

Project DARE No Effects at 10-Year Follow-Up

Donald R. Lynam

Department of Psychology University of Kentucky

Richard Milich

Department of Psychology University of Kentucky

Rick Zimmerman

Department of Behavioral Science College of Medicine

Scott P. Novak

Department of Behavioral Science College of Medicine

T. K. Logan

Center on Drug and Alcohol Research University of Kentucky

Catherine Martin

Department of Psychiatry University of Kentucky

Carl Leukefeld

Center on Drug and Alcohol Research University of Kentucky

Richard Clayton

Center for Prevention Research University of Kentucky

ABSTRACT

The present study examined the impact of Project DARE (Drug Abuse Resistance Education), a widespread drug-prevention program, 10 years after administration. A total of 1,002 individuals who in 6th grade had either received DARE or a standard drug-education curriculum, were reevaluated at age 20. Few differences were found between the 2 groups in terms of actual drug use, drug attitudes, or self-esteem, and in no case did the DARE group have a more successful outcome than the comparison group. Possible reasons why DARE remains so popular, despite the lack of documented efficacy, are offered.

This research was supported by Grant DA05312-10 from the National Institute on Drug Abuse and by General Clinical Research Center Grant M01 RR026202 from the National Institutes of Health. Correspondence may be addressed to Donald R. Lynam, Department of Psychology, University of Kentucky, Lexington, Kentucky, 40506.

Electronic mail may be sent to DLYNA1@POP.UKY.EDU

Received: March 12, 1998

Revised: November 10, 1998

Accepted: November 12, 1998

The use of illegal substances in childhood and adolescence occurs at an alarming rate. In response to this problem, there has been a widespread proliferation of schoolwide intervention programs designed to curb, if

not eliminate, substance use in this population. Project DARE (Drug Abuse Resistance Education) is one of the most widely disseminated of these programs ([Clayton, Cattarello, & Johnstone, 1996](#)).

The widespread popularity of DARE is especially noteworthy, given the lack of evidence for its efficacy. Although few long-term studies have been conducted, the preponderance of evidence suggests that DARE has no long-term effect on drug use ([Dukes, Ullman, & Stein, 1996](#) ; [McNeal & Hansen, 1995](#) ; [Rosenbaum, Flewelling, Bailey, Ringwalt, & Wilkinson, 1994](#)). For example, [Clayton et al. \(1996\)](#) examined the efficacy of DARE among over 2,000 sixth-grade students in a city school system. The students' attitudes toward drugs, as well as actual use, were assessed before and after the intervention and then for the next 4 years through 10th grade. Although the DARE intervention produced a few initial improvements in the students' attitudes toward drug use, these changes did not persist over time. More importantly, there were no effects in actual drug use initially or during the follow-up period. Further, results from shorter term studies are no more encouraging; these studies suggest that the short-term effects of DARE on drug use are, at best, small. In a meta-analysis of eight evaluations of the short-term efficacy of DARE, [Ennett, Tobler, Ringwalt, and Flewelling \(1994\)](#) found that the average effect size produced by DARE on drug use was .06, an effect size that does not differ significantly from zero.

Given the continued popularity of DARE, the limited number of long-term follow-ups, and the possibility of "sleeper effects" (effects showing up years after program participation), it seems important to continue to evaluate the long-term outcomes of DARE. The present study followed up the [Clayton et al. \(1996\)](#) sample through the age of 20. As far as we know, this 10-year follow-up is the longest reported on the efficacy of DARE. The original study, although presenting 5-year follow-up data, assessed adolescents during a developmental period when experimentation with drugs is quite prevalent and even considered normative by some authors ([Moffitt, 1993](#) ; [Shedler & Block, 1990](#)). The prevalence of minor drug use during this period may suppress the effects of DARE. However, by the age of 20, experimentation with drugs has reached its peak and begun to decline; it may be during this period that the effects of DARE will become evident. In fact, [Dukes, Stein, and Ullman \(1997\)](#) reported a 6-year follow-up that demonstrated an effect for DARE on the use of harder drugs when participants were in the 12th grade; this effect was not present 3 years earlier.

Method

Participants

The initial sample for this study consisted of sixth graders in the 1987—1988 academic year in a Midwestern metropolitan area of 230,000. An overwhelming majority of the sample came from urban or suburban areas. With regard to socioeconomic status (SES), the area is considered one of the more prosperous counties in a state known for its pockets of extreme poverty. Although actual SES measures were not collected, given the size and inclusiveness of the sample, the sample can be assumed to represent all economic strata. Of the initial sample, 51% were male and 75% were White.

Data were collected before and after the administration of DARE. Follow-up questionnaire data were collected from the students over a 5-year period from 6th through 10th grade. Of the original participants, completed questionnaires were obtained on at least three occasions (once in 6th grade, once in 7th or 8th grade, and once in 9th or 10th grade) for 1,429 students. This became the sample targeted for the present young adult follow-up study. Completed mailed surveys were received from 1,002 participants between the ages of 19 and 21.

The final sample of 1,002 consisted of 431 (43%) men and 571 (57%) women. The average age of the participants was 20.1 ($SD = 0.78$). The racial composition of the sample was as follows: 748 (75.1%) were White, 204 (20.4%) were African American, and 44 (0.4%) were of other race or ethnicity. Seventy-six percent of the final sample had received DARE, which corresponds almost exactly to the 75% of sixth graders who were originally exposed to DARE.

We conducted attrition analyses to determine whether the 1,002 participants differed from those 427 individuals who were eligible for the mailed survey study but from whom no survey was obtained. A dummy variable representing present—missing status was simultaneously regressed using a pairwise correlation matrix onto 15 variables from the original assessment: sex; ethnicity; age; DARE status; peer-pressure resistance; self-esteem, and use of, and positive and negative expectancies toward, cigarettes, alcohol, and marijuana. Missing status accounted for a small but significant proportion of the variance in the linear combination of the 15 study measures ($R^2 = .06$), $F(15, 1339) = 6.08$, $p < .001$, but only 3 variables were independently linked to missing status. Participants who were missing completed surveys tended to be older males who reported using cigarettes in the sixth grade. In general, attrition seemed to have little effect on the results that are reported here.

Procedures

Those individuals who could be located were sent a letter and a consent form requesting their participation in a follow-up to their earlier participation in the DARE evaluation. Those individuals who returned the signed consent form were mailed a questionnaire that took approximately 30 to 45 min to complete. Of the available sample, 5 had died, 176 refused to participate, 83 could not be located, and 163 were contacted but did not return the survey. For their time and effort, participants were paid \$15 to \$50.

Measures

Similar to the earlier data collection, participants were asked questions about their use of alcohol, tobacco, marijuana, and other illegal drugs. For each drug category, participants were asked to report how often they had used the substance in their lifetime, during the past year, and during the past month. In addition, participants were asked a variety of questions concerning their expectancies about drug use. For each drug, respondents reported how likely they believed using that drug would lead to five negative consequences (e.g., "get in trouble with the law" and "do poorly at school or work") as well as how likely they believed using that drug would lead to eight positive consequences (e.g., "feel good" and "get away from problems"). Negative and positive expectancy scores were formed for each drug at each age. Two potential mediators of the DARE intervention, peer-pressure resistance and self-esteem, were also assessed. Participants responded to nine items designed to assess the ability to resist negative peer pressure (e.g., "If one of your best friends is skipping class or calling in sick to work, would you skip too?"). Finally, participants responded to the 10-item Rosenberg Self-Esteem Scale ([Rosenberg, 1965](#)). All scale scores had acceptable reliabilities (alphas ranged from .73 to .93, with an average of .84).

Initial DARE Intervention

A complete description of the experimental and comparison interventions is contained in the [Clayton et al. \(1996\)](#) study. Twenty-three elementary schools were randomly assigned to receive the DARE intervention, whereas the remaining 8 schools received a standard drug-education curriculum. The DARE intervention

was delivered by police officers in 1-hr sessions over 17 weeks. The focus of the DARE curriculum is on teaching students the skills needed to recognize and resist social pressures to use drugs. Additionally, the curriculum focuses on providing information about drugs, teaching decision-making skills, building self-esteem, and choosing healthy alternatives to drug use. The control condition was not a strict no-treatment condition but instead consisted of whatever the health teachers decided to cover concerning drug education in their classes. The drug education received by students in the control condition cannot be described in detail because of the considerable latitude on the part of teachers and schools in what was taught. Nonetheless, in many instances, emphasis was placed on the identification and harmful effects of drugs, peer pressure was frequently discussed, and videos using scare tactics were often shown. These drug education units lasted approximately 30 to 45 min over a period of 2 to 4 weeks.

Results and Discussion

Because the school, and not the individual, was the unit of randomization in the present study, we used hierarchical linear modeling, with its ability to model the effect of organizational context on individual outcomes. For each of the substances (cigarettes, alcohol, and marijuana), we constructed three hierarchical linear models (HLMs) that examined amount of use, positive expectancies, and negative expectancies. We conducted additional analyses on peer-pressure resistance, self-esteem, and the variety of past-year illicit drug use. An HLM was used to model the effect of DARE on the school mean of each dependent variable (drug use and expectancies) while controlling for pre-DARE factors. This allowed for the comparison of how each school mean varied with the effect of DARE. We conducted preliminary analyses in which the effect of DARE was also modeled on the relationship between pre-DARE baseline and the substantive outcomes. Significant effects would suggest that DARE affected the relation between pre- and post-DARE outcomes. These effects were not significant and were thus fixed across schools. Respondents' sixth-grade reports of lifetime use served as baseline measures, whereas age-20 reports of past-month use of cigarettes, alcohol, and marijuana served as outcome measures. ¹The results of the full HLMs are presented in [Table 1](#).

Cigarettes

Pre-DARE levels of use and negative expectancies about cigarette use were significantly related to their counterparts 10 years later. There were no relations between DARE status and cigarette use and expectancies, suggesting that DARE had no effect on either student behavior or expectancies.

Alcohol

Pre-DARE levels of lifetime alcohol use and positive and negative expectancies about alcohol use were significantly related to their counterparts 10 years later. DARE status was unrelated to alcohol use or either kind of alcohol expectancy at age 20.

Marijuana

Pre-DARE levels of past-month marijuana use and negative expectancies about use were significantly related to their counterparts 10 years later. Similar to the findings for cigarettes, respondents' sixth-grade positive expectancies about marijuana use were not significantly related to marijuana expectancies at age 20. DARE status was unrelated to marijuana use or either kind of marijuana expectancy at age 20.

Illicit Drug Use

Finally, the number of illicit drugs (except marijuana) used in the past year was examined. Because no measures for these items were obtained during the initial baseline measurement, we estimated a means-as-outcomes HLM using no Level 1 predictors and only DARE status as a predictor at Level 2. The results show that DARE had no statistically significant effect on the variety of illicit drugs used.

Peer-Pressure Resistance

The results for peer-pressure resistance were similar to previous results. Pre-DARE levels of peer-pressure resistance were significantly related to peer-pressure resistance levels 10 years later, whereas DARE status was unrelated to peer-pressure resistance levels.

Self-Esteem

Finally, pre-DARE levels of self-esteem were significantly related to self-esteem levels at age 20. Surprisingly, DARE status in the sixth grade was negatively related to self-esteem at age 20, indicating that individuals who were exposed to DARE in the sixth grade had lower levels of self-esteem 10 years later. This result was clearly unexpected and cannot be accounted for theoretically; as such, it would seem best to regard this as a chance finding that is unlikely to be replicated.

Our results are consistent in documenting the absence of beneficial effects associated with the DARE program. This was true whether the outcome consisted of actual drug use or merely attitudes toward drug use. In addition, we examined processes that are the focus of intervention and purportedly mediate the impact of DARE (e.g., self-esteem and peer resistance), and these also failed to differentiate DARE participants from nonparticipants. Thus, consistent with the earlier [Clayton et al. \(1996\)](#) study, there appear to be no reliable short-term, long-term, early adolescent, or young adult positive outcomes associated with receiving the DARE intervention.

Although one can never prove the null hypothesis, the present study appears to overcome some troublesome threats to internal validity (i.e., unreliable measures and low power). Specifically, the outcome measures collected exhibited good internal consistencies at each age and significant stability over the 10-year follow-up period. For all but two measures (positive expectancies for cigarettes and marijuana), measurements taken in sixth grade, before the administration of DARE, were significantly related to measurements taken 10 years later, with coefficients ranging from small ($\beta = 0.09$ for positive expectancies about alcohol) to moderate ($\beta = 0.24$ for cigarette use). Second, it is extremely unlikely that we failed to find effects for DARE that actually existed because of a lack of power. Thus, it appears that one can be fairly confident that DARE created no lasting changes in the outcomes examined here.

Advocates of DARE may argue against our findings. First, they may argue that we have evaluated an out-of-date version of the program and that a newer version would have fared better. Admittedly, we evaluated the original DARE curriculum, which was created 3 years before the beginning of this study. This is an unavoidable difficulty in any long-term follow-up study; the important question becomes, How much change has there been? To the best of our knowledge, the goals (i.e., "to keep kids off drugs") and foci of DARE (e.g., resisting peer pressure) have remained the same across time as has the method of delivery (e.g., police officers). We believe that any changes in DARE have been more cosmetic than substantive, but this is difficult to evaluate until DARE America shares the current content of the curriculum with the broader

prevention community.

One could also argue that the officers responsible for delivering DARE in the present study failed to execute the program as intended. This alternative seems unlikely. DARE officers receive a structured, 80-hr training course that covers a number of topics, including specific knowledge about drug use and consequences of drug use, as well as teaching techniques and classroom-management skills. Considerable emphasis is given to practice teaching and to following the lesson plans. Although we did not collect systematic data on treatment fidelity in the present study, a process evaluation by [Clayton, Cattarello, Day, and Walden \(1991\)](#) attested to the fidelity to the curriculum and to the quality of teaching by the DARE officers.

Finally, advocates of DARE might correctly point out that the present study did not compare DARE with a no-intervention condition but rather with a control condition in which health teachers did their usual drug-education programs. Thus, technically, we cannot say that DARE was not efficacious but instead that it was no more efficacious than whatever the teachers had been doing previously. Although this is a valid point, it is unreasonable to argue that a more expensive and longer running treatment (DARE) should be preferred over a less expensive and less time-consuming one (health education) in the absence of differential effectiveness ([Kazdin & Wilson, 1978](#)).

This report adds to the accumulating literature on DARE's lack of efficacy in preventing or reducing substance use. This lack of efficacy has been noted by other investigators in other samples (e.g., [Dukes et al., 1996](#); [Ennett et al., 1994](#); [Wysong, Aniskiewicz, & Wright, 1994](#)). Yet DARE continues to be offered in a majority of the nation's public schools at great cost to the public ([Clayton et al., 1996](#)). This raises the obvious question, why does DARE continue to be valued by parents and school personnel ([Donnermeyer & Wurschmidt, 1997](#)) despite its lack of demonstrated efficacy? There appear to be at least two possible answers to this question. First, teaching children to refrain from drug use is a widely accepted approach with which few individuals would argue. Thus, similar to other such interventions, such as the "good touch/bad touch" programs to prevent sexual abuse ([Reppucci & Haugaard, 1989](#)), these "feel-good" programs are ones that everyone can support, and critical examination of their effectiveness may not be perceived as necessary.

A second possible explanation for the popularity of programs such as DARE is that they *appear* to work. Parents and supporters of DARE may be engaging in an odd kind of normative comparison ([Kendall & Grove, 1988](#)), comparing children who go through DARE with children who do not. The adults rightly perceive that most children who go through DARE do not engage in problematic drug use. Unfortunately, these individuals may not realize that the vast majority of children, even without any intervention, do not engage in problematic drug use. In fact, even given the somewhat alarming rates of marijuana experimentation in high school (e.g., 40%; [Johnston, O'Malley, & Bachman, 1996](#)), the *majority* of students do not engage in any drug use. That is, adults may believe that drug use among adolescents is much more frequent than it actually is. When the children who go through DARE are compared with this "normative" group of drug-using teens, DARE appears effective.

References

Clayton, R. R., Cattarello, A. M., Day, L. E. & Walden, K. P. (1991). Persuasive communication and drug abuse prevention: An evaluation of the DARE program.(In L.Donohew, H. Sypher, & W. Bukowski (Eds.), *Persuasive communication and drug abuse prevention* (pp. 295—313). Hillsdale, NJ: Erlbaum.)

- Clayton, R. R., Cattarello, A. M. & Johnstone, B. M. (1996). The effectiveness of Drug Abuse Resistance Education (Project DARE): 5-year follow-up results. *Preventive Medicine, 25*, 307-318.
- Donnermeyer, J. F. & Wurschmidt, T. N. (1997). Educators' perceptions of the D.A.R.E. program. *Journal of Drug Education, 27*, 259-276.
- Dukes, R. L., Stein, J. A. & Ullman, J. B. (1997). Long-term impact of Drug Abuse Resistance Education (D.A.R.E.). *Evaluation Review, 21*, 483-500.
- Dukes, R. L., Ullman, J. B. & Stein, J. A. (1996). A three-year follow-up of Drug Abuse Resistance Education (D.A.R.E.). *Evaluation Review, 20*, 49-66.
- Ennett, S. T., Tobler, N. S., Ringwalt, C. L. & Flewelling, R. L. (1994). How effective is drug abuse resistance education? A meta-analysis of Project DARE outcome evaluations. *American Journal of Public Health, 84*, 1394-1401.
- Johnston, L. D., O'Malley, P. M. & Bachman, J. G. (1996). *National survey results on drug use from the Monitoring the Future Study, 1975—1994*. (Rockville, MD: National Institute on Drug Abuse.)
- Kazdin, A. E. & Wilson, G. T. (1978). Criteria for evaluating psychotherapy. *Archives of General Psychiatry, 35*, 407-416.
- Kendall, P. C. & Grove, W. M. (1988). Normative comparisons in therapy outcomes. *Behavioral Assessment, 10*, 147-158.
- McNeal, R. B. & Hansen, W. B. (1995). An examination of strategies for gaining convergent validity in natural experiments. *Evaluation Review, 19*, 141-158.
- Moffitt, T. E. (1993). Adolescence-limited and life-course persistent antisocial behavior: A developmental taxonomy. *Psychological Review, 100*, 674-701.
- Reppucci, N. D. & Haugaard, J. J. (1989). Prevention of child sexual abuse: Myth or reality. *American Psychologist, 44*, 1266-1275.
- Rosenbaum, D. P., Flewelling, R. P., Bailey, S. L., Ringwalt, C. L. & Wilkinson, D. L. (1994). Cops in the classroom: A longitudinal evaluation of Drug Abuse Resistance Education (D.A.R.E.). *Journal of Research in Crime and Delinquency, 31*, 3-31.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. (Princeton, NJ: Princeton University Press)
- Shedler, J. & Block, J. (1990). Adolescent drug use and psychological health: A longitudinal inquiry. *American Psychologist, 45*, 612-630.
- Wysong, E., Aniskiewicz, R. & Wright, D. (1994). Truth and DARE: Tracking drug education to graduation and as symbolic politics. *Social Problems, 41*, 448-472.

1

Results were unchanged when prevalence of use or heavy use, rather than frequency of use, was used as the outcome variable.

Table 1. Hierarchical Linear Models Examining the Influence of Project DARE on Age-20 Levels of Drug Use, Drug Expectancies, Peer-Pressure Resistance, and Self-Esteem

Table 1
Hierarchical Linear Models Examining the Influence of Project DARE on Age-20 Levels of Drug Use, Drug Expectancies, Peer-Pressure Resistance, and Self-Esteem

Variable	Fixed Effect
Frequency of past-month cigarette use	
Intercept (γ_0)	-.006
Level 1: Pre-DARE lifetime cigarette use (β_1)	.240***
Level 2: DARE status (γ_1)	-.191
Negative expectancies toward cigarettes	
Intercept (γ_0)	.108
Level 1: Pre-DARE expectancies (β_1)	.145***
Level 2: DARE status (γ_1)	-.152
Positive expectancies toward cigarettes	
Intercept (γ_0)	-.011
Level 1: Pre-DARE expectancies (β_1)	.009
Level 2: DARE status (γ_1)	.053
Frequency of past-month alcohol use	
Intercept (γ_0)	-.034
Level 1: Pre-DARE lifetime alcohol use (β_1)	.115**
Level 2: DARE status (γ_1)	-.008
Negative expectancies toward alcohol	
Intercept (γ_0)	.035
Level 1: Pre-DARE expectancies (β_1)	.105**
Level 2: DARE status (γ_1)	-.004
Positive expectancies toward alcohol	
Intercept (γ_0)	-.052
Level 1: Pre-DARE expectancies (β_1)	.065*
Level 2: DARE status (γ_1)	.048
Frequency of past-month marijuana use	
Intercept (γ_0)	.033
Level 1: Pre-DARE lifetime marijuana use (β_1)	.098**
Level 2: DARE status (γ_1)	-.044
Negative expectancies toward marijuana	
Intercept (γ_0)	-.013
Level 1: Pre-DARE expectancies (β_1)	.123***
Level 2: DARE status (γ_1)	.039
Positive expectancies toward marijuana	
Intercept (γ_0)	-.021
Level 1: Pre-DARE expectancies (β_1)	.045
Level 2: DARE status (γ_1)	.051
Variety of illegal drugs used in past year ^a	
Intercept (γ_0)	-.081
Level 2: DARE status (γ_1)	.080
Peer-pressure resistance	
Intercept (γ_0)	.058
Level 1: Pre-DARE peer-pressure resistance (β_1)	.118**
Level 2: DARE status (γ_1)	-.139
Self-esteem	
Intercept (γ_0)	.133
Level 1: Pre-DARE self-esteem (β_1)	.129**
Level 2: DARE status (γ_1)	-.181*

Note. DARE status is coded 0 = control, 1 = DARE intervention.
^aAll beta coefficients presented are group-mean-centered, standardized effect sizes. ** These were the baseline measures for this model; thus, a means-in-oncenes model was estimated.
 * $p < .05$. ** $p < .01$. *** $p < .001$.