

Two-Year Behavior Outcomes of Project Towards No Tobacco Use

Clyde W. Dent, Steve Sussman,
Alan W. Stacy, and Sande Craig
University of Southern California

Dee Burton and Brian R. Flay
University of Illinois at Chicago

The article presents 2-year follow-up data from a school-based tobacco use prevention project designed to test the effectiveness of 3 primary components in social influence programs. The components either teach refusal skills, awareness of social value misperceptions, or physical consequences. Curricula were tested with a randomized experiment involving 48 junior high schools. These data suggested that (a) a physical-consequences curriculum is successful at attenuating increases in adolescent smokeless tobacco use, (b) cigarette experimentation may be attenuated by various approaches, and (c) a comprehensive program with all 3 components was necessary to attenuate increases in weekly use of both forms of tobacco. These results also indicate that school-based tobacco use interventions can be effective at least 2 years postprogram, after students make their transition to high school.

Project Towards No Tobacco Use (Project TNT) is a school-based prevention project with the objective of examining the relative effectiveness of three common strategies used in preventing adolescent use of tobacco. A previous report provided evidence that each of the strategies examined was effective at a 1-year follow-up (Sussman et al., 1993b). In the present report, a 2-year follow-up evaluation established whether preventive effects endured after students made their transition from junior high to high school.

Method

Design and Participants

A total of 48 junior high schools were recruited and randomly assigned to one of four program conditions or to a "usual-care" control condition. The program conditions consisted of activities that counteract (a) normative social influence (yielding to peer pressure to achieve acceptance: e.g., refusal assertion skills training), (b) informational social influence (social image misperceptions of tobacco: e.g., correction of tobacco use prevalence overestimation or (c) misperceptions regarding physical consequences of tobacco use (Sussman et al., 1993a). Three single-strategy curricula and a combined strategy curriculum were delivered to seventh-grade students. A "booster session," with contents tied to the original curriculum, was delivered to the eighth-grade cohort. A 20-page self-report questionnaire was administered to seventh-grade students. This same questionnaire was administered again 1 year and 2 years later to all students in the cohort at the project

schools. A saliva or breath sample was collected from students before each survey administration, to increase the accuracy of self-reported tobacco use (Burton et al., 1988).

Student data were collected from 6,716 seventh-grade students. Fifty percent of the students were male, 60% were White, 27% were Hispanic, 7% were Black, and 6% were Asian or "other." Two-year follow-up data were collected from 7,219 ninth graders in high schools fed by Project TNT junior high schools. Sixty-five percent of the students reported attending a Project TNT junior high school 2 years earlier. Data were aggregated to the junior high school as the unit of analysis at each time point.

Measures and Analysis

We examined four behavior outcome measures—two that measured rates of initial trial of cigarettes and smokeless tobacco and two that measured rates of weekly use of these substances. We first examine ninth-grade prevalence of these measures between male-female aggregates and urban-rural regions using *t* tests. Then, we present results from a five-group one way analysis of covariance (ANCOVA) model with school as the unit of analysis. The models include a measure of school "turnover" (defined as the proportion of new students attending school at the 2-year follow-up), region, and gender as covariates.

Results

Consistent with our baseline prevalence estimates (Sussman et al., 1993b), more rural than urban students were likely to try cigarettes—60% versus 52% by ninth grade. Male and female students reported equal trial rates of cigarettes within regions. Weekly smoking was 14% at ninth grade, which did not vary by gender or region. Change in prevalence of trial of cigarettes between seventh and ninth grades was 17%, and change in weekly cigarette smoking was 8% overall. Neither change estimate varied significantly by gender or region.

More male than female students were triers of smokeless tobacco (20% vs. 4%), and more triers were in rural than urban regions (12% vs. 9%), at ninth grade. Weekly smokeless tobacco use did not vary by urban versus rural region—4% reported weekly use of smokeless tobacco in both regions at ninth grade—but virtually all weekly use was reported by male stu-

Clyde W. Dent, Steve Sussman, Alan W. Stacy, and Sande Craig, Institute for Health Promotion and Disease Prevention Research, University of Southern California; Dee Burton and Brian R. Flay, Prevention Research Center, University of Illinois at Chicago.

Support for this research was provided by Grant CA44907 from the National Cancer Institute and Grant DA07601 from the National Institute on Drug Abuse.

Correspondence concerning this article should be addressed to Clyde W. Dent, Institute for Health Promotion and Disease Prevention Research, University of Southern California, 1540 Alcazar Avenue, Suite 209, Los Angeles, California 90033.

Table 1
Change in Prevalence of Tobacco Use (Grades 7 to 9)

Tobacco measure	Condition				
	Combined	Informational social influence	Normative social influence	Physical consequences	Standard care control
Trial cigarette use	16 _b	15 _b	17 _b	13 _b	23 _a
Weekly cigarette use	4 _b	12 _a	9 _a	8 _a	9 _a
Trial smokeless tobacco use	7 _a	4 _a	4 _a	0 _b	7 _a
Weekly smokeless tobacco use	-0 _{ab}	2 _a	2 _a	-1 _b	1 _a

Note. Within each row comparison, significant differences ($p < .05$, two-tailed) between percentages are indicated by different-letter subscripts; same-letter subscripts denote no significant difference; use of two letters indicates a marginal effect.

dents (7% vs. <1%). Change in trial of smokeless tobacco use was small (4% overall), which did vary by gender and region. Finally, weekly smokeless tobacco use changed by less than 1% overall, with more change among male than female students (4% vs. 1%).

Analyses of intervention component effects indicate support for 2-year maintenance of initial intervention effects in the combined and physical-consequences conditions. These data are shown in Table 1.

Discussion

These data suggest that (a) physical consequences information can be used to compose a curriculum that is successful at attenuating increases in smokeless tobacco use among adolescents, (b) cigarette experimentation may be attenuated by a variety of approaches, and (c) a multicomponent school-based tobacco use prevention program can be successful at attenuating increases in weekly use of both cigarettes and smokeless tobacco.

The physical consequences program was efficacious in attenuating increases in smokeless tobacco use. It was also effective in attenuating increases in trial of cigarettes. This pattern of results may contradict previous research, which found social influence programming to be superior to physical consequences programming (e.g., Flay et al., 1989). The present physical-consequences curriculum included several novel features, such as correcting myths about tobacco experimentation and addiction, role-playing that one has a disease, and presenting probabilities of consequences information in ways more personally relevant to youths. These features may have contributed to its effectiveness. Future research should examine these elements more closely.

The normative and informational social influence conditions showed the same change in prevalence of tobacco use over the 2-year period. It apparently is the case that either single component program is effective only on trial of smoking in the long run. Their combined effects are needed to have an impact on higher levels of smoking.

The combined condition and the physical-consequences condition showed a differential impact on use of the two tobacco products. Whereas the combined curriculum was the only one to have an impact on weekly cigarette smoking, the physical-

consequences curriculum was the only one to have an impact on trial of smokeless tobacco use. In the long run, physical-consequences information was especially important for the prevention of smokeless tobacco use. A modified combined condition that adds more physical-consequences information is likely to be the strongest and most generalized program overall.

Although the results of our study are favorable toward long-term maintenance of effects of school-based tobacco interventions, previous research has shown that school-based prevention programs implemented in junior high school have little chance of long-term success unless additional programming is offered throughout high school (Ellickson, Bell, & McGuigan, 1993; Flay et al., 1989). Materials should be updated to be applicable to the social situations of high-school students (e.g., jobs, unsupervised recreational time, dating) to maximize the probability that students will remain nonusers as they reach young adulthood.

References

- Burton, D., Sussman, S., Dent, C. W., Graham, M., Hahn, G. (Presenters), & Burhansstipanov, L. (Panel Presider). (1988, February). *Panel presentation: Use and cessation of smokeless tobacco and cigarettes by high school students*. Presented at the 40th Annual Meeting and Conference of the Society for Public Health Education (SOPHE) Association, Chicago.
- Ellickson, P. L., Bell, R. M., & McGuigan, K. (1993). Preventing adolescent drug use: Long-term results of a junior high program. *American Journal of Public Health, 83*, 856-861.
- Flay, B. R., Koepke, D., Thompson, S. J., Santi, S., Best, J. A., & Brown, K. S. (1989). Six-year follow-up of the first Waterloo school smoking prevention trial. *American Journal of Public Health, 79*, 1371-1376.
- Sussman, S., Dent, C. W., Stacy, A. W., Hodgson, C. S., Burton, D., & Flay, B. R. (1993a). Implementation, process, and immediate outcome evaluation of Project Towards No Tobacco Use. *Health Education Research: Theory and Practice, 8*, 109-123.
- Sussman, S., Dent, C. W., Stacy, A. W., Sun, P., Craig, S., Simon, T. R., Burton, D., & Flay, B. R. (1993b). Project Towards No Tobacco Use one-year behavior outcomes. *American Journal of Public Health, 83*, 1245-1250.

Received March 24, 1994

Revision received September 19, 1994

Accepted September 27, 1994 ■