

Long-Term Follow-Up Effects of a School-Based Drug Abuse Prevention Program on Adolescent Risky Driving

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Abstract:

This study examined long-term follow-up data from a large-scale randomized trial to determine the extent to which participation in a school-based drug abuse prevention program during junior high school led to less risky driving among high school students. Self-report data collected from students in the 7th, 10th, and 12th grades were matched by name to students' department of motor vehicles (DMV) records at the end of high school. The DMV data included the total number of violations on students' driving records as well as the number of "points" that indicate the frequency and severity of the violations. A series of logistic regression analyses revealed that males were more likely to have violations and points on their driving records than females, and regular alcohol users were more likely to have violations and points than those who did not use alcohol regularly. Controlling for gender and alcohol use, students who received the drug prevention program during junior high school were less likely to have violations and points on their driving records relative to control group participants that did not receive the prevention program. Findings indicated that antidrinking attitudes mediated the effect of the intervention on driving violations, but not points. These results support the hypothesis that the behavioral effects of competence-enhancement prevention programs can extend to risk behaviors beyond the initial focus of intervention, such as risky driving.

Keywords: adolescence | drug abuse prevention | risky driving

Article:

As young people explore new roles during adolescence, they often experiment with new behaviors that involve risk taking (Baumrind, 1987). For some adolescents, risk taking occurs with greater frequency, is more extensive in nature, and presents a higher level of danger to youth themselves and others (Tonkin *et al.*, 1990). Youth who seek out and engage in high levels

of risky behavior appear to share certain beliefs, attitudes, personality traits, and other characteristics. Indeed, theoretical formulations such as Problem Behavior Theory (PBT; Jessor & Jessor, 1977) suggest that substance use, early sexual activity, delinquency, and other problem behaviors are purposeful, functional, and instrumental in achieving personal goals from the point of view of the adolescent. These goals may include bonding with peers, asserting independence from authority, coping with feelings of inadequacy or failure, or attempting to appear more mature (Jessor, 1987). From an empirical standpoint, different problem behaviors have been found to covary, with several studies demonstrating that smoking, problem drinking, marijuana use, early sexual activity, and antisocial behavior frequently co-occur in the same individuals during adolescence (e.g., Donovan *et al.*, 1988). These findings support the notion that problem behaviors stem from a common set of risk factors and may represent a general syndrome of adolescent problem behavior with similar etiologic determinants.

Although much of the research on problem behaviors during adolescence has focused on substance abuse, delinquency, and sexual risk taking, fewer studies have focused on risky driving. However, risky driving is a major factor contributing to motor vehicle crashes, which represent the largest cause of death and disability among 16- to 19-year-olds in the United States and account for over one-third of all deaths in this age group (Insurance Institute for Highway Safety, 2002). In addition to being correlated with other problem behaviors, Jessor (1987) found that risky driving, defined as taking risks while driving in traffic in order to have more fun, was significantly correlated with several etiologic variables central to the framework of PBT, including low value placed on achievement, high value placed on independence, few parental role models for healthy behavior, and the presence of friends that model problem behavior. Similarly, others have found empirical evidence that risky driving is highly correlated with other adolescent problem behaviors (Vingilis & Adlaf, 1990) and that these behaviors stem from factors such as sensation seeking or thrill seeking, reduced risk perception, perceptions of invulnerability from harm, susceptibility to boredom, susceptibility to peer pressure, and tolerance for deviance (Arnett, 1992; Harre, 2002).

Substantial progress has been made in developing and testing preventive interventions for adolescent problem behaviors, particularly in the field of school-based drug abuse prevention. Research suggests that drug prevention programs that focus on drug resistance skills along with general social and personal skills training are the most effective (Botvin, 2000). Such competence-enhancement-based prevention programs teach young people ways to use cognitive and social skills to confront and struggle with, and to master developmental tasks and also aim to increase resilience to the social, environmental, and intrapsychic forces that promote and maintain problem behaviors. Thus, to the extent that there is a common etiology across different risk behaviors, a preventive intervention that teaches general life skills that can be applied to many situations may have behavioral effects on multiple negative outcomes. The goal of this study was to examine the extent to which participation in an effective competence-enhancement

drug abuse prevention program during junior high school produces prevention effects for risky driving in high school.

METHODS

Sample

The data for this study were collected from two sources. Student self-report data were obtained as part of a larger long-term follow-up study of a randomized drug abuse prevention trial (Botvin *et al.*, 1995). Data on risky driving were obtained by matching student names and addresses with those from official records obtained through the state department of motor vehicles (DMV). Of the over 3,500 students that participated in the long-term follow-up study, the DMV was able to provide a match for 2,042 or 58% of students. The length of the follow-up period between the initial baseline data collection for the school-based prevention program and the DMV data was approximately 6 years. The final sample of 2,042 youth included 1,360 students that received the prevention program and 682 that were in the control group of the original prevention study. The sample was 53% male and 47% female, 91% were White, and the median age was 18.1 years (range 17.3–21.0). Participants were primarily from middle-class suburban and rural areas of New York State, and 86% lived in two-parent families.

Procedure

In the larger school-based drug abuse prevention program, a randomized block design was utilized. Before randomization to the intervention or control groups, schools were surveyed and divided into high, medium, or low smoking prevalence. Then schools were randomized into one of three conditions from within these blocks: (1) prevention program with 1-day training workshop for providers, (2) prevention program with videotaped training, and (3) “treatment as usual” control group. Students in the two experimental conditions received a drug abuse prevention program consisting of a primary year of intervention in the seventh grade and booster interventions during the eighth and ninth grades. Owing to factors such as school absenteeism, transfers, and dropouts, the attrition rate over the initial 3-year period of the prevention intervention study was approximately 23%. Further details on the research methods and a description of the intervention used in the prevention study can be found elsewhere (Botvin *et al.*, 1995). To obtain data on risky driving, a list of names and addresses of students in the prevention study was provided to the New York State Department of Motor Vehicles. For students whose name and address could be matched to the DMV database, the DMV provided information on traffic violations on students’ driving records.

Prevention Program

The preventive intervention used in this study (*Life Skills Training*) teaches alcohol and drug resistance skills, norms against drinking and drug use, and material designed to facilitate the development of important personal and social skills. The goal of the prevention program is to

provide adolescents with the knowledge and skills needed to effectively resist social influences to engage in substance use, as well as to reduce potential motivations to use substances by increasing general personal and social competence. The program teaches students a variety of cognitive-behavioral skills for building self-esteem, resisting advertising pressure, managing anxiety, communicating effectively, developing personal relationships, and asserting one's rights. These are taught using proven skills-training techniques such as group discussion, demonstration, modeling, behavioral rehearsal, feedback, and reinforcement, and behavioral "homework" assignments for out-of-class practice. The program also teaches problem-specific skills related to alcohol and drug use. Students are taught, for example, ways to use general assertiveness skills in situations where they experience direct interpersonal pressure from peers to engage in alcohol and drug use. Material is also provided to reinforce norms against substance use.

This prevention approach has been shown to be effective among suburban, White youth with prevention effects lasting until the end of high school (Botvin *et al.*, 1995). Over the past several years, this approach has been revised for use with minority youth (Botvin *et al.*, 1994), and the program has recently been shown to be effective in preventing substance use among inner-city minority youth in a large randomized trial (Botvin *et al.*, 2001a). The present study is the first, however, to examine prevention effects on risky driving.

Measures

Prevention Study Data

From the school-based prevention study, data on demographic factors, self-reported alcohol use, and experimental condition (intervention or control group) in the seventh grade were used in the present analysis. Follow-up data on antidrinking attitudes in the 10th grade and self-reported alcohol use in the 12th grade from the school-based survey were used as well. Antidrinking attitudes were assessed with 10 items ($\alpha = .73$) such as "Drinking alcohol makes you look cool" and "Drinking alcohol makes you look more grown-up," with higher scores indicating greater disagreement. Alcohol consumption was assessed using three items reflecting the frequency of alcohol use, the quantity of use per drinking occasion, and the frequency of drunkenness. A dichotomous alcohol consumption index was calculated on the basis of these items, and participants were designated as regular alcohol users if they (1) drank alcohol in the past week, (2) reported having three or more drinks per occasion, or (3) got drunk in the past month.

Department of Motor Vehicle Data

The outcome variables in this study were taken from DMV records on traffic violations for participating students. In addition to the number of traffic violations, we used the number of "points" on students' driver's license as an outcome variable. The DMV uses a point system that helps identify drivers who commit more frequent and severe traffic violations within a specific period of time. More severe traffic violations are assigned higher point values: for example,

speeding more than 40 miles per hour over the posted speed limit is assigned 11 points, while speeding under 10 miles per hour over the limit is assigned 3 points. Points remain on one’s driving record for 18 months from the date of the violation. Thus if a violation has occurred over 18 months ago, it is possible to have violations on one’s driving record without having points. This occurred for 2% ($n = 42$) of participants in this study.

RESULTS

A series of chi-square analyses revealed that there were no differences between the experimental and control groups at baseline in terms of gender composition or the alcohol use index. In the 12th grade, 27% of students reported drinking in the last week, 56% reported typically taking three or more drinks per occasion, and 35% reported getting drunk in the past month. In terms of risky driving, 77% of the sample had no violations and 79% had no points on their DMV record. For those with violations on their record, the mode was three violations (range 1–9); for those with points on their licenses, the mode was 4 points (range 2–12). Because the driving outcomes were highly skewed, we used two dichotomous scores—one indicating the presence of any violations on one’s driving record and the other indicating the presence of any points—as the main outcomes in subsequent analyses.

Table 1. Experimental Condition as Predictor of Violations on Driver’s License, Controlling for Gender and Alcohol Use Index

	<i>p</i> value				
	Participants with violations (%)	OR	95% CI	GLM	GEE
Intervention					
No	25				
Yes	20	0.75	(0.61, 0.94)	.0116	.0205
Gender					
Female	15				
Male	30	2.72	(2.17, 3.41)	.0001	.0001
Alcohol use index (12th grade)					
No	18				
Yes	27	1.75	(1.39, 2.19)	.0001	.0001

Notes. Reference group for each predictor is the first of the two listed. Proportions are adjusted for the remaining two covariates.

A series of logistic regression analyses were conducted to examine the effect of the intervention on risky driving during high school. In each analysis, gender and alcohol use in the 12th grade were included as covariates. Results indicated that the intervention had a significant protective effect on risky driving. As shown in Table 1, the prevention program had a protective effect in terms of the presence of violations on one’s DMV record, with an odds ratio (OR) of 0.75 (95% confidence interval [CI] = 0.61, 0.94), controlling for gender and alcohol use. In this analysis,

being male was associated with increased likelihood of violations (OR = 2.72, 95% CI = 2.17, 3.41) as was regular alcohol use (OR = 1.75, 95% CI = 1.39, 2.19). Results were similar using the presence of points as the outcome variable, as shown in Table 2. The prevention program had a protective effect in terms of the presence of points on one's license (OR = 0.75, 95% CI = 0.60, 0.94), controlling for gender and alcohol use. Being male was associated with an increased likelihood of points on one's license (OR=2.59, 95% CI = 2.05, 3.27) as was regular alcohol use (OR = 1.65, 95% CI = 1.31, 2.09). Additional analyses revealed that the protective effects of the intervention on violations and points remained significant when alcohol use was not included as a covariate.

Following the criteria for testing mediation outlined by Baron and Kenny (1986), mediational analyses on a subgroup of participants that completed survey data in the 10th grade were examined to identify potential mediators of program effects on risky driving. Findings indicated that those in the intervention group had higher antidrinking attitudes in the 10th grade compared with controls, $F(1, 769) = 3.7, p < .05$; higher antidrinking attitudes predicted significantly fewer total violations in the 12th grade, $F(1, 759) = 5.3, p < .02$; and the direct effect of the intervention on the total violations became nonsignificant with antidrinking attitudes included in the model, $F(1, 759) = 0.1, p = .75$. These findings indicate that the program effects on total violations were mediated in part by increased antidrinking attitudes among those that received the prevention program. However, the mediational model was not significant for total number of points on participants' licenses.

Table 2. Experimental Condition as Predictor of Points on Driver's License, Controlling for Gender and Alcohol Use Index

	<i>p</i> value				
	Participants with points (%)	OR	95% CI	GLM	GEE
Intervention					
No	23				
Yes	18	0.75	(0.60, 0.94)	.0125	.0239
Gender					
Female	14				
Male	28	2.59	(2.05, 3.27)	.0001	.0001
Alcohol use index (12th grade)					
No	17				
Yes	25	1.65	(1.31, 2.09)	.0001	.0001

Notes. Reference group for each predictor is the first of the two listed. Proportions are adjusted for the remaining two covariates.

Because the intervention was randomized and administered at the school level, additional analyses were conducted to control for intracluster correlations (ICCs) among students within

schools. In the present context, ICCs quantify the degree of similarity of questionnaire responses within schools and how behaviors vary at the school level. The generalized estimating equations (GEE) method adjusts the estimated standard error to account for the within cluster correlation and generally provides for a more conservative test of the hypothesis when a positive ICC is present (Norton *et al.*, 1996). When the ICCs were taken into account using the GEE method, the *p* values for the prevention effects remained statistically significant for both number of violations (GEE *p* value = .0205) and number of points (GEE *p* value = .0239). Thus, findings indicate that those who received the intervention were less likely to have indicators of risky driving on their DMV records compared with those in the control condition, and that these findings remained significant when school-level clustering was taken into account.

DISCUSSION

A number of approaches have been taken to reduce risky driving and automobile accidents among youth, including driver education classes for adolescents, graduated licensing systems, and the development of licensing systems that target problem drivers (Young, 1991). A recent review found that driver education programs, one of the most popular methods used to prevent automobile accidents among youth, are largely ineffective in reducing accident rates (Vernick *et al.*, 1998). Thus, new approaches to the prevention of risky driving are needed. Because risky driving shares a number of risk factors with substance use and related problem behaviors, effective prevention programs that address these common risk factors may have an impact on risky driving as well.

This study examined the extent to which participation in a competence-enhancement-based drug abuse prevention program during junior high school led to less risky driving among high school seniors, as indicated by the presence of violations and points on students' DMV records at the end of high school. As expected, findings indicated that males were more likely to have violations and points on their driving records than were females, and that regular alcohol users in the 12th grade were more likely to have violations and points compared with nondrinkers and those who drank infrequently. However, the most notable finding was that students who received the drug abuse prevention program (Life Skills Training) during junior high school were less likely to have violations and points on their driving records relative to controls that did not receive the prevention program, after controlling for the effects of gender and alcohol use.

In other studies evaluating this prevention approach, the program has been shown to reduce alcohol use, including immoderate use and binge drinking, promote antidrinking attitudes, and reduce normative expectations for peer drinking (Botvin *et al.*, 1995, 2001a, b). Mediation findings from the present study indicated that the prevention program had an impact on risky driving by increasing antidrinking attitudes. It may be that participants in the prevention program developed antidrinking attitudes that reduced alcohol use specifically in the context of driving situations, although we could not directly test this hypothesis. Alternatively, the prevention effects may have been related more broadly to increases in resilience and competence, making

risky driving appear less attractive and instrumental from the point of view of a highly competent adolescent.

There are a number of strengths and weaknesses in this study. Strengths include the longitudinal design and long-term follow-up of participants over a 6-year period. In previous studies, risky driving has frequently been measured by asking young people about their risk-taking behavior while driving. However, there are a number of potential methodological problems with self-report data, including shared method variance if all data is assessed via self-report. The fact that the measure of risky driving in this study was based on actual DMV records rather than self-report strengthens the validity of the findings. Another strength is that alcohol use and gender (being male), important risk factors for risky driving, were incorporated into the regression model and controlled for. Limitations include the fact that because the sample was largely suburban and White, it is unclear to what extent the results can be generalized to other subgroups of youth.

The present findings indicate that an effective competence-enhancement-based prevention program can reduce risky driving, even when risky driving was not addressed in the intervention. A goal of future research should be to investigate the extent to which broad-based prevention programs for adolescents can prevent a range of problem behaviors, including those behaviors that fall beyond the original scope of intervention. Future work should also address whether effective prevention programs for problem behavior generalize to health-related behaviors that are not considered problematic from a deviance perspective (e.g., poor dietary behavior), as well as for behaviors related to positive youth development such as academic success, prosocial behavior, and relationship-building skills.

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