

Long-term behavioral effects of a school-based prevention program on illicit drug use among young adults

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Abstract

Most universal drug abuse prevention efforts target early adolescents with the goal of delaying or preventing the onset of substance use. The present study examined long-term follow-up data from a large-scale randomized trial of a school-based prevention program that used cognitive-behavioral skills-training techniques to enhance social and personal competence skills and drug refusal skills. The preventive intervention was implemented in junior high schools, and pretest data were collected from students in the classroom. Approximately 13 years later, follow-up data were collected by mail from 2042 young adults. Rates of overall lifetime illicit drug use, as well as lifetime marijuana use, marijuana intoxication, and lifetime non-medical pill use, were lower among students who received the prevention program (Life Skills Training) during junior high school compared to control group participants. These findings support the hypothesis that comprehensive, universal school-based prevention programs can produce long-term effects on illicit drug use behavior.

Keywords

Illicit drug use, adolescence, young adults, prevention, school-based

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Introduction

Illicit drug use and abuse are important public health problems in the US and can have significant negative effects on physical, psychological, interpersonal, and occupational functioning.¹ Epidemiologic research demonstrates that drug use often begins with experimentation during early adolescence, followed by increases over the course of adolescence, reaching a peak during early adulthood.² According to the National Survey of Drug Use and Health,³ the prevalence rate of past year illicit drug use in 2019 was highest (39.1%) among young adults age 18–25; this was significantly higher than youths age 12–17 (at 17.2%) and adults age 26 or older (at 18.3%).

Because this pattern of substance use is well established, most universal drug abuse prevention efforts target younger teens with the goal of delaying or preventing the onset of use. Reviews of the literature demonstrate that there has been substantial progress over the past three decades toward the development of school-based

approaches that successfully prevent substance use during the adolescent years when onset of use is highest.⁴ Prevention approaches that focus on teaching social resistance skills along with general life skills are among the most effective in decreasing the initiation of tobacco, alcohol, and marijuana use among secondary school students.⁵

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Table 1. Demographic characteristics of the young adult follow-up sample.

	Intervention group (%)	Control group (%)
% Male	46.5	48.6
% Minority	8.7	9.0
% Married	28.6	27.2
% Cohabiting	11.5	11.3
% College graduate	48.5	52.2
% Income <\$15,000/year	24.2	26.2

None of the differences across condition were statistically significant.

Although it is assumed that preventing or delaying onset of substance use during adolescence will disrupt pathways that lead to continued escalation of use or abuse into young adulthood, few studies have examined the long-term impact of universal school-based preventive interventions into the years of young adulthood. Furthermore, most prevention programs for adolescents target the use of tobacco, alcohol, and marijuana because these are the most widely used substances in our society. It is believed that preventing the use of these substances during adolescence will reduce the risk for later more serious drug involvement, including the use of illicit drugs other than marijuana. However, few studies have tested this hypothesis by looking at prevention effects on illicit drug use among participants many years later as young adults. The goal of the present study was to examine long-term follow-up data from a large-scale, randomized trial of a school-based prevention program that used cognitive-behavioral skills-training techniques to enhance social and personal competence skills and drug refusal skills.

Methods

Sample

The data reported in the present study are from a long-term, follow-up of a cohort of students who had participated in a randomized drug abuse prevention trial when they were attending junior high school.⁶ The prevention trial included 34 experimental and 22 control schools selected primarily from suburban school districts in New York State. All students attending schools assigned to the intervention group took part in the Life Skills Training (LST) drug abuse prevention program as a part of their regular curriculum, and students attending the control schools received standard health education. Table 1 shows the demographic characteristics of the young adult follow-up sample; there were no differences across experimental conditions in terms of gender, race/ethnicity, living arrangements, college graduation, or income levels.

Prevention program

The preventive intervention tested in this study was Life Skills Training (LST), which teaches drug resistance skills and activities to facilitate the development of important personal and social competence skills. By providing adolescents with the knowledge and skills needed to effectively resist social influences to engage in substance use and increasing general personal and social competence, the program aims to reduce social and psychological motivations to use substances. The program teaches cognitive-behavioral skills for building self-esteem, resisting peer pressure and media influences, managing anxiety, communicating effectively, developing personal relationships, and asserting one's rights, as well as domain-specific skills such as skills for resisting interpersonal pressure from peers to engage in substance use. Material is also provided to correct misperceptions regarding descriptive norms supporting drug use. The LST program uses a variety of interactive teaching methods such as group discussion and skills-training techniques such as demonstration, modeling, behavioral rehearsal, feedback and reinforcement, and behavioral "homework" assignments for out-of-class practice.

The LST program has been shown to be highly effective in 18 separate cohorts of young people, as reported in 35 outcome studies published in peer-reviewed scientific journals. Findings have consistently shown reductions in smoking, alcohol use, and marijuana use of 50% or more in students receiving the LST program relative to controls, as well as improvements in important risk and protective factors for adolescent drug abuse.⁷ In the cohort examined in the present study, significant intervention effects on alcohol, tobacco, and marijuana use were found at the end of the intervention when students were in the 9th grade⁸; similar effects were found when the cohort was followed-up in the 12th grade⁶; and program effects were found on illicit drug use at the end of high school.⁹ Taken together, these results illustrate that the LST program produces behavioral effects on a range of drug use outcomes that are highly durable.

Procedure

Prior to the randomized prevention trial, participating schools were surveyed and divided into high, medium, or low smoking prevalence. Schools were then randomized into the experimental or control conditions from within these smoking prevalence groups. Students in the intervention condition received a drug abuse prevention program consisting of a primary year of intervention in the seventh grade (15 class sessions) and booster interventions during the eighth and ninth grades (10 and 5 class sessions, respectively). The research protocol and consent procedure for this study was reviewed and approved by the

Institutional Review Board at Cornell University Medical College. Additional information on the research methods and a description of the preventive intervention used in this study can be found elsewhere.⁶

For the follow-up assessment during young adulthood, we attempted to obtain updated contact information for all participants who had initially completed the baseline survey. This process included confirming contact information using several methods. These included directory assistance searches, telephone matching services, department of motor vehicles databases, mailings with national change of address corrections, searches of credit databases, and information from previous follow-up attempts including contacts with parents. We were able to confirm current home address for 83% of the original sample. The follow-up survey was mailed to these participants, who were offered \$20 as an incentive to complete the survey. About 44% ($N=2042$) of those who were mailed packets received and returned the questionnaire.

Measures

Baseline. The seventh grade survey assessed demographic variables and the frequency and quantity of use for cigarettes, alcohol, and marijuana. For example, frequency of marijuana use was measured using a 9-point scale with possible responses ranging from “never tried it” (1) to “more than once a day” (9).

Follow-up. The young adult follow-up assessment, conducted 13 years after the initial pretest assessment (1998), asked participants how often (if ever) they have used several different types of illicit drugs on the same 9-point response scale. Because marijuana is the most prevalent in the U.S. population, we examined intervention effects on lifetime marijuana use and lifetime marijuana intoxication separately. We grouped the remaining substances into a non-medical pill use category, a summary score consisting of ever use of amphetamines, barbiturates, Quaaludes, and/or tranquilizers; and an overall illicit drug use category, which consisted of ever use of marijuana, non-medical pill use, or inhalants, amyl or butyl nitrites, heroin and other narcotics, LSD, PCP, and/or MDMA.

Results

Pretest equivalence

A series of chi-square analyses were conducted and demonstrated that there were no pretest differences in the young adult follow-up sample between the experimental and control groups in terms of gender or race/ethnicity, nor were there differences across conditions in rates of substance use or academic grades received in the seventh grade. As shown in Table 1, a similar set of analyses revealed that there were

no differences across conditions in the young adult sample in terms of marital or cohabitation status, college graduation rates, or percent with incomes of \$15,000 per year or less.

Attrition analysis

The overall retention rate of participants from the previous assessment was 56% and was similar across conditions. Attrition analyses also revealed no differential attrition rates across condition according to pretest substance use or demographic variables. Those who reported smoking, drinking, or marijuana use at baseline were more likely to drop out of the study relative to those who did not report using these substances. Approximately 9% of dropouts reported smoking marijuana at baseline versus 3% of those who stayed in the study, $t(5, 590)=9.02$, $p<0.001$. Additional analyses showed that males and minorities dropped out of the study at a higher rate compared to females and non-minorities. However, the rate of attrition of substance users, males, or minorities did not differ across experimental conditions.

Intervention effects

Analyses were run using PROC GENMOD in SAS to control for potential school clustering effects. A dummy variable for condition was created, where 1 was assigned to participants in the intervention group and 0 was assigned to control group participants. Demographic covariates included in the model included gender, minority status, academic grades in seventh grade, and college graduation rates and incomes at the follow-up assessment. We also included a pretest measure of lifetime marijuana use as a covariate to estimate the intervention effects more precisely on illicit drug use in young adulthood. As shown in Table 2, the intervention had a protective effect on overall lifetime illicit drug use (OR=0.77, 95%CI: 0.626–0.947). Furthermore, the intervention had a protective effect on lifetime marijuana use (OR=0.776, 95%CI: 0.629–0.958), lifetime marijuana intoxication (OR=0.810, 95%CI: 0.575–0.963), and lifetime non-medical pill use (OR=0.744, 95%CI: 0.575–0.963).

Discussion

The present study examined long-term, follow-up data from a large-scale randomized trial of a school-based prevention program delivered to students in junior high school. Among young adults assessed 13 years after the initial pre-test, students who received the prevention program (Life Skills Training) during junior high school were significantly less likely to report overall illicit drug use as young adults when compared to control group participants. Lifetime marijuana use and non-medical pill use were

Table 2. Adjusted proportions of illicit drug users in intervention and control groups in the young adult follow-up sample.

	Proportion of lifetime users in intervention group (%)	Proportion of lifetime users in control group (%)	Odds ratio	95%CI	p
Marijuana use	62.0	67.8	0.776	0.629, 0.958	0.018
Marijuana intoxication	57.1	60.1	0.810	0.575, 0.963	0.022
Non-medical pill use	13.2	17.0	0.744	0.575, 0.963	0.022
Overall illicit drug use	63.4	69.3	0.770	0.626, 0.947	0.014

Proportions adjusted for covariates including baseline lifetime marijuana use, gender, minority status, grades in school during junior high, college graduation status, and income; *p*-values are adjusted for school level clustering effects; Non-medical pill use includes amphetamines, barbiturates, Quaaludes, and tranquilizers.

lower in the intervention group when compared to controls. These findings support the hypothesis that comprehensive, universal, school-based prevention programs can produce long term effects on illicit drug use behavior.

The findings from the present study are important because they provide evidence that early prevention programming can have long term effects on the overall use of illicit substances many years later, including substances that were not specifically addressed in the prevention program. This finding suggests that the initial effects of the intervention, which targets tobacco, alcohol, and marijuana use, can generalize to a broader range of illicit drug categories, including non-medical pill use.

There are several strengths of the present study including a rigorous randomized controlled research design and the use of standardized and well-tested protocols for recruiting schools and tracking participants over time. Data were collected with confidential, standardized self-report surveys and measures had well-established psychometric properties. The intervention was theory-based, drawing from social cognitive¹⁰ and problem-behavior theories.¹¹ Methods used in the study were derived from over 30 years of research in the field of prevention science, and the prevention approach used in the present study has been extensively tested with results published in peer reviewed journals. Limitations of the present study include the moderate rate of participation during young adulthood and the possibility of underreporting of sensitive behaviors. These limitations could make it more difficult to demonstrate program effects, yet significant findings were observed despite these limitations. Therefore, the presence of prevention effects in the face of these limitations provides strong empirical support for the efficacy of this cognitive-behavioral prevention approach.

Declaration of conflicting interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: Dr. Botvin has a financial interest in the Life Skills Training (LST) program and his consulting company, National Health Promotion Associates (NHPA), provides teacher training and technical assistance for LST. Dr. Griffin is a consultant to NHPA.

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Significance for public health

Few studies have examined the long-term impact of drug abuse prevention programs delivered in schools during early adolescence. The present study examined long-term follow-up data from a large-scale randomized trial of a school-based prevention program and found that, 13 years later after the pretest assessment, rates of lifetime illicit drug use were lower among students who received the prevention program compared to control group participants. These findings support the hypothesis that comprehensive, universal school-based prevention programs can produce long-term effects on illicit drug use behavior.

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