

Project Towards No Drug Abuse: Generalizability to a General High School Sample

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Objectives. We examined the generalizability of a successful classroom-based prevention program developed for youth at alternative high schools (high risk) to youth at general high schools.

Method. A replication of a previously tested prevention program in a general high school population was conducted with 1-year follow-up data. Classrooms within each of three schools were randomly assigned to two conditions, classroom education or standard care control.

Results. Statistically significant effects on alcohol and illicit drug use were achieved in this population through a 1-year period following the program, although effects were not achieved on cigarette smoking and marijuana use.

Conclusions. These results suggest that this program (Project Towards No Drug Abuse) has applicability to a wide range of older teens. © 2001 American Health Foundation and Academic Press

INTRODUCTION

Despite several decades of targeted effort, drug use rates among high school students in the United States continue to be alarmingly high. For example, in recently released results of the national survey of high school youth [1], one in five 10th graders (22%) had used an illicit drug in the past month in 1999, up from 1 in 10 in that same age group in 1991, and double that in the 1999 8th grade cohort. Alcohol continues to be the most commonly used drug in high schools, with approximately 40% of 10th graders using it in the past month,

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compared to 20% of the 8th graders. In order to curb such trends, a reassessment of school-based drug abuse prevention strategies is needed [2].

Adolescent drug abuse prevention programs fall into three categories based on the risk groups for which they were designed [3]. Universal programs are designed to prevent initiation of drug use in general populations, such as all students in a traditional public school system. Selective programs are designed to affect subgroups of students at elevated risk for developing a problem, based on social, psychological, or other factors, such as children of drug abusers or poor academic achievers. Indicated programs are designed to affect high-risk subgroups already identified as having some detectable signs or symptoms of a developing problem, such as those students in nontraditional, alternative high schools or adolescents in the criminal justice system.

Current drug abuse prevention practice makes wide use of universal prevention programs, primarily comprehensive social influences programming, in late elementary and middle school. Selective and indicated programs tend to be used in settings composed of older adolescents, as the problems not curtailed by earlier universal strategies start to manifest themselves. Most selective and indicated prevention programs are much less widely applied and much more resource intensive (longer in duration, more expensive), and few are evidence-based [4]. Given the high levels of drug use prevalence in the general senior high school age population, relative to the middle school population, the entire senior high school age range may, in itself, be considered a risk factor in need of selective prevention programming. This contention is supported by a direct environmental definition of risk perspective in which risk is defined as the number of drug users in one's immediate environment [5,6]. Thus, older teens in general may be in need of selective-type programming.

The present investigation examines the generalizability of the indicated drug abuse prevention program results of Project Towards No Drug Abuse (TND) to a general high school context. This program was normed on continuation high school (high-risk) youth. As applied to general senior high school youth, this program may be considered to reflect a senior high school-based selective prevention model. We replicate here the analysis used in the previous [5] study on a sample of 1080 general high school youth. If similar results are found in this traditional high school setting, it would suggest that such programming can be used to reach a large number of youth across different types of senior high school population contexts.

Very few validated senior high school-based drug abuse prevention programs exist [7]. In prior reports, Sussman and colleagues presented the development and evaluation of a school-based drug abuse prevention curriculum applied to alternative senior high school (high-risk) youth [5,8]. Project Towards No Drug Abuse was developed as a high school aged indicated drug abuse prevention program utilizing a motivation-skills-decision-making model [8]. The previous program was developed through use of an iterative, empirical program development process. Student and staff interview studies, perceived efficacy studies, immediate impact component studies, and pilot testing were used to develop the final curriculum. These studies revealed that continuation high school youth want to graduate school and obtain prosocial life goals. However, they need to be motivated to change their habits to be able to achieve their goals. These studies also revealed that certain motivation-oriented activities may help reduce youths' ambivalence about habit change [8,9]. These youth need to learn to make explicit links between the importance of health as a value, achieving health goals (e.g., not abusing drugs), and focusing on the achievement of life goals. Also, they need to learn that they don't have to yield (by using drugs) to self-fulfilling, deviant stereotypes others place on them. Further, these youth state that, in general, they are moderate people. Thus, they need to learn to place partly formed specific self-attitude ratings (e.g., regarding drug use) within a more general self-rating as a moderate.

The program development studies also disclose the need to provide youth with *skills to change*, including (a) effective listening skills, (b) effective communication skills, and (c) self-control skills. Finally, youth need to learn to make an informed *decision* about their behavior by being provided with information (a) regarding myths people hold about drug use, (b) the insidious nature of life consequences of drug abuse, (c) the effects of drug abuse on others, and (d) means to integrate this previous information by use of a systematic decision-making process.

The prevention trial of Project TND with continuation (high-risk, alternative) high school youth was shown to exert preventive effects on alcohol and hard drug use. Alcohol use was reduced among higher initial use levels by approximately 30%, whereas hard drug use was reduced over all initial use levels by approximately 50% over a 1-year period. Effects were not found on cigarette smoking and marijuana use in that study. Project TND is the first program to demonstrate longer term effects on alcohol use and hard drug use among older, high-risk youth by using a school-based, limited-lesson (nine lessons) curriculum [5].

METHOD

Participants

A total of 1208 students enrolled at three Los Angeles area general public senior high schools participated in the study. One-year follow-up was conducted with 679 of the 1208 students (63%). Students varied from 14 to 17 years of age; 35% of this sample were in the 9th grade, 43% were the 10th, and 22% were in the 11th grade at baseline. The sample was 47% male; 34% white, 38% Latino, 26% African American, and 2% other. Less than 2% of the sample reported a preference for a language other than English and 68% lived with both parents. Baseline 30-day drug use rates were 21% for cigarettes, 38% for alcohol, 21% for marijuana, and 7% for other illicit drugs, which are quite similar to those in the general U.S. 10th grade population [1].

Experimental Design

Three general public high schools were randomly selected from a pool of 78 Los Angeles area general high schools. The pool was formed by listing the general high schools in districts that had contributed continuation (alternative) schools to the initial project. General and continuation schools are separate types within a district and do not overlap in student enrollment. The three schools selected for the present study were of approximately equal size and contained a total of 116 nonoverlapping classes of 4674 9th, 10th, and 11th graders. Twelfth grade classes were not considered for the study to allow for in-school 1-year follow-up. The average class enrollment size was 42 students. A total of 26 classes were identified, 8 at two schools and 10 at the third, by selecting classes conducted throughout the day (periods 2–6). Two science teachers at each school completed the class selections. The classes were then randomly assigned, in equal numbers by teacher and school, to one of two experimental conditions—control (standard care, $n = 13$) or classroom education program ($n = 13$). Classes are, therefore, the unit of assignment and analysis. Classes selected and assigned did not overlap in

student enrollments, thereby eliminating direct condition contamination (i.e., the same student did not serve as both a control and a treatment subject, nor did treatment subjects receive the same material twice).

A pretest survey was conducted in each of the 26 classes. In the program condition classes ($n = 13$), the pretest survey was followed by implementation of the TND drug abuse prevention program over the subsequent 3 weeks. Two project staff health educators were assigned to instruct program classes such that each one taught an equal number of classrooms at each of three schools. The "one-year" follow-up data collection effort was completed an average 13 months after the pretest assessment ($SD = 1.1$ months) and serves as the outcome end-point for the present analysis.

Classroom Program Content and Format

The nine-session classroom-based drug abuse prevention program (TND) consisted of three 50-minute sessions per week (Tuesday through Thursday) for 3 consecutive weeks during regularly scheduled class periods. The first lesson attempts to elicit cooperation and instructs youth in communication and listening skills, to assist in learning of subsequent information. The second lesson attempts to motivate students to listen further by providing stereotype information (e.g., that others believe all senior high school students are drug abusers) and facilitating their own rebellion against such stereotyping. Finally, the third lesson provides information regarding self-defeating myths senior high school students, themselves, hold about drug use.

The second week shifts into instruction in chemical dependency (fourth lesson), perspective taking regarding those affected by one's drug use (talk show; fifth lesson), and learning how to change behaviors to fulfill one's life goals (health as a value and stress-coping; sixth lesson). Students are taught that consequences of drug use tend to accumulate over time, that they really do value their own physical health to be able to achieve their life goals, and that they can learn healthful means of coping.

Finally, the third week material presents information on increasing one's self-control to better acquire environmental resources (seventh lesson). In addition, the third week material helps one to see that, since one desires to be a moderate type of person, drug use does not fit into one's plans (eighth lesson; attitudinal perspective theory; [5,8]). Finally, the last lesson encourages making a decision and a commitment regarding drug use. In summary, the first week stimulates learning, the second week teaches consequences of chemical dependency and coping alternatives, and the third week encourages additional skills development and motivation in the direction of becoming more moderate in behavior and attitudes.

Measures

Drug use. The primary type of measure of interest in this study was current drug use, at pretest and again 1 year later. To access current drug use behavior at each time point, subjects were asked "How many times in the last month have you used . . ." each of several different drug categories. Questions were directed to frequency of use of "cigarettes," "alcohol," "marijuana," "cocaine (crack)," "hallucinogens (LSD, acid, mushrooms)," "stimulants (ice, speed, amphetamines)," "inhalants (rush, nitrous)," and "other drugs (depressants, PCP, steroids, heroin, etc.)." For the purposes of analysis, the responses to the last five drug categories (cocaine through other drugs) were summed to form a hard drug use index ($\alpha = 0.82$). Responses were provided on 11-point rating scales, next to the drug category label. Response choices included "0," and other response choices were increasing in intervals of 10 (e.g., "1–10 times," "11–20 times") with a last (11th) category being "91–100+ times." The 2-week test–retest reliability of this format has been previously established to be greater than 0.70 (e.g., [10,11]).

Other pretest measures. Demographic variables measured included self reports of age (in years), gender (male or female), ethnicity (choice of one among white, Hispanic, black, Asian, or "other" categories), language preference (English or other language), and whether the student lived with both parents (yes or no).

Data Collection

Prior to the pretest survey administration, all students in the targeted classes were asked to have their parents sign and return an Internal Review Board approved consent form providing written permission or refusal for participation in the program or any part of the testing. For all students who did not return a signed form, attempts were made by project staff to contact the parent by telephone to describe the study and obtain verbal permission or refusal. Parental consents were obtained from 90% of the target sample ($n = 1080$). Parent or student refusal was less than 1%. Students for whom parental response could not be obtained after at least three attempts were surveyed anonymously at pretest, as approved by the local IRB and school officials, but were not targeted for long-term follow-up (9% enrolled in target classes).

The pretest data collection involved the collection of the paper-and-pencil questionnaires. Data collection was conducted solely by project staff who were not responsible for instruction of that particular set of students. Pretest measures were collected during single classroom sessions during regular school hours.

One-year follow-up surveys were administered in two ways. If a targeted student was still enrolled at the high

school (81% of those surveyed), project staff (previously unknown to the student) went to the school and surveyed them there using a paper-and-pencil questionnaire. Students not located at the original high school (19%) were surveyed by telephone using an interview format. Project staff (previously unknown to the student) contacted the subjects by telephone, read the questionnaire items to them, and recorded their responses on a survey form. Survey items and response categories were identical to those of the in-school questionnaire format and subject responses consisted of innocuous words such as numbers, letters, agree-disagree, or true-false. The number surveyed by each method did not vary by experimental condition.

All collection efforts were stopped after 4 months of attempting to follow-up subjects from a given school. The mean number of follow-up days was 388 (SD = 30.2 days). The 1-year follow-up survey was collected on 63% ($n = 679$) of the targeted sample, which is comparable to rates obtained with school samples at 1-year follow-up, as documented in a review by Hansen et al. [12].

ANALYSIS AND RESULTS

Preliminary Analysis

Attrition. The retained longitudinal sample size for analysis was 679. The analysis sample was restricted from the full pretest measured sample ($n = 1208$) by (a) failure to obtain parental response (consent) for longitudinal measurement (10% of target); and (b) loss of subjects to 1-year follow-up (study attrition). To assess the potential sample bias introduced by the combination of the two selection processes (consent and attrition), a preliminary comparison of the retained sample and the full sample on pretest drug use and demographic measures was completed. For the drug use measures, single sample t tests were computed as the difference between the retained sample mean and full sample mean, divided by the full sample standard deviation. For demographic variables, one way χ^2 tests were computed using the difference between the observed frequencies of the retained sample in each demographic category and the expected number based on the full sample portions. There were no statistically significant differences (t 's ranged from 0.41 to 0.99, χ^2 ranged from 1.22 to 2.70; all P 's > 0.05) on any assessed variable between the subsample of subjects measured at both occasions (pretest and 1-year follow-up) and all those measured at pretest. In each case, the retained sample appeared to be a representative subsample of pretested students; they were no less likely to use drugs nor did they differ from the full sample on any of the demographic variables. This pattern of results indicated good external validity for the primary results [13,14].

Condition comparability. Using random assignment, the expected values of the measurements should be equal across conditions, and any observed differences between conditions (at pretest and/or 1-year follow-up) may be evaluated against sampling fluctuations expected under the null hypothesis (no condition effects). However, because students were randomly assigned in clusters (classrooms) rather than as individuals, systematic differences in subjects across conditions may be less readily controlled and potentially bias the evaluation of treatment effects, essentially by undermining the random assignment and rendering condition groups nonequivalent to each other on measured and/or unmeasured factors. One source of evidence that such a bias has not occurred is to determine the condition comparability at pretest. As a check on the pretest condition comparability, means on each of the pretest drug use measures were compared across conditions, using the retained analysis sample and a series of one-way analysis of variance tests with condition as the grouping variable. Demographic variables were compared using two-way χ^2 tables. No statistical evidence was found that would indicate that the condition groups systematically varied on any of the pretest measures beyond random error (F 's ranged from 1.14 to 1.34; χ^2 ranged from 1.11 to 2.20; all P 's > 0.05), indicating successful randomization to conditions and good internal validity of the experiment.

Assessment of Program Effects on Drug Use

The use of pretest measurement of outcome measures and random assignment to groups suggests that an analysis of covariance model (ANCOVA), with pretest use as a covariate and condition as the grouping factor, is an appropriate procedure to test differences between groups at follow-up [15]. This model constitutes a "trend" analysis in that differences between groups at 1-year follow-up are considered in light of the pretest means of each group.

In this study, a sample of 679 students were randomly assigned to conditions and followed 1 year later. Students were assigned as a unit (their classroom). This means of assignment has two statistical implications. First, the degrees of freedom on which outcome P values should be based is limited to the number of classes assigned ($n = 26$), not the number of subjects ($n = 679$). Second, because respondents in clustered units (classrooms) may have similar responses (errors may be nonindependent), the estimates of sampling error may be biased downward, resulting in inflated P values. The common index of this statistical nonindependence is the intraclass correlation, and others have shown that self-reports of drug use in school samples exhibit intraclass correlations large enough to affect the computed P value if ignored [14]. In order to properly compute the P values associated with statistical tests of

differences between groups, we used the SAS data analysis procedure, PROC MIXED, which properly handles clustered data in the context of an ANCOVA.

Prediction of the level of current use (use in the past 30 days) of cigarette smoking, alcohol use, marijuana use, or hard drug use (a sum of five illicit drug categories) from pretest use level, condition, classes nested within condition, condition nested within schools, and the interaction between pretest level of use and condition was completed using the PROC MIXED procedure. The tests for the interaction term are of particular interest in this study since they test directly whether the program was more impactful on higher risk (i.e., higher baseline using) students than on nonusers.

If a statistical interaction between pretest level of use and condition was found for a particular outcome measure, a second set of simple main effect analyses was completed predicting 1-year outcomes from pretest use level for each condition. The slope and intercepts from these models were then used to plot the interactions between pretest use level and condition group.

A graphical presentation of the significant findings for the outcomes data is shown in Figs. 1 and 2. Cigarette and marijuana use tests failed to reveal significant effects (cigarette $F(1, 24) = 1.16, P = 0.64$; marijuana $F(1, 24) = 1.48, P = 0.49$). Two drug use measures showed a significant interaction between pretest use level and condition: alcohol ($F(1, 24) = 3.77, P = 0.05$) and hard drug use ($F(1, 24) = 21.31, P < 0.001$). Separate regression lines by condition are plotted for those measures in the figures over the pretest range of 0 (i.e., nonuse) to 30 (i.e., daily) times per month. For alcohol, there appears to be no effect of the program among pretest nonusers and lower levels of use, with the regression intercept values all roughly equal (average value = 4.8). At higher pretest alcohol use levels, the program condition students do exhibit lower alcohol use at 1-year follow-up compared to the control condition subjects at comparable pretest use levels. For hard drug use, the pretest nonusers do show a slight benefit from

program exposure, with a control group intercept of 2.8 and the program condition intercept at 1.2. The program students increase this advantage in lower 1-year follow-up use levels across the range of use.

DISCUSSION

The main objective of this study was to examine the generalizability of a successful classroom-based prevention program developed for high-risk students to youth at general high schools. We found that the pattern of results found in a large sample of general high school youth replicated those found in higher risk, continuation high schools. At 1-year follow-up, the program led to a significant reduction in hard drug use among all students and a significant reduction in alcohol use among students with higher levels of pretest use. As in the earlier study, cigarette and marijuana use were not affected [5].

The achievement of effects on hard drug and alcohol use in a general high school sample is an important finding. Few such evidence-based programs exist [4]. Further, it is encouraging to be able to achieve these effects with a program that is delivered to the full student body. Identifying, recruiting, and attracting only very-high-risk youth in general high schools is more difficult than simply providing programs to all students in schools. Of course, given the current levels of drug use in high schools, high school students in general may be considered at risk due to the higher prevalence of drug use in the school environment. Application of a selective risk prevention program such as Project TND to older youth in the general population seems warranted. General high schools are likely to be quite amenable to this type of limited-length prevention programming. There appear to be features in common among older teens that make this program effective across general and alternative high school settings. Possibly, adding a motivation component is essential for these youth.

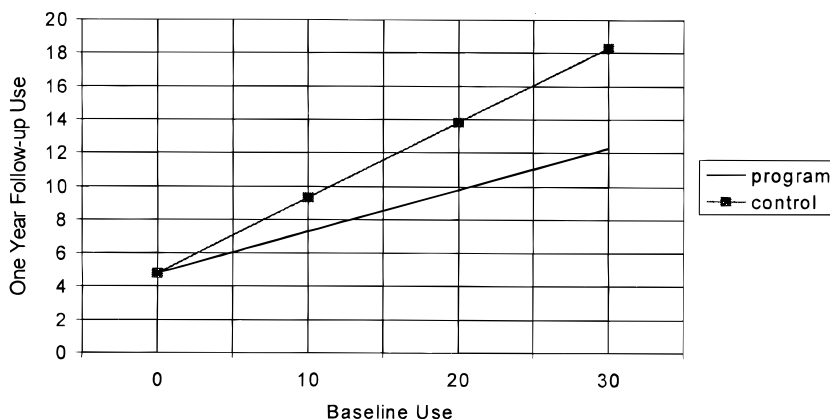


FIG. 1. Thirty-day alcohol use frequency.

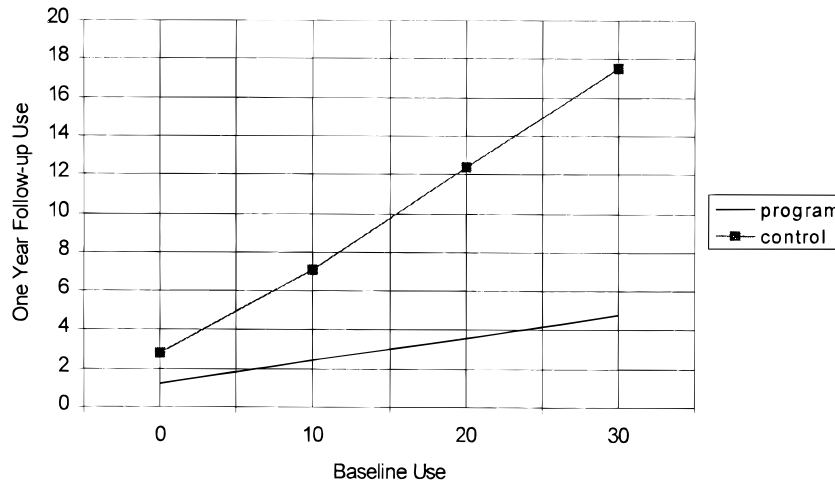


FIG. 2. Thirty-day hard drug use frequency.

We did not find program effects in either study for two commonly used drugs, cigarettes and marijuana. In the previous study [5], we suggested that youth may perceive these two drugs as relatively safe in the short run compared with heavy alcohol use and hard drug use. Perhaps more information on the immediate, subtle effects and progressive consequences of use of both of these substances is needed. Another possible explanation regarding the failure to achieve effects on cigarette use is that this is a highly addictive substance; perhaps tobacco use cessation techniques are in need of instruction (e.g., how to cope with withdrawal symptoms).

It would appear that a collection of prevention strategies is needed to effectively combat drug use in teenagers, ranging from primary comprehensive social influences prevention programs in the general population for younger teens to programs such as TND in older, high school populations of medium to high risk students. We do not wish to suggest that some comprehensive social influences strategies might not be effective among traditional high school youth. However, our previous program development testing failed to support high receptivity of social influences programming among older traditional or high risk-youth (especially use of refusal assertion training and normative restructuring; [5,16]). Still, we only wish to demonstrate that a health motivation–personal and social skills–decision-making model is effective among these general high school youth as well as among higher risk, older teens at continuation high schools. Certainly, more research is needed to fully delineate the types of empirically validated programming that best match different youth populations varying in both age and level of risk for drug abuse.

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