delivered as designed, we monitored 41 percent of the 2,300 classroom sessions using standardized observation forms. We trained the monitors to fill out the forms and used standard statistical techniques to measure intermonitor reliability. We also obtained anonymous evaluations from the seventh-grade students.

Our primary source for data on program outcomes consists of student self-reports detailing whether, how often, and how much students had used specific legal and illegal substances. We collected this information by questionnaire in six survey waves over the study period: before and after delivery of the seventh-grade curriculum, before and after delivery of the eighth-grade curriculum, and once each when the students were in grades nine and ten. The questionnaires also elicit information on student beliefs about specific drugs and other characteristics that may be associated with their use.
Data Quality

To motivate students to tell the truth about their drug use, we collected a saliva sample from each student immediately before administering the survey. We informed the students that tobacco and marijuana can be detected in saliva and that we would test the samples. Unlike many prevention studies, we did test these samples and compared the test results with cigarette self-reports.

We are confident that our data are reliable and valid. Few students refused to participate, and even fewer denied tobacco use but had positive physiological tests. Inconsistent reports—i.e., those in which students contradicted answers given at a previous wave—were relatively infrequent and were rarely attributable to obvious lying. In addition, efforts to recapture information from absentees and student transfers substantially reduced student attrition, holding down the expected loss of high-risk students over time.

IMPLEMENTATION RESULTS

The ultimate evaluation of Project ALERT will focus on its effectiveness in curbing adolescent drug use. However, an important requirement for interpreting those results rests on knowing whether the program was implemented as intended. Therefore, we devoted substantial resources to the implementation process. Our goals were to maintain the experiment's integrity by ensuring uniform curriculum delivery and by motivating schools and districts to cooperate with study requirements. To achieve these goals, we hired, trained, and monitored our own field staff and teachers; we also endeavored to maximize the program's benefits to schools and districts while minimizing the disruption that follows from fielding an experiment in a working school environment.

These efforts were successful. None of the 2,300 scheduled classes was missed during the two-year implementation period, and in the vast majority of the classes we observed, all of the curriculum activities were presented. Our evaluations also show that the teachers and teen leaders faithfully conveyed the intended content and adhered to the guidelines for delivery style.

Both student and monitor ratings indicate that the program works well in the classroom. It elicits lively student participation, generates enthusiasm, and adapts easily to diverse classroom environments. More important, the program helps students believe that they can successfully resist prodrug pressures in the real world. Our results indicate that 90 percent of the students thought Project ALERT was
credible; 82 percent felt it would help them say “no” to marijuana, cigarettes, and other drugs; and 88 percent felt they could probably resist active pressure to smoke marijuana and still feel good about themselves. Whether these beliefs translate into effective action will be the subject of future reports.

Of equal bearing on the study’s integrity is the issue of its underlying methodology. This report demonstrates that we have ensured a broad and balanced test of Project ALERT. The 30 participating schools represent widely diverse school environments, thereby ruling out the possibility of testing the program solely in favorable or unfavorable conditions. The school assignment procedure produced well-matched experimental groups; the data for assessing program outcomes are reliable and valid; and the information collected provides an appropriate basis for rigorously assessing the program’s effectiveness across different kinds of students with different levels of drug use. Finally, because the program was faithfully implemented, we will be able to attribute the results of the evaluation to the curriculum and to the social influence model that underlies it rather than to vagaries of program delivery.
ACKNOWLEDGMENTS

We are indebted to many people, both inside and outside RAND, who helped us design and implement Project ALERT. Foremost among them is the Conrad N. Hilton Foundation and its president, Donald H. Hubbs, whose support and commitment to combating drug use made this experiment possible. In the early design stages, we received valuable advice from RAND colleagues George Goldberg, Deborah Hensler, and Joseph Newhouse. We also owe a considerable debt to the entire research community involved in developing and testing antismoking programs based on the social influence model of prevention. Within that community, Cheryl Perry, Michael Telch, Nancy Gordon, Nathan Maccoby, and Gilbert Botvin gave us particularly helpful suggestions about implementing innovative programs in school settings.

The curriculum bears the indelible and perceptive imprint of Leni Wildflower, who translated our theoretical prescriptions into concrete activities; Louise Miller provided the creative direction for curriculum training; imbuing her trainees with enthusiasm, commitment, and competence. The health educators and teen leaders who taught Project ALERT brought it alive in the classroom; the field coordinators who supervised them were the linchpins of program implementation. Under the capable direction of Jennifer Hawes-Dawson and Paul Honig, a similarly dedicated staff carried out the data collection and data management plans. The cooperation of school and district personnel in each of the eight sites was superb as well; without them, this experiment would not have happened.

Finally, we wish to thank Stephen Klein and Jeannie Oakes of RAND for their many helpful suggestions in reviewing the report; Mary Vaiana and Andrea Fellows for their expert assistance in communicating our results; and Velda De Cosentine for her work in preparing the report for publication.
CONTENTS

PREFACE ........................................ iii
SUMMARY ..................................... v
ACKNOWLEDGMENTS ......................... xi
FIGURES AND TABLES ....................... xv

Section
I.  INTRODUCTION ............................ 1

II.  OVERVIEW OF THE EXPERIMENT ........ 3
    Experimental Design .................... 3
    Basic Design Questions ................ 4
    Which Prevention Model to Use ......... 4
    Which Substances to Target ............ 8
    Which Students to Target .............. 8
    What Kinds of Teachers to Use ........ 11
    Selecting Participating Districts ...... 12
    Assigning Schools to Experimental Conditions 17
    Summary .................................. 19

III. ADAPTING THE SOCIAL INFLUENCE MODEL TO 
    DRUG PREVENTION: THE PROJECT ALERT 
    CURRICULUM ................................ 21
    Introduction ............................. 21
    Adapting the Social Influence Model ... 22
    Overview of the Curriculum ............ 28
    Summary .................................. 37

IV. THE EVALUATION COMPONENT .......... 38
    Introduction ............................. 38
    Assessing Program Implementation .... 38
    Measuring Program Outcomes .......... 40
    Steps to Enhance Data Quality ......... 45
    Assessment of Data Quality .......... 49
    Minimizing Nonresponse and Attrition over Time 52
    Summary .................................. 55

V. IMPLEMENTATION STRATEGIES .......... 56
    Introduction ............................. 56
Recruitment and Training ......................................... 56
Enlisting District and School Cooperation ...................... 63
Summary .............................................................. 66

VI. IMPLEMENTATION RESULTS ................................... 67
District Cooperation with Experimental Requirements ....... 67
Completeness of Program Delivery ................................. 68
Fidelity of Program Delivery ........................................ 69
Student Response to the Curriculum ............................. 72
Summary .............................................................. 77

APPENDIX: SCHOOL ASSIGNMENT PROCEDURES FOR
PHASES I TO IV ....................................................... 79

REFERENCES .......................................................... 81
FIGURES

2.1. Experimental conditions ........................................... 4
2.2. Drug use rates in a one-month period by age ................. 9
3.1. Example of session 1 materials .................................. 31
3.2. Example of session 3 materials .................................. 34
3.3. Ways to say “no” poster ............................................ 36
4.1. Data collection and program delivery schedule ............... 41
5.1. Project ALERT field-based organization chart ............... 57
6.1. Evaluation of Project ALERT: seventh-grade students’ reports ........................................... 74
6.2. Potential effects on “nonusers”: seventh-grade students’ reports ........................................... 75
6.3. Potential effects on “users”: seventh-grade students’ reports ........................................... 76

TABLES

2.1. Characteristics of districts forming the sample ............... 15
2.2. Characteristics of schools forming the sample ................. 16
2.3. Baseline survey data by experimental cell ........................ 19
4.1. Percentage of seventh-grade students who had used cigarettes, marijuana, and alcohol within various periods before baseline ........................................... 42
4.2. Percentage of baseline nonusers, experimenters, and users ........................................... 43
4.3. Items other than personal substance use included in the baseline survey ........................................... 46
4.4. Number and percentage of students at each wave who denied previously admitted use ........................................... 50
4.5. Number and percentage of students at each wave with inconsistent onset data ........................................... 51
5.1. Health educator assignments ...................................... 60
6.1. Delivery of project alert ............................................. 68
6.2. Fidelity of program implementation ............................... 70
6.3. Average ratings of health educator teaching skills ............ 71
6.4. Average ratings of teen leader teaching skills ................. 71
6.5. Session effectiveness ratings ....................................... 72
I. INTRODUCTION

Adolescent drug use is widespread in the United States today. Recent surveys show that between 20 and 30 percent of high school seniors currently use marijuana and cigarettes, figures that translate into millions of young people using drugs at least once a month (Johnston, O'Malley, and Bachman, 1988). Two-thirds currently use alcohol, and over one-third report occasional heavy drinking (defined as the consumption of five or more drinks in a row).

These statistics warrant concern for several reasons. Cigarette smoking is widely acknowledged as an addictive behavior and as a major contributor to lung cancer, heart disease, and emphysema. Alcoholism, along with cigarette smoking, has been classed among the principal causes of preventable death in western countries (U.S. Surgeon General, 1979); alcohol-related accidents constitute the leading cause of death among adolescents and young adults (Statistical Bulletin, 1984). Although the long-term consequences of marijuana use are as yet undetermined, we do know that it hampers a young person's ability to learn, to remember, and to drive a car (Peterson, 1984). It may also increase the risk of pulmonary disease and lung cancer (Institute of Medicine, 1982). Adolescent use of all these substances elicits particular public concern because it extends the period during which an individual risks adverse effects and heightens the probability that the young person will try additional drugs (Yamaguchi and Kandel, 1984).

Recognizing the importance of these problems, the Conrad N. Hilton Foundation asked The RAND Corporation to design, implement, and evaluate a school-based smoking and drug prevention experiment for adolescents. That program, called Project ALERT (Adolescent Learning Experiences in Resistance Training), was implemented in 30 California and Oregon schools beginning in 1984. It is designed to curb adolescent drug use by motivating youngsters to resist drugs and by providing them with the skills to do so.

This report describes how the program was designed and implemented. It also assesses how well we achieved our goal of conducting a rigorous test across diverse school environments, specifically addressing the following questions:

- Are the school environments sufficiently diverse to provide a broad test of the curriculum?
- Were the schools well balanced across experimental conditions?
- Are the data for measuring program outcomes reliable?
- Has the curriculum been implemented as intended?
- How well does the curriculum work in the classroom?

The report demonstrates that we developed a balanced experimental design, maintained its integrity across diverse school settings, collected a rich and reliable data base for assessing how well it works, and implemented the curriculum as intended. The data also show that the curriculum flows smoothly in the classroom, elicits active student participation, and helps students believe they will be able to resist prodrug pressures in the real world.

The remainder of the discussion is organized as follows: in Sec. II, we provide an overview of the initial decisions that shaped the experiment’s design and the research questions it seeks to answer. Section III presents the curriculum’s theoretical foundation and shows how it has been translated into specific classroom activities. Section IV describes the evaluation component—the data collected to evaluate the fidelity of program implementation, the program’s impact on actual drug use behavior, and its impact on related attitudes and beliefs. It also describes the results of our efforts to enhance data validity and reliability.

Section V discusses Project ALERT’s implementation in the participating schools. Section VI assesses the success of that implementation effort and describes student response to Project ALERT.
II. OVERVIEW OF THE EXPERIMENT

EXPERIMENTAL DESIGN

The Project ALERT curriculum is designed for seventh and eighth graders, who as a group are vulnerable to social influences but are not yet heavy users of legal or illegal drugs. The curriculum seeks to prevent or delay initial drug use and to keep experimental or occasional users from making the transition to regular use and abuse. To achieve these ends, classroom lessons focus on three objectives:

- motivating students not to use drugs;
- helping them identify pressures to use; and
- building skills that will enable them to resist those pressures successfully.

Beginning in the fall of 1984, Project ALERT was implemented in eight school districts in California and Oregon. These districts included urban, suburban, and rural communities, and the experiment's school population encompassed a range of socioeconomic levels as well as several ethnic and racial groups.

The 30 participating schools were matched to achieve a balance on cigarette and marijuana use as well as on variables such as race/ethnicity, school size, and type of community. Schools were randomly assigned to one of three experimental groups—ten schools in each condition (see Fig. 2.1). Students in all 20 treatment schools received the same smoking and drug prevention curriculum during grade seven, but the method of program delivery varied. In one group of ten schools, older teen leaders assisted the health educator in half of the eight lessons; in the second, the health educator presented the curriculum without the help of teen leaders. A third group received no special curriculum but was tested at the same time as the students participating in the two treatment conditions, thus serving as a control.

All seventh graders in participating schools received the program assigned to their school. When they reached the eighth grade, students who were taught the seventh-grade program received three “booster” sessions. After that, they received no more special training, but RAND continued to monitor their drug use and related behavior throughout the period from before the program began in the seventh grade through the tenth grade. That monitoring included the collection of self-
reports and of physiological samples aimed at detecting drug use (see Sec. IV).

**BASIC DESIGN QUESTIONS**

Six design decisions shaped the experiment’s structure and focus: (1) which prevention model should provide the theoretical foundation; (2) which substances to target; (3) which students to target; (4) what kinds of teachers to use; (5) how to select schools for participation; and (6) how to assign participating schools to the experimental conditions. The following sections discuss each of these decisions in more detail.

**WHICH PREVENTION MODEL TO USE**

Our choice of prevention models was based on an earlier RAND study that evaluated the effectiveness of three major strategies for controlling adolescent drug use: law enforcement, treatment, and prevention (Polich et al., 1984). Neither treatment nor law enforcement offered substantial promise; only prevention showed signs of actually curbing adolescent drug use. But what kind of prevention? We evaluated three prevention models in our efforts to determine which was the most effective in reducing drug use.

**The Informational Model**

Prominent during the 1960s, the informational approach toward prevention seeks to help young people understand the legal and
medical consequences of drug use. The model assumes that adolescents use drugs because they lack knowledge about the negative effects of drug use and that once they receive this information, they should reduce their drug consumption. Informational programs frequently do increase students’ knowledge about drugs (and sometimes their curiosity), but research has shown that such programs have been less successful in changing children’s attitudes about using drugs and not at all successful in altering drug use behavior (Blum, Blum, and Garfield, 1976; Goodstadt, 1978; Hanson, 1980a; Kinder, Pape, and Walfish, 1980; Plant, 1980; Swisher, 1974). Many early drug prevention efforts also exaggerated the harmful effects of drugs, and, not surprisingly, adolescents dismissed both the inaccurate appeals and those who articulated them as lacking in credibility (Kinder, Pape, and Walfish, 1980).

The Affective Model

The prevention programs that gained popularity in the 1970s assumed that children use drugs to compensate either for a lack of self-esteem or for a lack of tools with which to communicate effectively and make rational decisions. Accordingly, the affective or general skills approach sought to bolster children’s self-image by helping them clarify their values and improve their decisionmaking and communications skills. The results from these programs fail to show a direct link to reduced drug use (Goodstadt, 1978 and 1981). Raising a child’s self-esteem is, after all, a complex task that is unlikely to be accomplished by a short-term program. Nor is it clear that children readily make the connection between broad skills in decisionmaking and their actions in specific drug pressure situations. And in their desire to avoid the propaganda image that undermined early drug education efforts, educators frequently avoided any mention of drugs in the classroom, thus failing to make the connection apparent.

The Social Influence Model

Several programs based on the more recent social influence model of adolescent behavior have had more encouraging results.1 These programs, aimed at preventing cigarette smoking among junior high school students, view initial cigarette use as a social phenomenon—a response to prosmoking messages and models presented by peers, adults, and the

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1See, for example, Dotvin and Eng, 1982; Evans et al., 1979 and 1981; Flay et al., 1983 and 1985; Hurd et al., 1980; Luepker et al., 1983; McCaul and Glasgow, 1985; Murray et al., 1987; Perry et al., 1980; Schinke, Gilchrist, and Snow, 1985; and Telch et al., 1982.
media. Accordingly, the programs seek to help young people identify the pressures to smoke, counter prosmoking arguments, and learn how to say “no” when directly offered cigarettes. To provide reasons for saying “no,” the programs emphasize the short-term effects of smoking rather than its long-term health effects, which seem vague and only distantly related to the concerns of most teenagers. In so doing, they also seek to reinforce group norms against smoking and to undermine beliefs that smoking is a widespread, desirable, and harmless activity.

Although few antismoking studies can claim to have eliminated group pretest differences that might explain their findings, they do provide cumulative evidence that programs based on the social influence model can help reduce the onset of smoking as well as the transition to regular use among adolescents. In general, such programs have narrowed the proportion of adolescents engaged in experimental or regular smoking by about one-fifth to one-half.

These results suggest that the social influence model offers the most likely approach for a broader drug prevention program aimed at adolescents. The literature on how drug use begins supports this view.²

Our review of previous works suggested that initial drug use, including the use of cigarettes, is primarily a response to social influences. Adolescents typically start using cigarettes, alcohol, and marijuana in a group setting, among their friends or relatives (Orive and Gerard, 1980; Friedman, Lichtenstein, and Biglan, 1985); moreover, those experiences are usually preceded by exposure to peers or family members who use the specific substance or approve of doing so (Kandel, Kessler, and Margulies, 1978; Jessar and Jessar, 1978; Huba and Bentler, 1984; Murray et al., 1983). The strong desire of most teenagers to appear “grown-up” and independent lends added weight to these social influences; when adolescents perceive drug use as an adult activity and see older youth or adults taking drugs, they are more likely to imitate that behavior as a means of laying claim to a more mature and independent status (Jessar, Chase, and Donovan, 1980).

These findings support the use of antismoking program components in a more general drug prevention program. The central role in the onset of drug use of those who use drugs or who approve of doing so attests to the importance of teaching adolescents how to identify and resist prodrug pressures in their social environment. It also argues for efforts to counteract the influence of friends and family who use drugs with attractive nonusing role models—a strategy used in some antismoking programs. The dominance of peer, as opposed to adult,

²See Polich et al. (1984) for an extensive analysis of drug use antecedents that draws on the major longitudinal studies of adolescent drug use over the past 20 years.
influences for some substances (cigarettes and marijuana) further suggests that teenage role models may be more effective than adults.

However, the antecedents literature also suggests that focusing solely on learning how to resist influences to use drugs is not enough; young people also need to see why they should resist as well as learn how to do so. Adolescent beliefs about specific substances (for example, that many or most teenagers use marijuana or that marijuana makes you feel good and doesn’t hurt you) tend to precede both experimentation with that substance and the transition to more habitual use (Chassin et al., 1981a and 1981b; Jessor and Jessor, 1978; Kandel, Kessler, and Margulies, 1978). Hence, counteracting the major factors promoting drug use requires that one address beliefs about these substances—particularly beliefs about the ways in which drugs can affect young people now, in their daily lives and social relationships.

Countering prodrug beliefs also means tailoring program content to specific drugs. In contrast to cigarettes, both marijuana and alcohol offer what many people perceive to be pleasurable psychological effects. Both also pose more serious dangers at first use than do cigarettes (e.g., possible loss of control over one’s actions and impairment of driving ability). To ignore these differences is to risk overlooking important motivations for both using and resisting drugs. We thus concluded that a curriculum based on the social influence model should address beliefs about each targeted substance’s harmfulness and desirability. In Sec. III, we discuss how we adapted the model accordingly.

A parallel issue involves the more general social climate surrounding drug use. Adolescent beliefs about drugs are clearly influenced by the manner in which society portrays them. It is important, then, to recognize that the studies documenting promising results for smoking prevention have all taken place during a period of rising social disapproval of cigarette use; perhaps the social influence model has worked only as a function of this underlying climate of disapproval. Whether such a climate exists for other drugs and is sufficiently widespread to provide the needed impetus for resisting them is unclear. While young people have become increasingly negative about marijuana, most approve of using alcohol. Hence the need to test, not assume, the model’s effectiveness for substances besides cigarettes—and to address social norms about use as well as individual perceptions.

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3National publicity for Nancy Reagan’s campaign against drug use may have helped promote such a climate during Project ALERT’s implementation; we are mindful, however, that the current atmosphere against smoking in the United States is the product of more than three decades of antismoking campaigns in the United States.

4Between 1977 and 1987, the proportion of high school seniors who disapprove of trying marijuana once or twice rose from 33 percent to 57 percent. In contrast, that proportion has risen only slightly for alcohol, from 16 percent to 21 percent (Johnston, O’Malley, and Bachman, 1988).
WHICH SUBSTANCES TO TARGET

To yield the greatest benefit to society, prevention programs should target those substances that pose potential harm to the greatest numbers of adolescents. But to actually prevent or delay use, they should also focus on the drugs that young people start using first.

Cigarettes, alcohol, and marijuana meet both of the above criteria. Alcohol is the most widely used substance among young people; cigarettes and marijuana vie for second place. Other substances—such as cocaine, stimulants, and depressants—have substantially lower prevalence rates. Furthermore, use of these three substances precedes the use of other illicit drugs. Numerous studies have found that adolescents typically try alcohol and cigarettes before initiating marijuana use; they are also highly unlikely to go on to other drugs without first having used marijuana (Huba, Wingard, and Bentler, 1981; Kandel and Feust, 1975; O’Donnell and Clayton, 1982). Indeed, Yamaguchi and Kandel (1984) concluded that “prior use of marijuana is necessary for progression to other illicit drugs.”

This research suggests that targeting both legal and illegal substances could have additional benefits; preventing or delaying early use of cigarettes or alcohol may reduce the use of marijuana, while preventing early involvement with marijuana use may lessen involvement in other illicit drugs.

WHICH STUDENTS TO TARGET

National data indicate that prevention programs will be most effective when aimed at young adolescents, most of whom have not yet become current users. Figure 2.2 shows 1985 national household survey data on monthly drug use for different age groups. This figure illustrates that by age 16 or 17, between 20 and 25 percent of high school students are using cigarettes and marijuana. Although fewer 14- and 15-year-olds fall in this category, the data suggest that the ideal age for primary prevention is even younger.

Figure 2.2 also shows that among 12- and 13-year-olds, very few (between 4 and 6 percent) had used cigarettes or marijuana in the month surveyed. At this age, therefore, it is theoretically possible to prevent regular use of these substances for about 95 percent of the junior high school cohort. Targeting prevention activities on younger

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5The national high school senior study for 1987 estimated that 66 percent of high school seniors currently used alcohol (in the last month), while 29 percent used cigarettes and 21 percent used marijuana. Rates for other illicit drugs all fall below 6 percent (Johnston, O’Malley, and Bachman, 1988).
Fig. 2.2—Drug use rates in a one-month period by age
(from NIDA National Household Survey on Drug Abuse: Main Findings, 1985)
adolescents also takes advantage of the more positive group climate that exists when few of a child's friends and acquaintances take drugs and when most do not approve of drug use.

We chose to design Project ALERT for seventh and eighth graders rather than for elementary school students because we believe that most young people become developmentally ready to learn how to resist prodrug pressures during this period. They have recently made the transition from the more sheltered primary school environment and are beginning to make more decisions on their own, to have a broader circle of friends and acquaintances, and to experience peer pressure. Many studies have documented an increase in peer influence and a corresponding decline in parental influence during adolescence—particularly in areas such as language, dress, use of leisure time, and substance use (Berndt, 1979; Brittain, 1963; Kandel, 1985). Seventh graders have entered the period during which peer influence begins to rise, but they have not yet reached the point (grade nine) at which peer conformity to antisocial behaviors peaks (Berndt, 1979).

As Fig. 2.2 shows, however, programs aimed at preventing alcohol use face less favorable odds of success than do those aimed at cigarettes and marijuana. The pattern of alcohol use among 12- and 13-year-olds more closely resembles that for cigarette and marijuana use among their older peers, the 14- and 15-year-olds. In addition, social drinking is both common and widely accepted in the United States; more people use alcohol, at least occasionally, than any other drug, and in some cultures alcohol plays an accepted role in family or religious celebrations. Among high school seniors, over two-thirds believe that regular marijuana use and daily cigarette use pose great risks of personal harm, but only 26 percent feel similarly about alcohol. Moreover, only 21 percent disapprove of trying one or two drinks, compared with 57 percent who disapprove of trying marijuana once or twice (Johnston, O'Malley, and Bachman, 1988).

These data suggest that many adolescents would reject a curriculum that urged alcohol abstinence. However, we felt it was inappropriate to imply that even occasional use of any substance was acceptable for this age group; indeed, the implicit message of Project ALERT is that it is not. To enhance the credibility of messages about alcohol's harmful

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6Moreover, alcohol use at this age may be substantially higher than the 1985 figures indicate. In the five preceding measurement periods (1974, 1976, 1977, 1979, and 1982), the corresponding percentage of 12- and 13-year-olds who had used alcohol in the past month was as follows: 19, 19, 13, 29, and 10. The degree to which the estimates for seventh graders have fluctuated from one survey to the next, coupled with the comparative stability of alcohol prevalence estimates for older teenagers, suggests that the 1985 figures may be low.
effects, we used a staged approach. During the seventh grade, the curriculum includes alcohol in sessions aimed at building resistance skills and providing role models for successful nonuse; during the eighth grade, when the program has established a reputation for telling the truth about drugs, we add specific motivational material on reasons not to use alcohol.

WHAT KINDS OF TEACHERS TO USE

A critical question about program delivery rested on whether to use only adults to teach the curriculum or, alternatively, to provide adolescent assistants who would act as credible models of successful nonuse.

Several research traditions support the inclusion of young people in program delivery. Social learning theory posits that adolescents learn from others in two ways: (1) through direct modeling (imitation) of others’ behavior; and (2) through reinforcement of adolescent beliefs, attitudes, and behavior by means of social approval or disapproval (Bandura, 1977a). The use of teenage role models who do not use drugs and who disapprove of doing so is relevant to both ways of learning.

Communication theory stresses the persuasive effects of credible communicators (Hovland, Janis, and Kelley, 1953; Kiesler, Collins, and Miller, 1969). Factors that increase credibility include expertise and perceived similarity to the audience—both of which favor the use of older teens as role models rather than same-age peers or adults. Older teens have had considerable experience coping with social pressure, and they are sufficiently similar to seventh graders to seem familiar while old enough to have the advantage of greater experience.

To determine how much older a teenage role model should be for maximal effectiveness with younger adolescents, we tested the curriculum in two pilot schools. In one school, we used high school teen leaders drawn from grades 10 through 12; in the other, we used teen leaders who had graduated from high school within the last two years. Student involvement and comments convinced us that high school teen leaders had greater credibility with seventh graders than did college-age teens. It also suggested that eleventh and twelfth graders typically outshine tenth graders in their ability to articulate their own experiences and to make personal connections with 12- and 13-year-olds.

The pilot test also showed us that it took substantial resources and the right kind of personnel to recruit and train high school students to deliver the curriculum effectively. Since some schools might lack these resources, we decided to test alternative modes of program delivery—
using teen leaders from neighboring high schools to assist the health educator in ten of the treatment schools and relying solely on the adult health educator in the other ten schools. This experimental design allows us to assess whether Project ALERT is equally, more, or less effective when taught by adults alone.

To minimize the class time that high school teens might miss while teaching Project ALERT, we included teen leaders in only half of the eight curriculum sessions. Because those sessions focus on learning resistance skills rather than on the consequences of drug use, this strategy capitalized on the teens’ strengths as role models, allowing them to demonstrate resistance techniques and to provide personal examples of how they had successfully resisted pressures to use drugs. It also limited the likelihood that team leaders would unintentionally give wrong answers to students’ questions about drug effects and reduced the amount of drug-specific knowledge the teens were required to know. Each classroom also had an adult co-teacher who provided support for teen teachers when needed and corrected any errors that occurred.

**SELECTING PARTICIPATING DISTRICTS**

**Schools as the Unit of Assignment**

We chose schools as opposed to classrooms as the unit of assignment for two reasons. First, we suspected that the social influence approach is most effective when it fosters a group climate for resistance, altering an entire cohort’s beliefs about the prevalence and desirability of drug use as well as teaching individual students how to resist. Adolescents find resistance considerably easier when they have social support for saying “no”; providing the program to the entire seventh grade enhances the likelihood that such support will be available.

Second, we thought it crucial to keep the treatment and control conditions separate. If the program had been provided to selected classrooms with comparison groups chosen from the same school, cross-group discussions of program lessons could easily have contaminated the control condition. Assigning individual schools to each experimental condition minimized the probability of contamination across groups.

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7 We rejected testing specific components of the prevention program, a strategy we would deem advisable only if there is sufficient evidence that the overall social influence approach can be successfully adapted to substances besides cigarettes.
Recruiting and Selecting Districts

Two objectives guided the district/school selection process. First, we strove to maximize the diversity of the sample so that the curriculum would be tested in a wide variety of school environments. Most prevention studies test their curricula in middle-class, homogeneous communities—often suburban school districts with a predominantly white population (Botvin and Wills, 1985; Flay, 1985). While such tests provide useful information, their generalizability to very different school environments is limited. Second, we needed cooperative districts that would abide by conditions we deemed essential to the integrity of the experiment.

We identified potential districts for the Project ALERT sample on the basis of demographic characteristics compiled for all California and Oregon school districts. We sought diversity on the following dimensions: geography, community type (urban/suburban/rural), racial/ethnic composition, socioeconomic level, school size, and grade span for the middle or junior high schools. We visited promising districts and talked with school and community personnel to determine whether the district was willing to meet the experimental requirements we imposed. As districts joined the experiment and as others dropped out of contention, we contacted new districts that would complement those already included.

In all, eight school districts, ranging in size from three to nine middle schools, signed up. The final sample included three schools from each of the four districts receiving the program in the fall semester (12 total) and four or five from each of four more districts receiving the program in the spring (18 total).8

Experimental Requirements

Districts and schools that agreed to participate had to comply with the following conditions, many of which disrupted their normal procedures:

Research Design and Evaluation. Districts had to allow RAND to select sample schools, randomly assign them to treatment or control conditions, and conduct data collection with participating students over a four-year period. Thus, each individual school ran the risk of not receiving the program while still participating in the evaluation component’s written questionnaires and physiological tests.

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8Because resource constraints limited the total sample size to 30 schools, we did not include all the potential schools in some districts.
Agreement Not to Contaminate the Experiment. Districts also had to forgo their own seventh-grade (and, in the subsequent year, eighth-grade) drug program in the treatment schools and avoid influencing the climate regarding drug use through undue publicity or atypical drug prevention efforts. The control schools were allowed to continue their regular drug curriculum, if they had one, as long as it did not focus on resistance skills and motivation. To be judged effective, therefore, the curriculum will have to exceed the performance of traditional programs delivered in control schools.⁹

Composition of Classes. Because social pressure to use drugs occurs in mixed- as well as same-gender situations, the program required mixed-gender classes. This requirement raised logistical issues for schools that planned to implement Project ALERT during same-sex physical education classes; where necessary, those classes were combined for Project ALERT and were divided into smaller, mixed-gender groups.

Schedule and Scope. Participating schools had to accommodate Project ALERT's schedule: weekly implementation with a break after session 5 for the seventh-grade curriculum, and weekly delivery for the eighth-grade curriculum. Both curricula were preceded by a data collection session, with a corresponding follow-up session held approximately one month after the conclusion of curriculum delivery. This requirement necessitated schedule changes in many schools, which typically deliver special health units on consecutive days within a one- to three-week period. The requirement that Project ALERT be delivered to the entire seventh grade during one semester also disrupted normal routines in schools where the program was (or would have been) scheduled during a class that only half the seventh grade received during any one semester.

Eleven of the districts we approached chose not to participate in the experiment because they could not meet these requirements.¹⁰

District and School Characteristics

The resulting group of participating districts and schools encompasses a wide range of community and school environments. As Tables 2.1 and 2.2 show, the eight districts include urban, suburban, and rural

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⁹Four of the ten control schools implemented drug prevention activities during grades seven or eight; all four focused on providing information about drugs.

¹⁰Five declined because they already had a drug prevention program they did not want to drop; six others felt they could not comply with other experimental requirements—random assignment of schools (one), collection of physiological samples (one), or weekly scheduling of all curriculum sessions during one semester (four).
communities from five regions in California and Oregon. The participating schools include a range of socioeconomic levels and several ethnic and racial groups. Of the 19 California schools, 11 draw from neighborhoods with median family income below the 1979 median for the state ($21,537); 7 of the 11 schools from Oregon serve neighborhoods with median family income below the Oregon median ($20,027).\textsuperscript{11} The range extends from $11,000 to $28,000. In addition, 9 of the 30 schools have a minority population of 50 percent or more. Among the participating seventh graders, 41 percent came from disrupted families (did not live with both natural parents), and one-third had a minority background.

The selection process also yielded substantial variation on other school characteristics—such as prevalence of substance use—for which no information was available at the time of district selection. For example, the percentage of students who had used cigarettes in the

\begin{table}[h]
\centering
\begin{tabular}{|l|c|}
\hline
Characteristic & Number of Districts \\
\hline
Location & \\
Oregon & 3 \\
Northern California & 3 \\
Southern California & 2 \\
Locale type & \\
Large city (over 100,000) & 2 \\
Medium city (50,000–100,000) & 1 \\
Suburb & 3 \\
Small city (under 50,000) & 1 \\
Rural & 1 \\
Grade span & \\
6–8 & 2 \\
7–8 & 4\textsuperscript{a} \\
7–9 & 2 \\
\hline
\end{tabular}
\caption{Characteristics of Districts Forming the Sample}
\end{table}

\textsuperscript{a}One of these districts includes two schools with grades seven to twelve.

Table 2.2

CHARACTERISTICS OF SCHOOLS FORMING THE SAMPLE

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Number of Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seventh-grade enrollment</td>
<td></td>
</tr>
<tr>
<td>Under 200</td>
<td>5</td>
</tr>
<tr>
<td>200-299</td>
<td>16</td>
</tr>
<tr>
<td>300-399</td>
<td>6</td>
</tr>
<tr>
<td>400-499</td>
<td>3</td>
</tr>
<tr>
<td>Nonwhite&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>0-9%</td>
<td>6</td>
</tr>
<tr>
<td>10-19%</td>
<td>9</td>
</tr>
<tr>
<td>20-49%</td>
<td>6</td>
</tr>
<tr>
<td>50-82%</td>
<td>9</td>
</tr>
<tr>
<td>Some college&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>37-49%</td>
<td>5</td>
</tr>
<tr>
<td>50-59%</td>
<td>11</td>
</tr>
<tr>
<td>60-69%</td>
<td>7</td>
</tr>
<tr>
<td>70-80%</td>
<td>7</td>
</tr>
</tbody>
</table>

<sup>a</sup>Combined percentage of blacks, Hispanics, Asians, American Indians, and multiethnic students at baseline.

<sup>b</sup>Percentage of students who reported on the baseline survey that at least one parent had attended some college.

...month prior to the baseline survey ranged from less than 10 percent in five schools to more than 30 percent in three other schools. If the curriculum proves successful in each of the varied settings included in the sample, this diversity will enhance the confidence with which the program's results can be generalized.

Neither the sample of schools nor the resulting sample of students can be considered a random or representative sample from California and Oregon. However, our goal is to evaluate Project ALERT's effectiveness across different school and district environments rather than to estimate use in a specific population. The purposive nature of the sample enhances the study's generalizability while not affecting its internal validity.
ASSIGNING SCHOOLS TO EXPERIMENTAL CONDITIONS

The assignment procedure strove to achieve comparability across the three groups of schools on characteristics potentially related to student substance use. By reducing differences among cells in measured school attributes, we hoped to improve comparability in unmeasured factors as well, thereby lessening the importance of individual school effects. We used three techniques, described below, to achieve comparability. First, we used district as a blocking factor. Second, we used randomized assignment of schools to prevent the introduction of bias. Third, we restricted randomization to those designs with relatively little imbalance on several key factors.

Blocking by District

School districts form blocks in Project ALERT because schools within a district often have similar underlying substance use rates. Local socioeconomic status and community norms may influence substance use in ways that other variables could not explain. Also, district policies—e.g., how severely officials penalize substance use on campus—may influence the rate of substance use.

Consequently, we matched the cells as closely as possible in terms of district. When we used three schools from a district, we restricted the designs that could be selected to those that assigned exactly one school to each cell. When we used four schools, we required that two cells receive exactly one school while the third cell received two schools. For districts with five schools, one cell received one school and the other two received two schools each. To maintain the randomization property, we selected at random the one or two cells that received two schools. In some districts with four or five schools, we could divide the district into two relatively homogeneous subblocks, one of which contained exactly three schools. In those cases, we required that each member of the three-school subblock be assigned to a different cell.

Restricting Assignments to Those with Well-Matched Cells

Despite the tendency for schools within a district to resemble each other on various characteristics, substantial differences do exist among

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12 This assertion is less likely to hold in large districts with schools that draw from highly diverse neighborhoods; hence the assignment procedure also takes into account variation across schools within districts (see the discussion that follows on the restriction of assignments to well-matched cells).
schools within districts. Because of this fact and the limited number of
units per cell (ten), blocking and randomization alone would not ensure
well-matched cells.\textsuperscript{13} To maximize cell similarity, therefore, we
restricted the assignments to a subset of designs containing well-
matched cells and selected randomly from among those assignments.
Each school in the sample had a one-third probability of being assigned
to any particular cell.

Data used for matching cells included a mixture of publicly available
data and some gathered specifically for this experiment. The most
important data source was an 11-question survey administered to
eighth-grade students at potential Project ALERT schools late in the
academic year preceding baseline. This survey provided information
about the mobility of the students between schools, the educational
level of both parents, whether English was spoken at home, and life-
time and recent student use of cigarettes and marijuana.

Census files provided demographic and socioeconomic status (SES)
data for the census tracts supplying students to each school, which we
matched with each school's catchment area to produce estimates of
racial/ethnic composition, median family income, educational levels of
adults, and the proportion of families that included both parents.
Sixth-grade reading, writing, and math achievement test scores were
collected for the schools that supplied students to our California sam-
ple. The state of California also supplied data on the percentage of
seventh graders who possessed limited English proficiency. Each
school provided data on current and past enrollment in the seventh
grade.

Because districts and schools joined the project sequentially, we
assigned schools to treatments in four phases. In each phase, schools
from two of the eight districts were assigned. The appendix provides
details of the assignment procedure for each phase.

Results of the Assignment Process

Table 2.3 compares the three experimental cells on several baseline
sample characteristics. It shows that we achieved substantial compar-
bility on a variety of measures that were unavailable when the assign-
ments were made. For each of the substance use variables, the
between-cell differences are small compared with differences that might
constitute "meaningful" treatment effects.

\textsuperscript{13} For example, simple random assignment within the blocking constraint might easily
have produced eight of ten control schools that ranked below average in percent minority
for their districts.
Use of blocking and restricted randomization substantially improved the balance across cells. For most variables, the amount of variation among cells is several times smaller than would have occurred, on average, with the use of simple random assignment.\textsuperscript{14} Greater imbalance than expected occurred for only one variable: the percentage of parents who refused consent. Even for this variable, however, simple random assignment would have created greater imbalance about 20 percent of the time.

**SUMMARY**

Our design decisions have ensured a broad test of Project ALERT across a wide variety of conditions. The sample includes eight West Coast school districts and 30 schools, representing a wide spectrum of community environments, racial/ethnic composition, SES, and under-
lying substance-use rates. Each of the three major grade spans for middle or junior high schools in the United States occurs in at least two districts. The seventh-grade curriculum has been taught by 30 different health educators; 97 high school students assisted in delivering the teen leader curriculum. These numerous replications of the main comparisons rule out the possibility of testing the curriculum solely in favorable or unfavorable environments.

The assignment procedure produced cells that match on important baseline characteristics. In addition, having ten schools per cell provides an opportunity for random school effects to average out within each cell. All schools complied with our requirement of randomized assignment. Participating schools also refrained from engaging in additional publicity or prevention activities that might have contaminated the experiment or given the treatment schools an undue advantage. Finally, because control schools were allowed to continue traditional drug prevention programs that did not contain Project ALERT's essential features, the test of its effectiveness is actually more stringent than one based on comparisons with schools having no prevention program at all.
III. ADAPTING THE SOCIAL INFLUENCE MODEL TO DRUG PREVENTION:
THE PROJECT ALERT CURRICULUM

INTRODUCTION

The Project ALERT curriculum builds on and extends the social influence model underlying recent smoking prevention programs. We have strengthened its theoretical base by elucidating the model of effective resistance behavior implicit in the social influence approach—that successful resistance requires both the motivation and the skill to resist prodrug pressures. Each curriculum activity is designed to develop the motivation to resist drugs, the skill to do so, or both.

Specific ways in which we have adapted the social influence model for Project ALERT include the following:

- providing a coherent theoretical framework to guide curriculum content and the process of delivering it;
- addressing the particular beliefs and circumstances surrounding initiation into each targeted substance—cigarettes, marijuana, and alcohol; and
- helping students identify and resist pressures from inside, as well as outside, themselves.

To guide curriculum development and delivery, we have drawn from the health belief model (Becker, 1974) and from the self-efficacy theory of behavior change (Bandura, 1977b). The former, which identifies specific prerequisites for taking preventive action, shaped the curriculum’s overall content. The latter dictated our emphasis on promoting resistance self-efficacy—the belief that one can successfully resist drugs—and provided guidelines for delivering the curriculum.

In this section, we describe how we adapted the social influence model for a drug prevention program. We discuss the theoretical underpinnings of the curriculum’s content and delivery process and show how we translated those concepts into classroom activities.¹

¹See Ellickson (1984b) for additional examples of the relationship between theory and practice in designing the curriculum.
ADAPTING THE SOCIAL INFLUENCE MODEL

Our review of how adolescents start using drugs and what works in drug prevention convinced us that the social influence model provided a solid base for a broader drug prevention curriculum. It already contained specific curriculum strategies that could be applied to alcohol and marijuana use—for example, identifying and countering prosmoking pressures and teaching students how to say "no" to direct offers of a cigarette. However, we felt that a broader drug prevention curriculum required three additional elements: (1) a coherent theoretical framework; (2) specific information about substances besides cigarettes; and (3) material designed to help adolescents identify and resist internal pressures to use drugs. To meet these needs, we adapted the social influence model in the following ways.

Providing a Coherent Theoretical Framework

We drew from the relevant research in two areas to help us structure the curriculum's content and delivery process.2

Guidelines for Curriculum Content: The Health Belief Model. The health belief model (HBM), an approach that has been used for a wide variety of preventive or health-promoting behaviors (Becker, 1974; Becker et al., 1977; Kasl, 1974; Katatsky, 1977; Rosenstock, 1974), guided the content of our curriculum. We considered this model particularly appropriate for our purposes because it specifically addresses how to motivate health-promoting action in the absence of symptoms. Adolescents who have never tried drugs or who have only experimented with them are unlikely to have experienced their negative consequences; hence, they lack the incentives for nonuse associated with impaired health, physical performance, or appearance. Moreover, the act of resistance itself can be costly to young people, requiring that they risk potential rejection from their friends.

The HBM covers both fronts by addressing consequences of drug use that are relevant to teenagers as well as the costs of resistance and the benefits of taking preventive action. It postulates that engaging in preventive or health-promoting action requires (1) the belief that not doing so will have serious personal consequences; (2) the perception that taking action will reduce the likelihood of experiencing (or continuing to experience) those consequences; and (3) the belief that these potential benefits outweigh the monetary and nonmonetary costs of changing one's behavior (perceived barriers to action). As such, the model both identifies factors that promote healthy behavior and

2See Ellickson (1984a) for a previous discussion of the curriculum's theoretical basis.
provides substantive goals for programs aimed at helping people do so (Becker, 1974; Rosenstock, Strecher, and Becker, 1988). Elements adapted from this model and stressed in Project ALERT include:

- increasing the student’s sense of the seriousness of drug use;
- augmenting the student’s perceived susceptibility to the consequences of using drugs;
- decreasing the perceived barriers to resistance (including the lack of resistance skills as well as the belief that resistance is costly and cannot be successfully carried out); and
- increasing the perceived benefits of resistance.

Each of these elements is aimed at strengthening motivation to resist by (1) providing personal reasons to avoid drug use; or (2) decreasing the adolescent’s perception that resistance is difficult and costly. For example, rather than presenting a laundry list of how drugs can hurt people, we focus on consequences that the students themselves consider serious and likely to happen to them (e.g., the potential to create problems in their daily lives and social relationships). We do this by eliciting their own beliefs about “how drugs can affect you” and then elaborating on their responses. In similar fashion, we try to personalize the benefits of resistance, thereby providing positive incentives for nonuse.

The heart of the curriculum—teaching resistance skills—seeks to lower barriers to resistance. Because we believe that its absence constitutes a major barrier to resistance, the curriculum gives particular emphasis to activities that foster resistance self-efficacy. For example, when students role-play how to refuse drugs offered by a friend or hear how others have done so, they both acquire a new skill and learn that resisting pressure may not be as difficult as they had thought. When they practice how to say “no” to the drug, not to their friend, they learn how to avoid the personal rejection that many adolescents fear will accompany resistance. And when they recognize that most people do not use drugs, they also learn to question the belief that resistance is rare and seldom successful.

This brief discussion of how we have translated the HBM guidelines into concrete activities illustrates the curriculum’s affinity with theories about how children give meaning to new information. Research from cognitive psychology stresses the importance of helping

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3This conceptualization explicitly incorporates self-efficacy into the health belief model by treating its absence as a barrier to resistance, a formulation also advocated by Janz and Becker (1984). As we discuss in the following section, Bandura’s prescriptions for enhancing self-efficacy have also provided the guidelines for Project ALERT’s teaching process.
students assimilate and “make sense” of new information by taking into account the ideas they have already acquired and providing connections between the classroom lesson and their real-life experiences (Collins, Brown, and Newman, in press; Lave, 1988; Resnick, 1987). The HBM shares this cognitive focus, stressing motivation as a prerequisite for action. So does Bandura, from whose work we drew our guidelines for the teaching process. Bandura’s focus on self-efficacy provides explicit strategies for helping students “connect” with the material being presented—seeing others model a new skill, role playing real-life scenarios, and, in general, actively participating in the learning process (Bandura, 1977b, 1984, and 1985). As we discuss below, it also guided the process by which we moved from HBM guidelines to specific activities.4

Guidelines for Curriculum Delivery: Self-Efficacy Theory. We also believed that how the curriculum was presented was potentially as important as the content itself in motivating students to resist drugs and in giving them resistance skills. Self-efficacy theory, which postulates that believing in one’s capacity to accomplish a particular task is a key prerequisite to successfully doing it, supported this assumption. It provides clear prescriptions for helping people believe they can change their behavior and thus for enabling them to actually do so. Those prescriptions are equally germane to our goal: helping adolescents believe they can successfully resist drugs and teaching them the necessary resistance skills.

Bandura and others have shown that specific measures of perceived self-efficacy predict behavior change across a variety of domains, including dieting, pain control, phobias, mathematical performance, and smoking cessation (Baer, Holt, and Lichtenstein, 1986; Bandura, 1977a; Bandura et al., 1980; Edell et al., 1987; Manning and Wright, 1983). Indeed, self-efficacy affects “whether people even consider changing their behavior, how hard they try should they choose to do so, and how well they maintain over time the changes they have achieved” (Bandura, 1984, p. 133).

By extension, techniques that could promote resistance self-efficacy—the belief that one can successfully resist prodrug pressures—should also foster the learning of resistance skills and their use in future situations. Such techniques exist. In research covering several

4At the end of this section, we describe each lesson in detail, providing additional examples of how the health belief model guidelines have been translated into concrete activities.
years, Bandura has identified the following methods for enhancing perceived self-efficacy:\footnote{Bandura, 1977a, 1977b, 1982a, 1982b, and 1985; Bandura and Simon, 1977; Bandura and Schunk, 1981; Bandura and Cervone, 1983.}

- specifying explicit, proximal goals;
- promoting performance accomplishments through active involvement (participation and practice);
- providing models of successful (resistance) behavior; and
- providing task-specific feedback that reinforces and validates successful performance.

We incorporated these processes into the Project ALERT curriculum in the following ways:

*Explicit, Proximal Goals.* Explicit, near-term goals provide clear guides for action that can be realized in the here and now. Proximal goals that foster achievement of larger future objectives are particularly effective in providing incentives and guides for action and in bolstering self-efficacy (Bandura, 1984). We operationalized these concepts by dividing each program session into discrete “skill chunks,” with proximal goals for each chunk that are explicitly communicated to the students: “Today we’re going to learn how to identify pressures to use drugs that come from inside ourselves,” or “Now we’ll learn how to say ‘no’ when someone offers us pot.” Because teachers frequently view these statements as nonessential, they are highlighted in the curriculum and stressed during training.

*Performance Accomplishments.* Bandura (1985) found that the most effective means of enhancing self-efficacy is through performance accomplishments—trying out the behavior in question and successfully performing it. Considerable research also indicates that adolescents are much more likely to learn new materials and skills when they actively participate in the learning process. Project ALERT seeks to foster such experiences by stressing active involvement and deemphasizing didactic teaching. Many activities call for student participation in the form of question-and-answer techniques, class and small-group discussions, individual and group role playing, and written exercises.

Following Bandura, we give particular emphasis to activities that elicit performance of resistance skills. For example, several “trigger” films call for group skits in which students act out successful “saying no” solutions before viewing the filmed solutions. The skits invariably anticipate one or more of our solutions, thereby reinforcing student performance while also allowing the health educator to stress that
there are several ways to resist. This process helps students learn that they can choose among several coping strategies, thus bolstering the likelihood that they will find a plausible option when the need arises and increasing the likelihood that they will actually exercise such an option.

Other resistance exercises call for individual practice—providing written responses to internal pressure scenarios and saying “no” to direct pressure from the teacher or teen leaders. Through repeated individual and group practice, we seek to help students experience the satisfaction of success, develop a robust sense of resistance self-efficacy, and look in a repertoire of responses they can use in real-world situations that tempt them to try drugs. To help students circumvent feelings of failure in the face of real-life pressures, we acknowledge the greater difficulty of resisting outside the classroom, emphasizing that saying “no” successfully becomes easier the more you do it.

**Modeling.** Several of these participatory learning modes make use of modeling—learning new behaviors by observing (and later imitating) the behavior of others. As individual students act out different ways to say “no” or provide counterarguments to prodrug pressures, the rest of the class observes a successful technique that they can emulate in the future; similarly, the classroom teen leaders, as well as the health educator, provide personal examples of effective resistance that demonstrate how it can be done while illustrating the rewards to be gained from resisting.

We enhance the credibility of the role models by selecting live and filmed teen leaders who appeal to a variety of student groups, maximizing ethnic and racial diversity where appropriate, and balancing teen leader “images” (athletic, social, student leader, fringe, etc.). Role model credibility is also strengthened by the classroom behavior of both the health educators and the teen leaders. Encouraged to respect the students, they strive to create an environment in which students feel important and reinforced for participating in session activities.

**Reinforcement and Validation.** The fourth technique for enhancing self-efficacy involves verbal persuasion—encouraging students to believe that they are acquiring specific resistance skills and that they will be able to use these skills effectively outside the classroom (Bandura, 1985). Project ALERT stresses verbal persuasion in the form of task-specific feedback that reinforces student performance. Because the program elicits responses from the students rather than presenting a prefabricated menu of “do’s and don’ts,” there are numerous opportunities for feedback. Moreover, the health educators and teen leaders practice several reinforcement techniques during training—for example,
praising students for specific contributions or repeating student responses of “saying no” solutions. These techniques, several of which are built into the curriculum, foster increased self-efficacy by ensuring that appropriate student contributions receive attention and approval.

Validation, or the nonjudgmental acknowledgment of student feelings, plays a more subtle role. We encourage the health educators and teen leaders to acknowledge student feelings that the pressures to use drugs are powerful and that resistance can be difficult. Denying such beliefs would, we believe, build hostility and resistance; acknowledging them supports both the legitimacy and the importance of the program. (Why teach these skills if they are easy to put into practice?)

*Respect for Students.* We have added *respect for students* to this list of tactics for presenting the curriculum effectively. We stress treating students with respect because we believe that doing so enhances their receptivity, motivation to learn, and identification with the teacher. In Project ALERT, creating a climate of respect means that both health educators and teen leaders must acknowledge students’ freedom of choice, listen to their opinions, and abide by the ground rules mutually established by teachers and students—for example, not repeating confidential statements outside the classroom. We ask teachers to avoid exhorting students not to use, emphasizing instead that Project ALERT will help students say “no” when they don’t want to use drugs but feel pressured to do so. These statements are built into the curriculum.

### Providing Specific Information About Each Substance

Because Project ALERT targets several substances—cigarettes, marijuana, and alcohol—we felt that we needed to address specific beliefs about the harmfulness or desirability of each substance. Demonstrating that cigarette use has declined dramatically or showing how it can affect one’s attractiveness to others will not necessarily affect motivations to try marijuana or alcohol. We also needed to address adolescent beliefs about what makes marijuana or alcohol use desirable and to clarify the potential problems that teenagers can experience even the first time they try such substances.

We designed exercises for the seventh- and eighth-grade curricula that focused on why people do and do not use cigarettes, alcohol, and marijuana; what the consequences are of their use; and how to identify and counter the messages in cigarette and alcohol ads. We also developed posters and original films that amplify these exercises—for example, a film that dramatizes the consequences of using pot at a
party and another that shows teenagers discussing the benefits of resisting pressures to use alcohol and marijuana.\textsuperscript{6}

**Identifying and Countering Internal Pressures to Use Drugs**

To help us understand the pressures to use drugs that adolescents experience, we conducted a series of discussions with junior high and high school students at the beginning of our curriculum design process. We divided students into user and nonuser “rap” groups and asked them why they did or did not use specific substances, how they got started, in what circumstances they used different drugs, and what helped them resist. These discussions yielded an important lesson: while many students insisted that no one forced them to do drugs, all felt pressured to do so. Closer probing disclosed that students felt internal pressures—subtle beliefs such as “I’ll be left out if I don’t act like the others”; “Doing drugs will be a good way to get back at my parents”; or “I’m bored; maybe smoking pot will make life more interesting.”

These rap sessions also revealed an important difference between younger and older adolescents: high school students could identify these internal pressures, but junior high students could not. Neither their experience nor their cognitive development had yet equipped the junior high school students to identify their own beliefs about the rewards associated with trying drugs or to perceive how those beliefs could translate into internal pressures to experiment.

To address this lack of self-awareness, we designed exercises to help students identify—and resist—internal pressures. For example, we developed short psychodramas that graphically depict “pressures from inside yourself” plus exercises that help students identify the different sources of pressure and point out how they work. In addition, we stressed learning how to say “no” both to internal pressures and to direct offers of a cigarette, marijuana joint, or drink.

**OVERVIEW OF THE CURRICULUM**

Project ALERT seeks to develop the motivation and skills to resist drugs by helping students:

- develop reasons not to use drugs;
- identify pressures to use;

\textsuperscript{6}See the following sections and Ellickson, 1984a, for a more complete description of these activities.
• counter prodrug messages;
• learn how to say "no" to external and internal pressures;
• understand that most people do not use drugs; and
• recognize the benefits of resistance.7

The seventh-grade curriculum consists of eight sessions, five of which constitute the curriculum's core and are taught sequentially over five weeks. The last three sessions, designed to reinforce the earlier lessons, can be more widely spaced.8 The three eighth-grade booster sessions are also taught a week apart; they are designed to reduce the erosion of resistance skills by reinforcing the previous year's lessons. They also seek to strengthen the motivation to resist by introducing new material on reasons not to use alcohol, cocaine, and other substances and by clarifying how friends can help each other resist drugs.

Each lesson bears the imprint of the theoretical guidelines derived from the health belief model and from self-efficacy theory. Each session also builds on preceding ones. The first two lessons are intended to develop motivation to resist by enhancing students' perception of the seriousness of drug use and of their personal susceptibility to its harmful effects. The next three sessions address both motivational and skill-building objectives; they help students identify pressures to use drugs, counter prodrug messages (including the belief that "everyone uses"), and learn how to say "no" to both internal and external pressure. The final three sessions reinforce the earlier content and add activities designed to clarify the benefits of resistance.

Sessions 3 through 8 also seek to dispel barriers to resistance—e.g., lack of resistance skills and beliefs that resistance is difficult, rare, and unlikely to be successful. By practicing these skills themselves and observing how others have avoided pressures to use drugs, students are encouraged to develop the conviction that they know how to resist drugs and can do so successfully.

We now discuss each session in more detail, showing how we translated the theoretical guidelines into concrete activities. We focus on the seventh-grade curriculum and refer to eighth-grade activities only when they add new material. We also refer to the instructor as

7These goals are often sufficiently specific to function as the proximal goal for a curriculum activity (e.g., learning how to identify where pressures to use drugs come from). In other cases, we phrase them in terms of specific activities (e.g., translate the goal of countering prodrug messages into the phrase "Now we'll rewrite the ad to tell the real truth about drugs").

8Our implementation schedule called for a week's break after session 5 and for consecutive weekly sessions thereafter.
the health educator, although, as we discussed in Sec. II, the health educator might be team-teaching some sessions with a teen leader.

Session 1: Reasons People Do and Do Not Use Drugs

The first session sets the stage for the program. The health educator introduces Project ALERT and tells the students that during the eight-session program, they will discuss why people do and do not use drugs, will learn how to identify and resist prodrug arguments, and will learn how to say “no” when they feel pressured to try cigarettes, marijuana, alcohol, or other substances.

Students are then divided into groups and asked to write down reasons why some people do smoke cigarettes or marijuana and why most do not. Their lists, which are taped on the blackboard, typically include some aspect of peer pressure: to be accepted, to be “cool,” to be part of the group.

The focus on peer pressure sets the stage for the “saying no” exercises later in the curriculum. Students also suggest other reasons—e.g., using pot or cigarettes is relaxing or helps you get away from your troubles. These responses allow the health educator to correct misconceptions such as the belief that cigarettes and marijuana are physically relaxing.9

When asked to give reasons why people do not use pot or cigarettes, students usually point out that both substances are bad for your health, can get you in trouble, and waste money. In addition, they mention the effects of cigarettes on one’s social acceptability and lungs while noting that pot can “mess up your life” (affect one’s grades and motivation) and “make you feel terrible” (nauseated, paranoid). These themes are elaborated in a film, Let’s Talk About Marijuana, which shows junior high and high school students discussing why teenagers use pot and why most of them do not.

These activities bring out consequences of use that are immediately relevant to teenagers while avoiding didactic lecturing and scare tactics that might cause students to avoid or block out the message. They also bring specificity to the curriculum, clarifying student beliefs about the harmfulness or desirability of each substance. Because they are

9Both cigarettes and marijuana actually increase heart rate rather than relax the body. People addicted to nicotine physically need its presence in the bloodstream to avert the feeling of tension that comes from nicotine withdrawal. When they raise their nicotine level again, the tense feeling abates and they feel relaxed. In the case of marijuana, users feel relaxed because the drug slows down reaction time, thought processes, and the ability to register what people are saying.
Why people don't smoke cigarettes?

1. They know it's bad for them!
2. They don't want to get addicted!
3. It's dangerous to your lungs.
4. They don't want to get cancer.
5. It can get to be costly!
6. They don't want to get in trouble.
7. It can get on your clothes, in your hair, and give you bad breath.
8. It can put bacteria on your teeth and make yellow marks.

Why People don't smoke Pot.

1. Because it can kill your brain cells.
2. It's against the law.
3. They're not under peer pressure.
4. They don't want to mess up their lives.
5. They feel terrible after a while.
6. They make their families feel upset.
7. It's too dangerous.

Fig. 3.1—Example of session 1 materials
elicited from the students themselves, the "why not" lists automatically reflect the consequences of drug use that seventh graders consider serious and likely.

**Session 2: Consequences of Use**

The second session builds on these ideas by asking students to trace what happens "after you smoke a cigarette or marijuana joint the first time, after you've smoked a while (regularly at parties), and after you've smoked a long time (several years)." Using question-and-answer techniques, the health educator elicits important consequences that students may not have mentioned, corrects erroneous perceptions, and clarifies problems associated with smokeless tobacco products. These discussions are supplemented by specially designed posters depicting the effects of tobacco and marijuana use and by an original film dramatizing the effects of using pot at a party. During the first eighth-grade booster session, we expand the material on drug use consequences to include problems associated with alcohol use along with new facts about cocaine, drinking and driving, smokeless tobacco, and clove cigarettes.

Because adolescents tend to be present-oriented, session 2 stresses the immediate and social consequences of use: how cigarette smoking can affect one's personal attractiveness (yellow teeth, "ashtray" breath, smelly hair and clothes); how marijuana use affects the ability to control one's actions, to drive a car, to cope with one's emotions, and to communicate and remember; and how both can interfere with performance at sports or cause trouble at home or at school. Immediate consequences heighten student susceptibility to the effects of trying drugs; social consequences emphasize results that adolescents consider serious. Long-term health hazards, although also discussed, are given less emphasis.

**Session 3: Identifying and Countering Prodrug Pressures**

In the third session, the students demonstrate their own skills at identifying and countering arguments to use. This session, which introduces pressures to use drugs, is designed to reduce barriers to resistance: inability to identify internal and external pressures, the belief that use is widespread, and inadequate skills in countering prodrug arguments. It has three activities: (1) identifying where pressures come from; (2) getting an accurate picture of drug use; and (3) outsmarting the advertisers.
The class begins with a group discussion and poster-making activity focused on identifying both the sources of pressure (friends, parents or other adults, the media, oneself) and specific “pressure messages” that might emanate from each source. Because students typically omit “pressures from inside yourself,” we provide the health educator with questions that draw out the appropriate response. Students then think up counterarguments to one or two of the pressure messages written on the poster.

To further demonstrate what internal pressures are like and to reinforce group norms against use, the health educator asks students to estimate the proportion of eighth graders in their district who have used cigarettes (and then marijuana) in the past month. Their estimates, which typically exceed actual prevalence rates, are countered with district statistics showing that only a minority are current users. Students are encouraged to recognize that choosing not to use drugs places them in the majority and to explain “why we usually think most people use” (we see the same kids smoking in the same places; nonusers seldom talk about what they don’t do; nobody notices that a group of kids is not using pot).

In the final activity of session 3, students play “outsmart the advertisers.” Using ads the teacher had earlier asked them to bring from home, they identify how advertisers associate cigarettes and alcohol with things most people want—for example, cigarettes will make you glamorous, independent, and liberated if you are a woman or macho if you are a man, or drinkers are successful people with good taste. The health educator points out what powerful messages these are and how they appeal to values reinforced in the culture in many other ways. Students then rewrite their ads to tell the real truth about cigarettes and alcohol—e.g., “Come puff your life away,” or “Then I flunked to Myers’s rum.”

Sessions 4 and 5: Saying “No” to External and Internal Pressure

The fourth and fifth sessions tackle an additional barrier to resistance: difficulty in saying “no” to direct offers of a cigarette or marijuana joint and to the more indirect pressures that come from within ourselves. In schools assigned to the teen leader program, these sessions also serve to introduce the teen leaders.

During session 4, we stress that there are several different ways to say “no”; if one way does not feel comfortable, perhaps another will.

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10District data came from the prebaseline survey used in assigning schools to the experimental conditions.
Fig. 3.2—Example of session 3 materials

"You've come a long way, baby—to the hospital!"
"Baby, you'll last longer if you don't smoke"

"Drink tonight, hangover tomorrow."
"Then I flunked to Myers's rum"

"Be a real cowboy, don't smoke!"
"Come puff your life away"
After viewing a “trigger” film in which the heroine is faced with the challenge of refusing the offer of a cigarette from a boy she much admires, the students form small groups to act out how the film character can say “no” and still feel good about herself. Once they have presented their skits, we ask the students to compare their own solutions with the three shown on film and with the six ways to say “no” shown on a poster (a simple “no,” giving a reason, offering an alternative, standing up to pressure, avoiding the scene, and leaving the scene).

Teen leaders or health educators then elaborate on the several choices depicted in the “Ways to Say ‘No’” poster and provide personal examples of how they themselves have resolved similar problems.

Session 5 provides additional “saying no” practice, with an emphasis on internal pressures—beliefs that prompt one to try drugs even when no one directly offers them. Teen leaders or health educators help the students identify “pressures from inside yourself” by acting out examples of these beliefs—for example, feeling that trying drugs will make one accepted or less anxious at a party, will overcome boredom, or will demonstrate one’s independence and maturity. Students then write down and act out their own responses to several internal pressure scenarios.\(^{11}\)

**Sessions 6 to 8: Reinforcing the Core Curriculum and Identifying Benefits of Resistance**

The last three sessions reinforce the material already presented. They review the consequences of use through a classroom contest, ask students to resolve the dilemma posed in another trigger film depicting two boys offered marijuana at a party, and have students create their own skits in which the central characters say “no” successfully.

Sessions 7 and 8 also point out the benefits of resistance, a concept that implies two distinct but related strategies: clarifying the rewards derived from the act of resisting drugs as well as the benefits of nonuse. Adolescents rarely think about, much less verbalize, the rewards of resistance. Just as they are more likely to notice smokers than nonsmokers, so are they more likely to contemplate the advantages of drug use than those of avoiding it. We seek to make the rewards of resistance more salient by explicitly asking students to write down all “the good things you get” from resisting pressures to use drugs. Seventh graders typically conceptualize these benefits as the

\(^{11}\)To reinforce an overall climate of resistance, the eighth-grade booster sessions include practice in how friends can support each other in saying “no” to drugs as well as exercises designed to reinforce skills learned the previous year.
WAYS TO SAY "NO"

Simply say NO
NO THANKS

Give a reason
NO IM INTO ATHLETICS

Offer an alternative
NO THANKS LETS GET SOME FOOD INSTEAD

Stand up to pressure
I REALLY MEANT IT WHEN I SAID NO!

Leave the scene

Avoid the scene

Fig. 3.3—Ways to say "no" poster
reverse form of negative consequences (e.g., improved vs. impaired performance, white vs. yellow teeth, or being able to remember vs. loss of short-term memory). Thus the exercise reminds them of the costs of drug use and of their own vulnerability to these costs.

We also encourage students to write down benefits directly derived from the act of resisting drugs: the sense of personal satisfaction and improved self-image associated with being able to say "no"; increased respect from one's peers and/or family; and the feeling of being in control of one's actions. Because they bring immediate gratification, these rewards have special appeal for adolescents. A videotape depicting teenagers talking about the benefits of resisting pressure supplements this activity.

At the end of the program, students write down "why I don't want to become dependent on drugs" on Project ALERT diplomas. The health educator collects the diplomas, reads volunteered responses, and returns them in a "graduation" exercise.

SUMMARY

The Project ALERT curriculum builds on the social influence approach to smoking prevention and strengthens its theoretical base. Focusing on the social influence model's implicit premise—that successful resistance behavior requires both motivation and resistance skills—we have drawn on two theoretical sources to guide curriculum content and delivery. The health belief model, which addresses motivation, has shaped the curriculum's overall content. Self-efficacy theory, which provides strategies for changing behavior, influences the way we teach resistance skills and convey information.

Elements of smoking prevention programs that have been incorporated into Project ALERT include helping adolescents understand the immediate consequences of use, identify and counter prodrug pressures, resist direct offers, and recognize that most people do not use drugs. We have adapted their approach by giving the process of curriculum delivery as much attention as its content; by including information about marijuana, alcohol, and other drugs that is meaningful to adolescents; by helping students identify and resist inner pressures to use drugs; and by clarifying the benefits of resistance.

Project ALERT's theoretical foundation, coupled with attention to the reality of adolescent motivations and abilities, provides one of the requirements for rigorously testing the social influence model's effectiveness in preventing drug use. The other two requirements are an adequate evaluation design and faithful program implementation. In the next three chapters, we turn our attention to these topics.
IV. THE EVALUATION COMPONENT

INTRODUCTION

In evaluating Project ALERT’s ultimate effectiveness in curbing actual drug use, we seek to answer the following questions:

- Does the social influence model work when applied to substances other than cigarettes?
- Is the program effective across a variety of school environments?
- How effective is this approach at preventing or delaying drug use onset? Does it curb greater involvement for both nonusers and experimenters?
- Is it equally effective when delivered with and without the assistance of teen leaders?
- How long do program effects, if any, persist?

This section describes the data base that will allow us to resolve these questions. It also presents information on three additional features of the evaluation plan: (1) the steps taken to monitor and assess the fidelity of curriculum delivery; (2) the plans for assessing whether the program has the expected impact on adolescent beliefs about drugs and their ability to resist them; and (3) our efforts to minimize data problems that can threaten the validity and generalizability of the results. It concludes with an assessment of the overall reliability and validity of the data base.

ASSESSING PROGRAM IMPLEMENTATION

Experience tells us that prevention programs can fail for one or both of two reasons: (1) the underlying model reflects a faulty diagnosis of the problem and its solution; or (2) the program was poorly implemented. Unfortunately, many evaluations do not provide information that allows us to distinguish between the two (Schaps et al., 1981; Pollich et al., 1984). To eliminate this ambiguity, we devoted substantial resources to ensuring that the program was faithfully implemented.

To assess whether the Project ALERT curriculum was delivered as designed, we monitored 41 percent of the 2,300 classroom sessions scheduled during grades seven and eight using standardized observation forms that had been tested and refined during the program’s pilot test.
Each form broke the lesson into its major activities (for example, introduction, video and discussions, role playing, and wrap-up); for each activity, the monitor assessed whether its key components had been covered and the extent to which it generated student interest and participation.

At the end of the lesson, the monitors completed three series of overall session assessments:

- Completeness and fidelity of program content
  - How well was the session's substance conveyed to students?
  - Were all the lesson's key activities delivered, and if not, what was omitted?
  - Which activities, if any, were rushed, interrupted, or too drawn out?
- Fidelity of the teaching process (did the delivery process adhere to Project ALERT's teaching style?)
  - How warm and open was the classroom environment?
  - How well did the health educator (and teen leaders, where applicable) draw students out in discussions, make appropriate use of positive feedback and discipline, work together as a team, and establish rapport with students?
  - How well did they know the curriculum?
- Overall session evaluation
  - How well did the session go overall?

All evaluative judgments were rated on five-point scales anchored by behavioral indicators that specified how to judge the end points. For example, indicators that the teacher's knowledge of the curriculum was inadequate (a score of 1) included omitting key session points and activities, constantly referring to the manual, reading the lesson verbatim, demonstrating an inability to answer questions for which the curriculum provided answers, and making incorrect statements about proximal goals. Superior knowledge (a score of five) was indexed by the opposite criteria.

We taught monitors how to fill out the form for each session and how to resolve rating discrepancies. In addition, experienced staff accompanied new monitors on their initial assignments to further discuss and resolve rating discrepancies in actual classroom situations.

To assess intermonitor reliability, we compared the variance between sessions with the variance within sessions using the analysis-

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1Key session points, activities, and proximal goals were highlighted in each lesson, which the monitors used to follow the health educator's presentation. When outside interruptions such as loudspeaker announcements shortened the time available for a lesson, omitted statements and activities attributable to that interruption were not counted as indicating inadequate knowledge of the curriculum.
of-variance (ANOVA)-based intraclass correlation (Winer, 1971). The intraclass correlation estimates the reliability of a single monitor's ratings on the basis of the agreement observed among monitors rating the same session. During the seventh grade, 77 sessions were rated by two or more monitors. For the overall session effectiveness rating (averaged rating across three components of the sessions), we obtained an estimated reliability for a single monitor's rating of 0.67. The estimated reliability of overall session effectiveness ratings for two monitors was 0.81.

In addition to classroom monitoring, we obtained two other evaluations of program implementation: (1) anonymous student evaluations of the seventh-grade curriculum; and (2) written and verbal feedback from the health educators and teen leaders following delivery of each week's curriculum session. The former provide a systematic picture of student reaction to the Project ALERT curriculum—how well they liked it, whether they were comfortable participating in classroom activities, whether they thought they were told the truth about drugs, and whether they thought the program would help them resist drugs in the future. The latter provided additional information about how well the curriculum worked in the classroom.

MEASURING PROGRAM OUTCOMES

Drug Use Outcomes

Our primary sources of data on program outcomes are student self-reports detailing whether, how often, and to what degree students have used specific legal and illegal substances. To collect these data, we administered 25- to 30-page questionnaires to students six times over the study period: before and after delivery of the seventh-grade curriculum (waves 1 and 2), before and after delivery of the eighth-grade curriculum (waves 3 and 4), and once each when the students were in grades nine and ten (waves 5 and 6). These data collection points permit evaluation of program results 3, 12, 15, 24, and 36 months after baseline (see Fig. 4.1).^3

^2Most of the 77 sessions paired a monitor based in the district with a monitor from the central staff. About 60 percent of these sessions involved lessons 1 to 3. Monitor involvement in the reliability sample was proportional to each monitor's overall participation in the classroom observations. In general, monitoring was spread uniformly across curriculum sessions.

^3At waves 3, 5 and 6, we also conducted extensive efforts to track students who had moved, mailing surveys to their new home or school.
At baseline (wave 1), the questionnaires included a battery of questions about personal use of the three target substances: cigarettes, alcohol, and marijuana. These items elicit information about lifetime use, the most recent occurrence, frequency of use within the past month and year, and dosage. They also provide indicators of abuse such as frequent and heavy use within the past month, use by oneself, and binge drinking.

To tap the use of other, less prevalent drugs, we asked a series of yes-or-no questions about lifetime and current use of chewing tobacco or snuff and about lifetime use of stimulants, depressants, cocaine, and other drugs filled in by the student. Except for chewing tobacco, which 24 percent of the seventh graders had used at least once, the highest rate of lifetime use before program delivery was only 4 percent—for stimulants (uppers).

As the students grew older and more likely to expand their drug involvement, we added items to the original battery. By grade ten, the survey included questions about substance use over the last six months, frequency of being high or intoxicated, how often students had used eight additional drugs over the past year, and simultaneous use of multiple drugs. It also asked students how often they had missed school or work because of using marijuana or alcohol.

Table 4.1, which summarizes baseline results on recency of use for the seventh-grade students, illustrates the richness of the data available for measuring program outcomes. Taken together, these questions allow us to classify almost every student into one of the following categories at baseline: nonusers, experimenters (those who have tried
once or twice but are not current users), and users (current users or those who have used on three or more occasions). Because the items are repeated at subsequent waves, we can also observe patterns of use over time—including initiation and quitting, transitions from occasional to regular use or abuse, and transitions from soft to hard drugs. In addition, repeated observations provide consistency checks for the identification of lying or misreporting at successive waves of data collection.

As Table 4.1 shows, a fairly substantial proportion of seventh graders had tried alcohol, cigarettes, or marijuana before Project ALERT began. However, about 80 percent or more had not used these substances recently (in the past month), perhaps a more realistic measure of "user" status. Nevertheless, these figures are considerably higher than those we earlier described for a national cohort of 12- and 13-year-olds in 1985. They indicate that Project ALERT's prevention potential in West Coast schools is not as high as the national data suggested it might be.

Table 4.1

PERCENTAGE OF SEVENTH-GRADE STUDENTS WHO HAD USED CIGARETTES, MARIJUANA, AND ALCOHOL WITHIN VARIOUS PERIODS BEFORE BASELINE

<table>
<thead>
<tr>
<th>Period of Time</th>
<th>Cigarettes</th>
<th>Marijuana</th>
<th>Alcohol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past two days</td>
<td>5</td>
<td>b</td>
<td>b</td>
</tr>
<tr>
<td>Past week</td>
<td>7</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Past month&lt;sup&gt;a&lt;/sup&gt;</td>
<td>16</td>
<td>7</td>
<td>23</td>
</tr>
<tr>
<td>Past year&lt;sup&gt;a&lt;/sup&gt;</td>
<td>33</td>
<td>14</td>
<td>55</td>
</tr>
<tr>
<td>Lifetime</td>
<td>52</td>
<td>20</td>
<td>74</td>
</tr>
<tr>
<td>Never</td>
<td>46</td>
<td>78</td>
<td>22</td>
</tr>
<tr>
<td>Incomplete data</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Inconsistent data</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Sample size</td>
<td>6,527</td>
<td>6,527</td>
<td>6,527</td>
</tr>
</tbody>
</table>

NOTE: Last four rows sum to 100 percent; other rows are not mutually exclusive.
<sup>a</sup>Data are also available about number of times used during this period.
<sup>b</sup>Information about use in the past two days was obtained only for cigarettes.
Table 4.2 portrays that prevention potential by classifying these seventh graders into three groups: nonusers, experimenters, and users. To determine the cutoff point between experimenters and users, we analyzed student profiles on attributes related to future drug use (peer and parental use and approval of drugs, student beliefs about drug use, school performance, and family background characteristics). Because students who had tried cigarettes or alcohol once or twice in the past month more closely resembled those who had tried three or more times, we grouped these two together.

As Table 4.2 indicates, Project ALERT's potential for curbing use among nonusers and experimenters is greatest for marijuana, next for cigarettes, and lowest for alcohol. At baseline, 90 percent of the participating seventh graders either had never used marijuana or had tried it only once or twice in the past year; the corresponding figures for cigarettes and alcohol are somewhat lower (78 percent and 66 percent, respectively). These figures reflect the greater acceptability and availability of the legal substances. Table 4.2 also indicates that we cannot prevent the majority of our students from experimenting with alcohol, because almost 75 percent of them had already done so by the seventh grade. Hence our assessment of program impacts on alcohol will focus on the more realistic goal of curbing transitions to regular use and abuse.

Table 4.2

PERCENTAGE OF BASELINE NONUSERS, EXPERIMENTERS, AND USERS

<table>
<thead>
<tr>
<th>Baseline Use Status</th>
<th>Substance</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cigarettes</td>
<td>Marijuana</td>
<td>Alcohol</td>
</tr>
<tr>
<td>Nonuser</td>
<td>46</td>
<td>78</td>
<td>22</td>
</tr>
<tr>
<td>Experimenter (tried once or twice, not in past month)</td>
<td>32</td>
<td>12</td>
<td>44</td>
</tr>
<tr>
<td>User (tried 3+ times or used in past month)</td>
<td>21</td>
<td>9</td>
<td>30</td>
</tr>
<tr>
<td>Classified</td>
<td>98</td>
<td>99</td>
<td>97</td>
</tr>
<tr>
<td>Unclassified owing to missing or inconsistent data</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>
These statistics on baseline usage underline the importance of assessing program effects for children at different levels of risk for future drug use. Considerable research has shown that prior use of a specific substance constitutes the single most powerful predictor of future use (Bachman, O'Malley, and Johnston, 1984; Kandel, Kessler, and Margulies, 1978; Collins et al., 1987). Lumpin nonusers, experimenters, and users together would prevent us from assessing whether the curriculum has differential impacts on children who, because they have already tried a specific substance, are at greater risk for continued and broader drug involvement than their nonusing counterparts.

Accordingly, the evaluation of program effects on drug use behavior will divide our students into three levels of risk at baseline. For cigarettes and alcohol, those three levels will consist of the categories shown in Table 4.2: nonuser, experimenter, and user. Because marijuana nonusers constitute a large and more heterogeneous group, we plan to subdivide them into two risk categories: level 1, those who had also not tried cigarettes by grade seven, and level 2, those who had already tried smoking. Recent research suggests that prior cigarette use puts young people at greater risk for initiating marijuana than does prior alcohol use (Newcomb and Bentler, 1986); our own data show that seventh graders who have tried smoking are four times as likely to initiate marijuana use within the next year as those who have not. Level 3, the highest-risk category, will consist of students who have already tried marijuana.

Intervening Program Outcomes and Antecedents of Use

Many evaluations of successful programs provide little information on how that success was achieved (Sorg, 1980; Glasgow and McCaul, 1985). Did the program produce the changes in student beliefs and perceptions that were anticipated? Or did it work, but not in the expected ways? Project ALERT was designed to help students develop the motivation and capacity to resist drugs by altering several intervening variables:

- increasing their belief that drug use entails serious consequences;
- increasing perceived susceptibility to those consequences;
- reducing student estimates of use among their peers;
- enhancing the belief that resisting drugs is possible and likely to be successful;
• fostering the perception that resistance pays off; and
• lowering students' intentions to use drugs in the future.

Accordingly, the evaluation component includes measures designed to tap each of these perceptions as well as student use of specific drugs and additional characteristics that may be associated with drug use. To facilitate more reliable measurement of underlying attitudinal or personality dimensions, we typically included multiple items that can be used to create a single scale for each domain. The major areas covered are listed in Table 4.3.4

Baseline measures for these and the drug use variables also allow us to adjust for differences in between-cell program outcomes that are not attributable to the curriculum itself. Our procedures for assigning schools to experimental conditions substantially reduced differences in student and school characteristics across the three groups. Nevertheless, any remaining differences, as well as those created later by sample attrition, must be accounted for in the outcome analyses.

STEPS TO ENHANCE DATA QUALITY

Because adolescent drug use is illegal, many observers fear that students will not tell the truth about their own drug experiences. In fact, researchers have found student reports of drug use to be generally accurate.5 Nevertheless, such fears underscore the need to reduce incentives for under- or overreporting drug use behavior as well as the need to assess the extent to which either occurs. Additional threats to data accuracy and reliability can arise if students consciously try to "help" (or hinder) the experiment or if they have difficulty recalling past behavior or reading and understanding the questions. We took several steps to address these problems, descriptions of which follow.

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4 Additional items tapping the concepts listed in Table 4.3 were added in subsequent waves; we also expanded our coverage of variables related to drug use by later adding questions about religiosity, physical and mental health, stressful life events, use of leisure time, peer support, assertiveness, and difficulty of getting drugs.

5 Single et al. (1975) analyzed the internal consistency of responses from 8,200 secondary school students and concluded that "self-administered unsigned questionnaires provide reliable and valid measures of adolescent use of illicit drugs at one point in time, but less reliable responses over time." They added that "inconsistency over time is related to infrequent, sporadic and not current use." Williams et al. (1979) found a very high correspondence between self-reports of recent cigarette use by 14- to 17-year-olds and results of a test for cotinine (a metabolite of nicotine) in the students' blood.
Table 4.3
ITEMS OTHER THAN PERSONAL SUBSTANCE USE INCLUDED IN THE BASELINE SURVEY

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of Items in Baseline Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceptions Project ALERT seeks to modify</td>
<td></td>
</tr>
<tr>
<td>Consequences of drug use</td>
<td>14</td>
</tr>
<tr>
<td>Likelihood of addiction or dependency</td>
<td>2</td>
</tr>
<tr>
<td>Student estimates of drug use prevalence</td>
<td>2</td>
</tr>
<tr>
<td>Resistance self-efficacy</td>
<td>9</td>
</tr>
<tr>
<td>Benefits of resisting</td>
<td>2</td>
</tr>
<tr>
<td>Expectations of future use</td>
<td>3</td>
</tr>
<tr>
<td>Other independent variables</td>
<td></td>
</tr>
<tr>
<td>Environmental influences</td>
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</tr>
<tr>
<td>Peer use of target substances</td>
<td>6</td>
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<tr>
<td>Peer approval of using target substances</td>
<td>3</td>
</tr>
<tr>
<td>Parental use of target substances</td>
<td>3</td>
</tr>
<tr>
<td>Parental approval of target substances</td>
<td>3</td>
</tr>
<tr>
<td>Sibling use of target substances</td>
<td>3</td>
</tr>
<tr>
<td>Offers of target substances</td>
<td>6</td>
</tr>
<tr>
<td>Family structure</td>
<td>1</td>
</tr>
<tr>
<td>Closeness to parents</td>
<td>1</td>
</tr>
<tr>
<td>Subject's behavior and personality</td>
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<tr>
<td>Rebelliousness, nonconformity</td>
<td>3</td>
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<tr>
<td>Deviant behavior</td>
<td>4</td>
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<td>School performance and educational aspirations</td>
<td>2</td>
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<tr>
<td>Self-esteem</td>
<td>2</td>
</tr>
<tr>
<td>Depression</td>
<td>1</td>
</tr>
<tr>
<td>Background characteristics</td>
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<tr>
<td>Ethnicity</td>
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<tr>
<td>Gender</td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td>1</td>
</tr>
<tr>
<td>Parents' education</td>
<td>4</td>
</tr>
</tbody>
</table>

**Saliva Collection and Testing**

To motivate students to tell the truth, we collected a saliva sample from each student immediately before administering the survey, informing the students that tobacco and marijuana can be detected in saliva and that the samples would be tested. Such procedures have been found to improve the accuracy of reported cigarette use among eighth graders (Bauman and Dent, 1982; Murray et al., 1987). Thus,
some prevention studies collect specimens but do not test them (McAlister et al., 1982; Botvin et al., 1984).

We chose to test the specimens because we also wanted an objective measure of the accuracy of student reports about personal tobacco use.⁶ At each survey wave, the test tubes containing individual saliva samples were packed in dry ice and shipped to the American Health Foundation in New York, where they were tested by radioimmunoassay procedures for the presence of cotinine, a metabolite of nicotine (Langone et al., 1973; Haley et al., 1983).⁷ Depending on dosage and other factors, this test can detect moderate use of cigarettes within a period of up to three days (or chewing tobacco over a longer period). Results above 10 nanograms per milliliter (ng/ml) indicate personal tobacco use, while those below 10 ng/ml could indicate either light use or exposure to others’ cigarette smoke (Carey and Abrams, 1988; Wall et al., 1988). Since values exceeding 10 ng/ml are rare or nonexistent among nonsmokers, the risk of incorrectly labeling self-reported nonusers as liars on the basis of this cutoff point is very small (Jarvis et al., 1988; Carey and Abrams, 1988).

The saliva cotinine test reliably discriminates between adult smokers and nonsmokers and is sensitive to low rates of smoking as well as to intermittent use. In young smokers, however, it may not always distinguish smoking a single cigarette from passive exposure (Carey and Abrams, 1988). Consequently, comparisons of saliva tests with self-reports should allow us to detect lying about recent use at low and moderate levels but is less likely to discern failure to report an isolated instance of recent smoking.

Assurances of Data Confidentiality

To reduce incentives for distorting or concealing use, the data collectors followed a strict protocol that described our extensive measures for protecting data privacy and stressed the importance of telling the truth. They also explained that each student had the right to refuse to fill out the survey, provide a saliva sample, or both. To keep nonparticipating students from distracting others during data collection, we escorted nonparticipants to some other location designated by school officials.

⁶Although tetrahydrocannabinol (THC), the active constituent of marijuana, can be detected in saliva, the tests appear to be insensitive to use beyond the previous 24 hours.

⁷We rejected a less expensive test for thiocyanate in saliva because it yields substantial overlap between the scores of nonsmokers and moderate smokers, leading to an unacceptably high rate of false positives (Benfari et al., 1977; Luepker et al., 1981).
Confidentiality measures included preventing teachers, parents, or other nonresearch personnel from seeing student responses, using trained personnel to collect the data, identifying student surveys by number rather than by name, and hand-carrying sensitive data (separate sheets connecting names to ID numbers) from the school to RAND. We also obtained a certificate of confidentiality from the Department of Health and Human Services that prevents public or private individuals from seeking disclosure of individual data by filing suit.

To reduce the possibility that students in treatment schools might try to provide the answers that their Project ALERT teachers would like (or dislike), we used separate personnel for data collection and program delivery. Two-person teams collected the saliva samples and administered the written survey during regular classroom periods. These teams followed a scripted protocol that standardized procedures across classrooms and schools. To further ensure uniformity, the data collectors attended a three-day training session at RAND before each wave of data collection.

Development of Questionnaire Items

To choose items for the questionnaires, we conducted an extensive review of the research on drug use. Almost all of the selected questions had been successfully used in national surveys of adolescent drug use, although we modified some to accommodate the reading levels and experience of seventh and eighth graders. We pretested five successive versions of the baseline survey before using it in the schools; we also pretested subsequent additions to it. These procedures reduced the likelihood that students would provide inaccurate or inconsistent responses because they could not read or understand the question.8

Finally, because recall problems increase as the time between an event and the survey date increases (Bachman and O'Malley, 1981; Bradburn, Rips, and Shevell, 1987), we restricted questions about lifetime use to whether the student had ever tried specific substances, reserving the more difficult questions about frequency of use for shorter time periods.

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8Some seventh- and eighth-grade classrooms had notably lower reading levels than others. We obtained information from the regular teachers about student reading levels in each classroom, and where appropriate, one data collector read the questionnaire aloud.
ASSESSMENT OF DATA QUALITY

High Participation Rates

These efforts to encourage student participation proved quite successful. At baseline, less than 1 percent of the students refused to fill out a survey. Moreover, that proportion remained constant throughout the next three waves of survey administration, indicating that the vast majority of students perceived the data collection process to be nonthreatening.

Accurate Reporting

Students also appear to have told the truth about substance use. Less than 1 percent of the baseline students (17 out of more than 6,500) who denied tobacco use on the survey had cotinine scores that identified them as probable liars. Moreover, 95 percent of the students with positive cotinine scores (N = 257) also admitted to recent smoking or to the use of other tobacco products on the questionnaire. At wave 4, comparisons of physiological test scores and self-reports yielded similar results. Again, only a handful of students denied use in the face of positive cotinine values (N = 15); 96 percent of those with scores indicating active exposure to tobacco admitted use in their self-reports. These findings suggest that the frequency of lying about recent tobacco use is very low; the saliva test verified self-reports for nearly all the students who denied recent tobacco use.

Data on inconsistencies in student self-reports, which provide another measure of accuracy, support the conclusion that few students deliberately lied about alcohol and marijuana use as well. Overall, data inconsistencies were lower than previous assessments of the reliability of student self-reports. Across four waves of data, we found that the proportion of students who denied using a target substance after previously admitting use averaged about 5 percent. Such denials ranged between a low of 2.4 percent for lifetime use of marijuana at wave 2 to a high of 8.1 percent for alcohol onset at wave 4 (see Table 4.4). These results compare quite favorably with the findings of Single, Kandel, and Johnson (1975), who reported an average denial rate of 7 percent for the three substances.

The majority of these retractions came from students who had experimented with one of the substances at some point before they entered grade seven. Because the use they later "denied" was very limited and occurred some time ago, we think that these students may
Table 4.4
NUMBER AND PERCENTAGE OF STUDENTS AT EACH WAVE WHO DENIED PREVIOUSLY ADMITTED USE

<table>
<thead>
<tr>
<th>Wave Number</th>
<th>Cigarettes</th>
<th>Alcohol</th>
<th>Marijuana</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (N = 6,527)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2 (N = 6,411)</td>
<td>245 (4.2%)</td>
<td>366 (6.3%)</td>
<td>142 (2.4%)</td>
</tr>
<tr>
<td>3 (N = 5,880)</td>
<td>317 (5.4%)</td>
<td>430 (7.3%)</td>
<td>171 (2.9%)</td>
</tr>
<tr>
<td>4 (N = 5,111)</td>
<td>377 (7.4%)</td>
<td>413 (8.1%)</td>
<td>211 (4.1%)</td>
</tr>
</tbody>
</table>

simply have forgotten that it happened or subsequently decided that a few puffs or sips were no longer worth mentioning.

In contrast, denials that seem likely to reflect deliberate misreporting were infrequent. Severe retractions—instances in which students denied any experience after having admitted to frequent use on a previous questionnaire—accounted for 7 percent or less of all marijuana and cigarette denials over the four waves and for less than 4 percent of all alcohol denials.8 The maximum number of students who provided severe retractions was 38 (for cigarettes).

Another group of students provided inconsistent data by initially reporting no use of a target substance but later admitting that they had tried it—without also reporting initiation within the intervening time period. Over four waves of data collection, these later admissions averaged about 2 percent, ranging from a low of 1 percent for marijuana at wave 4 to a high of 3.4 percent for cigarette onset at wave 2 (see Table 4.5). Again, our results compare favorably with Single’s earlier study, in which later admissions of alcohol and marijuana use averaged over 4 percent.

Most of the inconsistent “admissions” appear to reflect inaccurate reports of when initiation occurred. Students whose first admission occurs in grade eight (following two or more previous reports of no use) probably did begin using after the last survey date but failed to place the experience within the intervening time period. Certainly the weight of multiple and consistent prior denials argues for considering

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8We defined “frequent use” as 11 or more times in the past year or 6 or more times in the previous month.
them new initiates. The explanation is less obvious, however, for those who admitted "ever using" (but not in the past year) only three months after reporting no experience at baseline. These could be new initiates who had inadvertently skipped the question on use in the past year, or they could be baseline triers who reconsidered their definition of initiation at wave 2, deciding to count a previous trial as "real use." Additional analyses of reported age at first use suggest that the latter interpretation is most likely. We have counted these students as experimenters in our baseline estimates.

Overall, our findings agree with those of other researchers: inconsistent student reports occurred relatively infrequently and typically did not reflect willful misrepresentation (Singleton, Kandel, and Johnson, 1975; O'Malley, Bachman, and Johnston, 1983). Most of the inconsistencies that emerged across four waves of data appear to represent errors of recall about when use occurred or confusion about how to label a few sips of alcohol or puffs of marijuana or tobacco. Does sipping champagne at a relative's wedding constitute use? Does sneaking a few puffs of Mom or Dad's cigarette really mean you have tried cigarettes? What if your parents offer it to you? These are the questions many seventh and eighth graders asked us during data collection; they indicate sincere confusion about what constitutes use, as well as students' concerns about labeling themselves as users when they had merely tried "a few puffs or sips."¹⁰

Nevertheless, a few students did intentionally deny use that was both frequent and relatively recent. We flagged these serious denials and dropped them from the analysis, checking first to see if they were

¹⁰With the exception of religiously sanctioned use of wine, students were told to count any use as a "yes."
significantly more likely to occur in the treatment or control groups and thus threaten the experiment's internal validity. In general, both the serious and the more typical inconsistencies were distributed equally across the experimental groups; hence the analysis of treatment effects remains unaffected.

MINIMIZING NONRESPONSE AND ATTRITION OVER TIME

A particular concern in longitudinal studies is subject nonresponse. Missing data at one or more survey waves can produce analysis samples that differ from the study's target population,\textsuperscript{11} introduce bias into the analysis, and, if dropouts differ substantially from stayers, reduce the evaluation's generalizability. If students omitted from the analysis constitute a nonrandom sample of the original population, they can alter the nature of the group to which the experimental results apply. If such losses differ among experimental groups, estimates of treatment effects can be biased.

For example, students who transfer from one school to another tend to use cigarettes, alcohol, and marijuana more often than do the "stayers" (Ellickson, Bianca, and Schoeff, 1988). Substantial losses of these movers could reduce the generalizability of the results among "at risk" students. If such losses occur disproportionately in the treatment cells, estimates of program outcomes could overstate program effectiveness (unless the analysis takes that fact into account). If, on the other hand, the losses occur about equally across the three experimental cells, the biases would tend to cancel out.

We used several strategies to limit nonresponse. To minimize missing answers that might be attributable to student confusion or to concern about data confidentiality, we took the steps described above: undertaking multiple pretests of the questionnaire, providing standardized answers to student queries, and developing extensive privacy protection procedures. We also took steps to minimize the amount of missing data attributable to (1) parents' refusal to allow students to participate in data collection; (2) absence from school when the surveys were administered; and (3) attrition due to student transfers.

\textsuperscript{11}Our target population at baseline included all seventh-grade students who were eligible for program participation because they were enrolled throughout the five-week period of core curriculum delivery.
Parent Refusals

Requiring active consent from parents (a signed form for every student participating in the evaluation) frequently reduces sample sizes by approximately two-fifths to one-half (Josephson and Rosen, 1978; Lueptow et al., 1977). Active consent also tends to yield samples that underrepresent groups that are important to include in prevention research: minorities, low achievers, and children who have already used drugs (Kearney et al., 1983; Severson and Ary, 1983; Thompson, 1984).

Passive consent procedures (in which parents return a form only if they do not want their child to participate) typically produce substantially higher participation rates. However, many observers fear that this method carries the risk of including children whose parents actually oppose participation but failed to indicate it by returning a form. We conducted a pilot study to evaluate this risk and concluded that the likelihood of falsely labeling nonresponse as consent was small and could be further reduced through the use of both mail and school channels of communication to inform parents about the study (Ellickson and Hawes, in press).

On the basis of these findings, we used a multistage passive-consent process for informing parents: we sent the materials by regular first-class mail, followed up with a postcard reminder, and later sent the original consent package home with each child. We allowed four weeks for parents to respond. The consent package included a letter from the school principal plus a detailed fact sheet about the prevention program and the evaluation activities; these materials were translated into Spanish for schools with a substantial proportion of Spanish-speaking students.

The resulting parent refusal rate of 8.5 percent was considerably lower than the 40 to 50 percent nonresponse rate we might have expected from active consent. In addition, the passive-consent process reduced the loss of “at risk” students. While we lacked data on prior drug use among students whose parents refused participation, we were able to compare them with baseline respondents along the following dimensions: grades in math and English during grade seven, frequency of absences during grade seven, and ethnicity. That analysis indicated that students whose parents refused consent for the evaluation component were not more likely to come from black or Hispanic families or to have frequent absences than the children whose parents did not refuse consent. In fact, they were significantly more likely than participating students to come from Asian families and slightly more likely to have higher grades (Bell, Gareleck, and Ellickson, in press). Being
Asian and doing well in school have each been shown to be associated with lower rates of adolescent drug use (Barnes and Welte, 1986; Chassin, Mann, and Sher, 1988; Jones and Moberg, 1988; Oetting and Beauvais, 1987; Wills, 1986).

Absences and Transfers

To reduce sample losses attributable to student absence and transfers, we (1) scheduled makeup sessions for absent students (starting with wave 1 in the spring group of 18 schools); and (2) tracked students who transferred out of participating schools and mailed the survey to those we located (waves 3, 5, and 6).

The first makeup session reduced the absentee rate by more than two-thirds (from 8.3 percent of the spring sample to 2.5 percent); subsequent efforts yielded reductions of 50 percent or more. Overall, the makeup sessions recaptured close to 6 percent of the baseline sample at four of the five postbaseline waves, reducing the absentee rate to an average of 4 percent (Ellickson, in press).

The tracking effort was similarly successful. At wave 3, we tracked more than 1,000 transferees and retrieved surveys from two-thirds of them. This process cut the loss attributable to student transferees from 15 to 5 percent and raised the overall participation rate from 80 to 90 percent (Ellickson, Bianca, and Schoeff, 1988).

Tracking also reduced the bias attributable to the loss of “at risk” students. Transferees were significantly more likely than stayers to come from disrupted family environments, to have a history of prior deviant behavior and/or drug use, and to do poorly in school. While attrition was constant across experimental conditions and thus did not affect internal validity,\textsuperscript{12} loss of these students could reduce generalizability. Through the tracking process, we succeeded in recovering 40 percent or more of the problem-prone students in each category (Ellickson, in press).

For example, after wave 3 data collection in the classroom, we had data for 3.5 percent fewer children from disrupted families compared with the proportion contained in the baseline sample. After tracking, we had made up 57 percent of that loss, retrieving about 2 percent of the baseline students who did not live with both parents. We obtained the best results—retrievals of 50 percent or more of the loss—for these students plus those who had engaged in deviant activities (truancy, vandalism, lying, cheating, or stealing).

\textsuperscript{12}Transfer rates at wave 3 did not differ significantly across experimental cells; they amounted to 18, 17, and 19 percent for the health educator, teen leader, and control groups, respectively.
SUMMARY

We have collected data that allow us to evaluate whether the program was implemented as intended, how effectively it curbs adolescent drug use, and how it achieved its effects. Six survey waves provide detailed information for analyzing Project ALERT’s effectiveness across different kinds of students, different levels of drug use, and different periods of time. In addition, efforts to recapture information from absentees and student transfers substantially reduced student attrition, holding down the expected loss of high-risk students over time.

We are confident that the data are reliable and valid. Few students refused to participate, and even fewer denied tobacco use but had positive physiological tests. Inconsistent reports—i.e., those in which students contradicted answers given at a previous wave—were relatively infrequent and were rarely attributable to obvious lying. Our confidence is further strengthened by the cumulative pattern of results from multiple analyses and data sources.
V. IMPLEMENTATION STRATEGIES

INTRODUCTION

Our goals for implementing Project ALERT were to maintain the experiment's integrity and to obtain district and school cooperation. To ensure the former, we established strict requirements for participation and tried to maximize uniform curriculum delivery by hiring, training, and closely monitoring our own field staff and teachers. To promote district and school cooperation, we tried to minimize the disruptions caused by the experimental design and to maximize the benefits of participating. We have already discussed school requirements for participation (see Sec. II); in this section we outline the other components of our implementation strategy.

RECRUITMENT AND TRAINING

Central Coordination Combined with On-Site Managers

We organized the field staff by district under the central direction of the staff based at RAND. Each site was assigned one field coordinator and, if warranted by size, an assistant field coordinator. The field coordinators were responsible for their site's health educator and teen leader staff, which ranged in number from 2 to 6 and from 6 to 14, respectively (see Fig. 5.1).

The field coordinators were the linchpins of implementation. Responsible for their site's health educators and teen leaders, they were charged with making sure Project ALERT was implemented smoothly and faithfully. To do this, they established data collection and program delivery schedules, conducted meetings with school and community representatives, helped recruit and train the health educators in their site, supervised program delivery, and provided continual feedback to RAND about the implementation process.

As the key link between the central staff at RAND and their district, the coordinators had to be sensitive to the needs of both. All the coordinators had prior experience working in schools and either lived on site or spent most of their time on site during program implementation. We included them in the early stages of district negotiations so that district personnel would become comfortable with them.
The coordinators spent several days at RAND for training and maintained almost daily contact with RAND staff during data collection and curriculum delivery. Each was paired with a RAND staff member whose responsibility was to provide support as needed, to learn
what was happening in that site, to provide a cross-site perspective, and to adjudicate questions about research requirements.¹

**Strategies Underlying Recruitment, Training, and Classroom Delivery**

The literature on effective innovation identifies several characteristics that contribute to success.² They include:

- clarity of goals and procedures;
- staff competence;
- staff commitment;
- adaptability of the innovation to its organizational environment;
- participation in planning and problem solving;
- clear lines of authority;
- support from top leadership; and
- ongoing communication.

We tried to incorporate these characteristics into our field operations.

Training for the health educators, teen leaders, and field coordinators covered the experimental requirements plus the curriculum’s goals, substantive content, and delivery process. Because implementing the curriculum consistently across multiple sites meant not modifying it, we tried to encourage “ownership” of the curriculum in other ways—for example, by showing teachers that it accommodated their personal teaching styles and by encouraging health educators and teen leaders to suggest ways of making activities work better in diverse classrooms.

We included the field coordinators and health educators in important planning and problem-solving activities. For example, the field coordinators helped develop procedures for recruiting and interviewing health educators and suggested that we spend more training time on modeling and practice. The health educators worked with the trainer to develop the teen leader training manual and provided valuable feedback for fine-tuning the curriculum.

The organizational structure provided central support and coordination for on-site implementation while clearly giving substantial authority to the field coordinators in charge of specific sites. RAND-based

¹For example, shifting postprogram data collection forward several weeks was not acceptable, as it would lead to an evaluation that covered different time periods across districts. In contrast, holding classes in the library, as long as students were not unduly interrupted, was an accommodation that did not impinge on the experiment’s integrity.

²See, for example, Berman and McLaughlin, 1978 and 1979; Ellickson and Petersilia, 1983; Pressman and Wildavsky, 1973; and Sarason, 1982.
monitors were asked to give feedback on classroom performance to the coordinators rather than to the health educators; field staff also coordinated their on-site visits with the field coordinators and checked with them before contacting district personnel. The coordinators met weekly with health educators to discuss their teaching experiences and prepare for the next curriculum session. Health educator meetings with teen leaders accomplished similar ends.

**Recruiting Health Educators**

The health educators hired for Project ALERT faced a difficult task. They were asked to adhere faithfully to the curriculum’s content and teaching style, but at the same time they were expected to bring the curriculum alive in the classroom. Therefore, in recruiting health educators, we looked for people who were comfortable with the facilitative style of teaching embedded in the curriculum. Other recruitment criteria included possession of a current teaching credential, prior teaching experience (preferably with adolescents), and a drug-free lifestyle. While we preferred a background in drug prevention or health promotion, we did not rule out otherwise qualified candidates who lacked such experience. Both the curriculum and the training were designed to provide the necessary substantive information.

Following Stimpson’s suggestions (1980), prospective candidates were interviewed by a three-member panel that included the field coordinator for the district, the teacher trainer, and an implementation staff member. We interviewed 104 of the 400 applicants and hired 30, 80 percent of whom were female.

Table 5.1 shows health educator assignments for seventh- and eighth-grade program delivery. During grade seven, five health educators taught in more than one school, working with teen leaders in one school and without the teens in another. The rest were assigned to only one school. With the exception of one health educator who asked not to be assigned to the teen leader condition, the assignments were made by matching health educator schedules with school schedules.

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3The three-session booster program in grade eight was too short to include teens in program delivery.

4The assignments were not randomized because some of the health educators had job or family responsibilities that made them unavailable during the evening (when teen leader training was scheduled) or on the specific day that a particular school preferred that Project ALERT be delivered.
Table 5.1

HEALTH EDUCATOR ASSIGNMENTS

<table>
<thead>
<tr>
<th>Educational Level</th>
<th>Health Educator Only</th>
<th>Health Educator + Teens</th>
<th>Both</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>7th grade</td>
<td>12</td>
<td>13</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>8th grade</td>
<td>28</td>
<td>N/A</td>
<td></td>
<td>28</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>58</td>
</tr>
</tbody>
</table>

Health Educator Training

Approximately six weeks before the seventh-grade program was scheduled to begin, the health educators attended a three-and-one-half-day training workshop at RAND designed to cover the core of the curriculum, the first five lessons. Health educators who worked with teens received an additional day of training on how to recruit and train teen leaders. On-site training was provided for lessons six through eight, which reinforce the earlier sessions and use many of the same skills.

The training had three goals: (1) to provide health educators with a firm grasp of the curriculum's content and delivery style; (2) to develop feelings of program ownership; and (3) to clarify the importance of adhering to the research goals and requirements. During the workshop, the trainer walked through each lesson, explaining its rationale, modeling key activities, and then dividing the health educators into smaller practice groups. Modeling helped the health educators visualize the flow and substance of each activity and provided specific examples of ways to reinforce students, involve them in curriculum activities, and describe personal experiences with internal and external pressure. Practice helped them gain experience and see different ways of adapting the curriculum to one's personal style. It also unearthed problems in understanding the intent and spirit of specific exercises or in carrying them out. Performance feedback focused on clarifying the curriculum's intended purpose and delivery style. To give the health educators experience in providing feedback and to avoid the potentially deflating aspects of receiving criticism, we encouraged the health educators to help evaluate their own performance.
To provide a realistic view of student reactions to the curriculum, we showed videotapes of actual Project ALERT classes. The videotapes offered examples of how different teachers integrated the program's key processes into their lessons, reinforcing the point that adhering to the curriculum's essential features did not preclude making it one's own. A session on "the seventh grader" rounded out their picture of how students might behave in the classroom.

Although the written curriculum included considerable substantive information about drugs, we developed several activities to help the health educators feel more comfortable with this information. We showed films about drugs, held a question-and-answer session with our staff doctor, and developed a "Dr. ALERT" hotline that health educators could call when students asked questions they could not immediately answer. Health educators were encouraged to respond to such questions by telling students they would check the issues out and get back to them at their next meeting.

A final but important aspect of training focused on idiosyncrasies related to the fact that the curriculum is embedded in a research program. Because the health educators were to be "guests" in other teachers' classrooms, we asked each to meet with the regular classroom teacher before the first class and establish classroom management guidelines that adhered to the curriculum's emphasis on promoting respect for students without undermining the regular teacher's routine. We also asked them to fill out feedback forms evaluating each curriculum session and to participate in weekly debriefing and planning meetings with their field coordinators during program implementation.

Recruiting Teen Leaders

The job of the teen leaders was to serve as role models for successful drug resistance and to provide their own examples of how to resist pro-drug pressure. Therefore, teen leaders had to be nonusers and had to remain drug free while they were involved with the program. We also sought students who could articulate their experiences sincerely, show a genuine interest in seventh graders' lives and experiences, and avoid preaching.

To maximize their appeal to different seventh-grade groups, we tried to recruit teen leaders who reflected the ethnic makeup of each treatment school and encompassed a broad group of interests—e.g., athletes, "cool" and nonstodious types, and student government leaders. Two

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5The first training workshop used videotapes from the curriculum's pilot test in two Los Angeles-area schools. Subsequent workshops used videotapes made during field implementation.
teens—usually one male and one female—participated in each lesson. Whenever possible, we also balanced these teams with respect to ethnicity, interests, and personality.

The field coordinators, assisted by the appropriate health educators, recruited and interviewed teen leaders from the nearest high school in the community. All students in the school were eligible to apply. To publicize the program, field staff posted fliers and job descriptions on bulletin boards, held recruitment meetings after school or during lunch, and made presentations in selected classes. About 440 students filled out an application and signed up for an interview, averaging 55 per site.

Because of the large number of applicants, the interview panel met with the teen candidates in groups of five to eight, a strategy that allowed us to observe how candidates interacted with their peers. The interview focused on why they were interested in Project ALERT, on their experience working with younger adolescents, and on their experience with peer pressure. Ninety-five teens were selected for core training. Those most likely to be chosen displayed the following qualities: use of personal experience statements, good communications skills, empathy with seventh graders, including and validating others in the group, and openness to new ideas.

Teens selected for training had to obtain school permission to be absent one day a week for the four weeks in which their sessions were scheduled. They also had to obtain parental consent, sign a commitment to remain drug free during the course of the program, and agree to our asking their parents to verify their drug-free status. Before finalizing our decisions, we reviewed the applicants with appropriate high school staff, checking for potential problems such as frequent absences, failing grades, or drug use.

**Teen Leader Training**

Teen leader training, conducted by the health educators, was geared toward helping teen leaders model and reinforce ways to resist drug use. Drawing on their strength as role models for younger adolescents and on their credibility as communicators, the teens were called upon to relate their own experiences with peer pressure, help students feel that they really could say “no” successfully, and reinforce appropriate student responses in class. They led small group discussions, helped students prepare skits, demonstrated what internal pressures are like, and led direct pressure activities. To minimize the amount of information they needed to know and the amount of time lost from their classes, the teens were included in four of the eight sessions that
focused on resistance skills. Lessons that presented material on drug use consequences were taught by the health educator.

Teen leader training emulated the basic tenets of the curriculum and health educator training: modeling, practice, and performance feedback. It also emphasized building a sense of group identification—for example, strengthening their commitment to each other, their health educator, and the goals of the program. Activities dealing with active listening, self-disclosure, listening barriers, and facilitating group discussions helped improve the teen leaders’ ability to communicate effectively.

Of the 95 teens selected, 72 were chosen to participate in classroom sessions. (The rest were designated as alternates.) They received additional training on each session’s activities (three to four hours per session) and spent time “rehearsing” with their partner prior to actual classroom teaching. On teaching days, the teen leaders met with their health educator after each class and at the end of the day to receive performance feedback and discuss their experiences.

ENLISTING DISTRICT AND SCHOOL COOPERATION

Our organizational strategies helped promote a smooth and consistent curriculum delivery process. However, they would have been to no avail if participating districts and schools had not cooperated fully with our experimental requirements. If one district or school had withdrawn from the study, the experimental design and associated school assignment process would have been severely compromised. If one principal had refused to cooperate with our survey or saliva collection procedures, the data base could have been seriously biased.

That these misfortunes did not occur reflects each district’s commitment to the research and belief that the project offered substantial benefits to participating and future students. In addition, we did as much as we could to maximize the benefits and minimize the costs of participation. Our strategies for enlisting district cooperation, discussed below, reflect prescriptions derived from research on educational innovations and change (Cuban, 1984; Lortie, 1975; Sarason, 1982).

Maximizing Benefits

The primary benefit of participation was the Project ALERT program itself. Drug information programs of the sort that most districts used—if they had a drug program at all—had proved ineffective in reducing drug use among adolescents. But smoking prevention
programs based on the social influence model of drug use and emphasizing resistance skills had already shown promise. Moreover, Project ALERT’s theoretical base “fit” most educators’ concepts of the pressures that lead to use of drugs among teenagers. Thus, most districts were eager for the Project ALERT curriculum. As a benefit of participating, we agreed to give districts a set of curriculum materials for each of the district’s junior high or middle schools following our test of the program.

A second benefit of participation was staff training. Providing inservice training to school staffs was not part of our agreement with districts. However, realizing that a primary motivation for districts to participate in the experiment was the promise of the drug prevention curriculum in the years to come, we encouraged the teachers in whose classes we taught Project ALERT to watch the curriculum being delivered and to see how the students responded to it. We also provided a one-day program orientation for those districts and schools intending to continue on their own with Project ALERT.

District personnel supported the concept of an experiment. District personnel understood that without research efforts of this type, one would never know what works. In addition, districts would receive some current, albeit aggregate, information on their students’ attitudes about and use of drugs.

Minimizing Costs

In implementing Project ALERT, we substantially reduced costs to the districts by hiring and training our own staff. However, nonmonetary costs can still be incurred if:

- school personnel have to devote extra time to it;
- prior work is obviated by the program’s new requirements;
- class time is lost from academic subjects; and
- goodwill is spent “selling” or defending the program.

To minimize these potential costs, we developed the following strategies:

Tailoring the Program to District Needs. We tailored the program to unique district or school requirements provided that doing so would not jeopardize the experimental design. At one school, for example, we hired extra teachers so that we could deliver the program to several seventh-grade classes simultaneously. This helped the school staff schedule their time without jeopardizing Project ALERT’s implementation. In another, we divided curriculum content into nine class sessions in order to accommodate unusually short class periods.
The subject in which Project ALERT was taught was another decision that we tried to tailor to each district’s policies. We preferred that Project ALERT be taught in an academic subject, but we agreed to deliver the program in physical education classes if that was where health was taught in that school and if the school could guarantee us a single classroom environment. Similarly, we preferred implementing Project ALERT in a traditional school plant, but we delivered the program in an open school when a self-contained classroom environment was provided.

Hiring Field Coordinators. To reduce the burden on district and school staffs, we hired our own on-site field coordinators to oversee program implementation. Each coordinator was responsible for his or her site’s program quality; for recruiting, selecting, and supervising the Project ALERT teachers and teen leaders; for developing schedules with classroom teachers; and for maintaining good relations with the districts and schools. Coordinators were also responsible for spotting potential problems and for working these problems out before they became major issues.

Hiring Health Educators to Teach Project ALERT. We hired our own teachers so that school personnel did not have to learn a new curriculum and so that we did not have to convince teaching staffs of the merits of our program. We also controlled the place, time, and extent of training we gave teachers and made the Project ALERT teachers responsible to us. Although there were several potential costs of hiring our own teachers—e.g., possible loss of classroom control by virtue of their being “guest” teachers; less familiarity with students, staffs, and community; and potential friction between the classroom teachers and our health educators—we averted those costs by stressing respect for school policies and for the classroom teacher’s authority and procedures.

Keeping District and School Staff Informed. Throughout program implementation, we endeavored to keep as many people informed as possible. We encouraged open meetings with school staff and parents to explain the program. We responded to requests for information from the school community, hoping to nip potential misunderstandings in the bud. At the same time, we tried to avoid publicity that could embroil district and school staffs in discussions with the community about Project ALERT.

Reimbursing Districts for Exceptional Costs. When Project ALERT unavoidably required extra costs or time from district or school personnel, we reimbursed staff for their time or paid for the costs of materials. For example, we reimbursed school office staff for
the time it took to compile data for us and paid the costs for the extra school stationery we required.

SUMMARY

Our implementation goals for Project ALERT were to ensure the experiment’s integrity and to motivate schools and districts to cooperate. To achieve these goals, we hired, trained, and monitored our own field staff and teachers and took care to maximize the benefits to schools and districts while minimizing the inevitable disruptions of fielding an experiment in a working school environment. The results of our implementation strategy suggest that we were successful. In the next chapter, we discuss them in detail.
VI. IMPLEMENTATION RESULTS

Our ultimate evaluation of Project ALERT will focus on its effectiveness in curbing adolescent drug use. However, an important prerequisite for interpreting the results is establishing whether the program was implemented as intended. Failure to achieve stated prevention goals is frequently attributed to faulty implementation; in addition, poorly implemented programs do not provide adequate tests of the underlying prevention model. Similarly, a curriculum that engenders limited student participation or enthusiasm has little potential for affecting their behavior outside the classroom.

Information on the process of program delivery shows that:

- all districts cooperated with the experimental requirements;
- the curriculum was fully implemented and delivered as intended; and
- student evaluations of the curriculum demonstrated that it worked well in diverse classrooms.

In this section, we document these results.

DISTRICT COOPERATION WITH EXPERIMENTAL REQUIREMENTS

Each district faithfully adhered to the participation agreement. Schools cooperated with random assignment even though some schools that ended up in the control condition had hoped to receive the program. Treatment schools with existing drug prevention programs dropped them while Project ALERT was in progress; as requested, control schools offered no program at all or simply provided the information sessions that typify traditional approaches to drug prevention. In the treatment schools, the Project ALERT core curriculum was delivered to all enrolled seventh-grade students, and all who remained enrolled the following year received the booster sessions. The classes were scheduled as we had asked (one session per week, with a break of one or two weeks between sessions 1 through 5 and sessions 6 through 8). They included both sexes and ranged in size from about 20 to 36 students.

Data collection proceeded on schedule, and participating schools facilitated the parental consent process by including letters from the
principal in the consent package. No school asked to be excluded from the requirement for collecting saliva samples. When students made the transition to high school, the feeder schools continued to cooperate with the evaluation component, providing student master lists that helped us determine who had transferred and who was still enrolled. To help us track students who had transferred, junior and senior high schools provided information on the student’s new school; the 30 original schools also helped us obtain data on grades and absentee records for a study of baseline nonresponse.

COMPLETENESS OF PROGRAM DELIVERY

Project ALERT was indeed delivered to participating students. Our classroom logs and field coordinators’ reports show that every scheduled class was presented, although several had to be rescheduled to accommodate special school events or unanticipated occurrences such as blizzards. Over the two-year period, the health educators and teen leaders delivered the seventh- and eighth-grade Project ALERT lessons in 2,305 classes, reaching over 5,000 students each year (see Table 6.1).

On the basis of monitoring assessments done in about 950 classes—41 percent of the lessons taught—we can also conclude that all curricular activities were presented in the vast majority of classes. As Table 6.1 shows, the monitors recorded missed activities in 16 percent of the observed classes, but in half the cases, the omitted activity was the lesson wrap-up, which reviews the session’s important points but

<table>
<thead>
<tr>
<th>Variable</th>
<th>Seventh</th>
<th>Eighth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of classes taught</td>
<td>1,666</td>
<td>639</td>
</tr>
<tr>
<td>Number of classes missed</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Number of classes monitored</td>
<td>657</td>
<td>289</td>
</tr>
<tr>
<td>Percent of classes monitored where:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All activities were presented</td>
<td>84</td>
<td>83</td>
</tr>
<tr>
<td>All activities except wrap-up were presented</td>
<td>93</td>
<td>92</td>
</tr>
<tr>
<td>No activities were rushed</td>
<td>60</td>
<td>59</td>
</tr>
<tr>
<td>No activities went on too long</td>
<td>81</td>
<td>80</td>
</tr>
</tbody>
</table>
does not introduce new material. Hence, substantive material was omitted in less than 8 percent of the observed classes.

The majority of health educators also succeeded in teaching the curriculum lessons within the times suggested for each segment. In 80 percent of the classes, the health educators avoided stretching any activity too long (becoming repetitive and diminishing the time available for the rest of the lesson). In about 60 percent, however, the monitors judged that one or more activities had been rushed (forgoing or cutting off student comments in the interest of time).

Timing problems generally occurred in each year's initial lesson, when the health educators were still adjusting to the constraints of having to teach a session in its entirety during a single class period. In more typical classroom situations, such constraints would not apply; the classroom teacher could accommodate school announcements, late students, and other interruptions by carrying over unfinished material into the next class day.

**FIDELITY OF PROGRAM DELIVERY**

The fact that health educators met every scheduled class and generally covered all the lesson activities provides strong evidence that the entire curriculum was implemented. However, if they presented the lesson but substantially modified specific components or failed to follow the guidelines for facilitating student involvement, the underlying curriculum model would still receive a less adequate test. Consequently, we also examined whether the health educator conveyed the intended substance and established a facilitative climate in the monitored classrooms. We then assessed the lesson's overall "gestalt"—the session blend of intended substance and delivery style. Table 6.2 shows the results.

In 90 percent or more of the monitored classes, the 17 observers felt that the health educator and teen leaders had established the intended classroom environment, had conveyed the intended substance, and had effectively combined substance and process. By this we mean that the classroom session received a rating of three or higher on each of three five-point scales: how warm and open the classroom environment was, how well the session's purposes were conveyed, and how the session went overall. The midpoint on each scale marked a satisfactory performance. The mean ratings for each scale were as follows: 4.2 for classroom climate, 4.2 for substance, and 3.9 for overall gestalt.1

1Sessions in the teen leader curriculum generally received higher ratings than those in the health-educator-only curriculum. However, the differences were small enough to be
Table 6.2
FIDELITY OF PROGRAM IMPLEMENTATION

<table>
<thead>
<tr>
<th>Variable</th>
<th>Percent of Classes Rated Satisfactory or Above(^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seventh Grade</td>
</tr>
<tr>
<td>Established intended classroom environment</td>
<td>97</td>
</tr>
<tr>
<td>Conveyed intended material</td>
<td>95</td>
</tr>
<tr>
<td>How well it went overall</td>
<td>93</td>
</tr>
</tbody>
</table>

\(^a\)Rated \(\geq 3.0\) on a five-point scale.

Both the health educators and the teen leaders received high ratings on teaching skills as well. Tables 6.3 and 6.4 show the ratings for characteristics such as knowledge of curriculum, ability to draw students out in discussions, and appropriate use of positive feedback. All three qualities were emphasized throughout the training and feedback sessions; providing feedback and eliciting class discussion were also explicitly written into the curriculum text. For the 58 health educators, the ratings represent the average score assessed across 946 seventh- and eighth-grade sessions; for the 72 teen leaders, they represent average scores assessed across 161 seventh-grade sessions.

The health educators, who had considerably more classroom experience than the teens, received the higher ratings. They were well prepared to teach each class and consistently achieved better than satisfactory scores on other teaching attributes. The teen leaders also prepared carefully for class and established good rapport with their seventh-grade students; students frequently groaned upon hearing that teens would not be back after Project ALERT’s final session. During class, their attention was riveted on the teen leaders; after class, they hung around to talk with them. While the teen leaders were slightly less effective at facilitation skills, their overall ratings on these qualities were still impressive.

explained by variation among the health educators, most of whom taught only one curriculum. When we control for that fact, none of the differences achieves statistical significance.
Table 6.3

AVERAGE RATINGS OF HEALTH EDUCATOR TEACHING SKILLS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Seventh Grade</th>
<th>Eighth Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of curriculum session</td>
<td>4.5</td>
<td>4.6</td>
</tr>
<tr>
<td>Ability to draw out students in discussion</td>
<td>4.0</td>
<td>4.1</td>
</tr>
<tr>
<td>Appropriate use of positive feedback</td>
<td>4.2</td>
<td>4.4</td>
</tr>
<tr>
<td>Appropriate classroom discipline/management</td>
<td>4.0</td>
<td>4.2</td>
</tr>
<tr>
<td>Overall health educator teaching effectiveness</td>
<td>4.2</td>
<td>4.4</td>
</tr>
</tbody>
</table>

*Ratings were on a five-point scale, with five the highest score.

Table 6.4

AVERAGE RATINGS OF TEEN LEADER TEACHING SKILLS

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Rating*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation for class</td>
<td>4.3</td>
</tr>
<tr>
<td>Rapport with students</td>
<td>4.2</td>
</tr>
<tr>
<td>Ability to draw students out in discussion</td>
<td>3.8</td>
</tr>
<tr>
<td>Appropriate use of positive feedback</td>
<td>3.8</td>
</tr>
<tr>
<td>Appropriate use of discipline</td>
<td>3.8</td>
</tr>
<tr>
<td>Overall teen leader teaching effectiveness</td>
<td>3.8</td>
</tr>
</tbody>
</table>

*Ratings were on a five-point scale, with five the highest score.

These data provide solid evidence that Project ALERT was implemented with fidelity. Our faith in the monitors' assessments is supported by the fact that they provided reliable ratings (as indexed by the measures of single- and inter-rater reliability discussed in Sec. IV). But did those ratings show a consistent halo effect?

Other evidence indicates that the monitors observed the lessons critically, noting both strengths and weaknesses in program delivery. For example, they faithfully recorded when curriculum activities were

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2The fact that we hired and trained the health educators and monitored their performance clearly contributed to this result. This level of fidelity should be more difficult to attain in a nonresearch environment.
omitted or rushed, reporting that the latter occurred in 40 percent of the observed classes. In addition, they noted clear differences in overall lesson quality. As Table 6.5 shows, the monitors gave lessons 1 and 6 significantly lower effectiveness ratings than the other six sessions. Both lessons had problems that explain the results: session 1 had more instances in which activities were rushed than any other; feedback from the health educators indicated that session 6 lacked a consistent flow and contained an activity that failed to sufficiently engage students.\textsuperscript{3} Hence the monitors accurately noted problems in lesson content that impinged on the quality of curriculum delivery.

STUDENT RESPONSE TO THE CURRICULUM

Our observations indicated that Project ALERT worked well in the classroom: the activities flowed smoothly, elicited active student participation, and generated enthusiasm. Moreover, because the curriculum was designed to elicit and build on student perceptions and beliefs, it adapted easily to diverse classroom environments. At the beginning of Project ALERT, health educators ascertained what students in each

\begin{center}
Table 6.5
\end{center}

\begin{center}
\begin{tabular}{|c|c|c|}
\hline
Session Number & Seventh-Grade Program & Eighth-Grade Program \\
\hline
First & 3.74\textsuperscript{a} & 4.19 \\
Second & 4.15 & 4.13 \\
Third & 4.15 & 4.09 \\
Fourth & 4.13 & N/A \\
Fifth & 4.16 & N/A \\
Sixth & 3.80\textsuperscript{a} & N/A \\
Seventh & 4.18 & N/A \\
Eighth & 4.10 & N/A \\
\hline
\end{tabular}
\end{center}

\textsuperscript{a}Difference between the specific session score and the overall session effectiveness score is significant at $p = .01$, based on a two-sample $t$-statistic, after adjusting for differences among monitors with analysis of covariance.

\textsuperscript{3}While we did not change lessons during field implementation, we did revise this session after the program test was over, changing the sequence of activities and modifying the activity that had failed to engage the students.
class did and did not know; hence they could adjust the content to classrooms with different levels of information, experiences with drugs, and general academic skills. Student misconceptions were identified and corrected; accurate student responses were reinforced and elaborated.

This adaptability to diverse classrooms extended to resistance skill building as well. The health educators asked students to identify sources of pressure before going on to help them counteract prodrug arguments. As students came up with their own successful resistance solutions, their teachers showed them how each solution fit on the “Ways to Say ‘No’” poster, thereby reinforcing their responses and helping them learn other strategies as well. Because students who felt more comfortable in role-playing situations typically presented their skits first, the less assertive students had more time to overcome their fears about acting in front of their classmates. Similarly, the less imaginative students discovered that simple solutions could work as effectively as the more complex.

Student evaluations of the seventh-grade curriculum provided additional confirmation of the monitors’ reports (see Fig. 6.1). These anonymous surveys, collected from over 5,000 students after program delivery ended, reveal a highly favorable response to the curriculum:

- 87 percent of the students “liked” Project ALERT or “liked” it “a lot”;   
- 79 percent felt comfortable or very comfortable taking part in class discussions; and   
- 90 percent thought Project ALERT had told the truth about marijuana (i.e., thought the program was credible).

These results indicate that we achieved the environment we had been hoping for—an environment in which the students felt that they could participate in class without being “put down.” They also indicate that students valued such participation and felt that they were being given accurate and reliable information rather than propaganda. While students in the program utilizing teen leaders in the classroom responded slightly more favorably on these dimensions than did students in the program utilizing the health educator alone, such differences are small (see Fig. 6.1).

The students also reported feeling able to resist as a result of Project ALERT:

- Over 82 percent of the students felt Project ALERT would help them say “no” to marijuana, cigarettes, and other drugs.
Fig. 6.1—Evaluation of Project ALERT: seventh-grade students' reports

- Over 88 percent felt that if someone tried to pressure them to smoke marijuana and they didn't want to, they could or probably could say "no" and still feel good about themselves.

Finally, the student responses enabled us to get a sense of Project ALERT's potential effects on prevention. Figure 6.2 illustrates the
Fig. 6.2—Potential effects on “nonusers”: seventh-grade students’ reports

program’s potential preventive effect for students who considered themselves nonusers. Salient results are as follows:4

- For cigarettes, 10 percent said that Project ALERT had helped them decide not to use; 60 percent said that it had strengthened their decision against using cigarettes; and 30 percent said that Project ALERT had made no difference.
- For marijuana, 8 percent said that Project ALERT had helped them decide not to use; 56 percent said that it had strengthened their decision against using marijuana; and 36 percent said it had made no difference.

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4 Data may include some who have tried a substance and quit and some who have not used in the past month.
Figure 6.3 presents the program's potential preventive effect with students who considered themselves users. This figure illustrates the following:

- Sixty-six percent said that Project ALERT had made them think about quitting smoking, and 34 percent said that the program had had no effect.
- For marijuana, 54 percent said the program had made them think about quitting, and 46 percent said it had had no effect.

These results suggest that the program provided the majority of students with the foundation for resisting drugs in the future. Nevertheless, saying that you have decided not to use is not the same as doing it. What these subjective responses show is that the program works

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5 Data may include regular users and those who have used occasionally.
well in the classroom, elicits highly favorable student evaluations, and prompts the great majority to believe it will help them resist drugs in real-life situations. They also give us reason to believe that the curriculum provided students with the motivation and skills they will need to translate that belief into effective action. Whether that proves to be the case will be the subject of future reports focusing on Project ALERT’s impact on actual drug use.

SUMMARY

Our goal for Project ALERT’s design and implementation phase was to provide a solid foundation for rigorously testing the program’s effects on adolescent drug use. This report demonstrates that we have done so.

The program is being tested across widely diverse school environments, thereby ruling out the possibility of assessment solely in favorable or unfavorable conditions. The variety of schools participating—schools from urban, suburban, and rural communities with a wide range of minority students and underlying substance use rates—ensures a broadly generalizable curriculum test.

We have developed a balanced experimental design, maintained its integrity across the 30 participating schools, and collected valid and reliable data for measuring program outcomes. Less than 1 percent of the students refused to fill out a survey, and even fewer provided self-reports on tobacco use that were contradicted by physiological tests. Longitudinal inconsistencies in student reports are somewhat lower than those reported in earlier studies and are rarely attributable to obvious lying.

Assessments of the program delivery process support our belief that we have provided a rigorous test of a curriculum based on the social influence model of prevention. No scheduled class—among more than 2,300—was missed over the two-year implementation period, and all curriculum activities were presented in the vast majority of observed classes. Just as important, we also feel confident that the curriculum was implemented as designed, by which we mean that the teachers and teen leaders did, in fact, convey the intended content and adhere to the guidelines for delivery style.

Finally, both student and monitor ratings indicate that the program works well in the classroom: it stimulates active student participation, generates enthusiasm, and helps students believe they can successfully resist prodrug pressures in the real world. These findings indicate that we have developed a curriculum that elicits a favorable response across
widely varying classroom environments, given it a solid test, and laid
the foundation for a rigorous evaluation of the program’s impact on
adolescent drug use.
Appendix

SCHOOL ASSIGNMENT PROCEDURES FOR
PHASES I TO IV

THE PHASE I ASSIGNMENT PROCEDURE

In Phase I, we assigned a total of six schools, three from each of two
districts. Based on the use of district as a blocking factor, we con-
sidered only balanced assignments—i.e., where each cell included
exactly one school from each district. Temporarily ignoring assign-
ments to experimental cells, we find that each school from the first
district (District A) must be paired with a school from the second district
(District B). This yields the six potential configurations shown below:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2-B2</td>
<td>A2-B3</td>
<td>A2-B1</td>
<td>A2-B3</td>
<td>A2-B1</td>
<td>A2-B2</td>
<td></td>
</tr>
<tr>
<td>A3-B3</td>
<td>A3-B2</td>
<td>A3-B3</td>
<td>A3-B1</td>
<td>A3-B2</td>
<td>A3-B1</td>
<td></td>
</tr>
</tbody>
</table>

Clearly, some of the potential configurations would produce better-
matched cells than would others. For example, suppose that schools
A1 and B1 had the lowest socioeconomic status (SES) in their respec-
tive districts and that schools A3 and B3 each had the highest SES. In
that case, configuration 1 would produce a poor design because the
mean SES for the cell with schools A1 and B1 would fall much below
the mean SES for the cell with schools A3 and B3. In contrast, config-
uration 6 would produce a good design because the values of mean SES
would match closely across the three cells.

In Phase I, we selected the configuration that produced the best-
matched (least imbalanced) design on the following variables: preva-
ience of substance use, racial/ethnic composition, SES, school size, stu-
dent mobility, and achievement on standardized tests. How well cells
matched on a single variable was measured by the variance of the cell
means for that variable. We computed a weighted sum of those vari-
ances to measure how well the schools matched overall; after standardi-
zation of the variables, we assigned the highest weights to prevalence
of cigarette and marijuana use. Once we had determined the best
configuration, we randomly assigned each of the three pairs to a different experimental cell.

THE ASSIGNMENT PROCEDURE FOR PHASES II TO IV

During Phase II, we again assigned three schools from each of two districts. The Phase II assignment procedure differed from that of Phase I in that it tried to compensate for imbalance left over from the earlier phase. Rather than considering only configurations, we listed all potential assignments, again obeying the restriction of one school per cell from each district. In other words, it mattered to which cell a particular pair of schools was assigned. When assessing the imbalance of an assignment, we based cell means on all 12 schools (four per cell) that would have been assigned to that point. To increase the degree of randomness in the possible assignments, we randomly selected one of the eight best-matched potential assignments. In other words, we excluded the other 28 possible assignment combinations from consideration.

In each of Phases III and IV, we assigned four schools from one district and five schools from another, for a total of nine schools per phase. Except that they involved considerably more schools (each potential configuration included three triplets, rather than three pairs, of schools), the Phase III and IV assignment procedures closely resembled that used in Phase I. In particular, each procedure used data only for those schools being assigned in that phase. Because there were many more potential configurations at these phases than occurred when only six schools were to be assigned, we randomly selected one out of the four best-matched potential configurations. As in Phase I, once the configuration had been selected, we randomly assigned each of the three triplets to a different experimental cell.

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1Besides assigning schools to cells, this phase involved randomly selecting a school to exclude from one district with four potential schools.

2Conditional on the Phase I assignments, Phase II schools were not equally likely to be assigned to each cell; unconditionally, however, the Phase II assignments were strictly random. Furthermore, no one knew what the unconditional probabilities were for any particular cell/school combination.

3At Phases III and IV, we determined that compensating for previous imbalance would do little to improve the overall balance across the three cells.
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