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*Innovative Programs*

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## **School-Based Prevention of Teen-Age Pregnancy and School Dropout: Process Evaluation of the National Replication of the Teen Outreach Program<sup>1</sup>**

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*Examined a program designed to prevent adolescent pregnancy, school failure, and dropout using a process model of evaluation to assess with which groups of participants and under what conditions the program was most effective. Students in the Teen Outreach Program of the Association of Junior Leagues and matched comparison students in 35 schools nationwide participated. Sites that highly utilized a volunteer service component, and sites that primarily served older students reported lower levels of student problem behaviors at program exit, after controlling for problem behaviors at entry. These findings occurred only for program youths and not for comparison youths. The connection of volunteer service to reductions in adolescent problem behaviors is interpreted in terms of helper-therapy and empowerment theories. Limitations of the analytic strategy used in this study, as well as techniques for addressing the limitations, are also discussed.*

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Many of the problems that affect adolescents in our society—such as teen-age pregnancy, school failure, and school dropout—have serious consequences for adolescent development as well as substantial costs to society (Burt, 1986, Huesmann, Eron, Lefkowitz, & Walder, 1984; Loeber & Dishion, 1983; National Research Council, 1987). The high short- and long-term costs associated with these problems create a pressing need for preventive programs in this area.

Schools provide an attractive potential site for preventive interventions, given both their geographic consolidation of adolescents and the 15,000 hours students spend in formal schooling through the high school years (Weissberg & Allen, 1986; Zigler, Kagan, & Muenchow, 1982). As preventive programs are developed, however, there is a need for research that focuses not only upon program outcomes but also upon the processes by which programs produce change in participants (Gray & Braddy, 1988). In assessing program effects, action research with children and adolescents must also account for the developmental stage of program recipients (Rolf, 1985). Such research is needed to move beyond a simple catalog of programs which did and did not work and to provide a base for developing new programmatic interventions.

This study describes process-oriented evaluation data from a preventive intervention that has attracted national attention for its role in preventing school dropout and teen-age pregnancy. The Teen Outreach Program, sponsored by the Association of Junior Leagues in collaboration with the American Association of School Administrators, is a school-based program that encourages young people to perform volunteer service in their communities. The program links volunteer work to classroom-based group discussion on a wide range of issues, from human growth and development to making life decisions. The Teen Outreach Program was recently identified by the National Research Council (1987) in an extensive review of teen pregnancy prevention programs as one of only three approaches with documented effectiveness in reducing teen-age pregnancies. Four consecutive years of data on the program have indicated that it reduces teen-age pregnancy and school failure and dropout rates by approximately 30 to 50% relative to matched comparison groups of students (Philliber, Allen, Hoggson, & McNeil, 1989).

Yet, important as these initial findings are, they tell us little about which aspects of the program are important to its apparent success and under which conditions the program is most likely to be successful. The present study utilized a comparative design to move beyond the traditional evaluation focus (i.e., Did it work?) to the more informative questions: "What works best?," "With whom?," and "Under what conditions?" (Basham, 1986). Such an ap-

proach is a necessary step in moving from successful individual programs to identified principles of intervention that can be used in designing new programs and modifying existing systems.

For example, one potentially important element of the Teen Outreach Program is its emphasis upon volunteer service. This emphasis has the potential to empower students by taking them out of traditional classroom roles and giving them a chance to be help-givers rather than just help-receivers (Bronfenbrenner, 1979; Rappaport, 1987). The "helper-therapy" principle, introduced by Riessman (1965), suggests that helping other people can be therapeutic and can lead to personal growth, particularly for persons in disempowered groups. A number of programs based upon this principle have now been developed, including programs targeted at adolescents. Although the effects of these programs have not yet been systematically documented (Cowen, 1982; Harrington, 1986), the helper-therapy principle suggests one mechanism by which volunteer work in the Teen Outreach program might benefit students.

A second possible effect of volunteer service on students may be to increase their identification with the prosocial values of adults in the larger community. Adolescents' prosocial values have been directly related to multiple indices of their social competence and inversely related to several serious adolescent problem behaviors (Allen, Leadbeater, & Aber, 1990; Allen, Weissberg, & Hawkins, 1989). Also, Staub (1979), in a review of empirical studies of children participating in helping interactions, concluded that helping interactions may shape a child's prosocial behavior. Thus there are many benefits that potentially accrue to children when education is moved "beyond the walls of the classroom" as Sarason (1982) has suggested. Yet, whether a volunteer service component is actually related to the program's overall success has not yet been examined.

Several other aspects of the Teen Outreach Program may also be related to the program's success. For example, a diverse population of young people participate in the Teen Outreach program, including males and females, in 7th through 12th grades, who are from a range of racial/ethnic backgrounds. The program uses a curriculum that provides information on human development, information on skills for making life-options decisions, and supportive group discussions. Again, however, whether any of these factors is actually related to program success is unknown.

This study addressed questions about the conditions under which the Teen Outreach program was successful by examining naturally occurring variations in the implementation of the Teen Outreach program at 35 different sites in 30 schools across the United States. Within each site, we assessed four different types of factors that were potentially relevant to the success

of students in the Teen Outreach program. These included (a) student demographic factors (age, race, gender); (b) structural program factors (whether the program was given during vs. after school and whether it was offered for credit vs. not-for-credit); (c) program intensity factors (number of hours spent in classroom discussions and in volunteer activities); and (d) curricular factors (use of various parts of the Teen Outreach curriculum).

Our goal was to identify factors that would explain the differing *relative* effectiveness of different Teen Outreach programs at different sites. Because it is virtually impossible to assign students randomly to enough different versions of any national program to meaningfully explore *intra*-program differences experimentally,<sup>3</sup> an analytic framework was established to assess and account for multiple potential confounding factors. Thus, an effort was made to assess the role of overall cohort effects, schoolwide effects, and motivational biases in influencing the results at any given site.

This study was embedded within a larger evaluation that used a quasi-experimental design involving Teen Outreach students and a comparison group of students closely matched on various background characteristics (Philliber et al., 1989). Following the lead of several recent studies of adolescent problem behaviors (Donovan & Jessor, 1985; Donovan, Jessor, & Costa, 1988; Kandel & Raveis, 1987; Leadbeater, Hellner, Allen, & Aber, 1989) we assessed outcomes in terms of multiple problem behaviors, and we assessed the presence of an overall problem behavior syndrome as our outcome measure.

## METHOD

### *Settings*

The Teen Outreach Program was conducted at 35 different sites in 30 schools nationwide in 1986–1987. It was a collaborative effort between local school personnel, local Junior Leagues, and the Association of Junior Leagues and American Association of School Administrators. The program was

<sup>3</sup>Obtaining random assignment of students to treatment and control groups *within a site* is a somewhat more feasible goal which is being implemented in future years' evaluations of Teen Outreach. However, this use of random assignment still does not help in the comparison of Teen Outreach programs at *different* sites, where site and population of students are inevitably confounded.

designed to provide meaningful volunteer service experiences and classroom-based discussion opportunities to young people identified by teachers and guidance counselors as at risk for significant behavioral problems (particularly school dropout and teen-age pregnancy).

Students in the program participated in ongoing classroom-based discussions of issues covered in the Teen Outreach Curriculum (Association of Junior Leagues, 1988) in meetings held at least once weekly throughout an academic year. The curriculum consisted primarily of techniques for engaging students in discussions of selected topics, group exercises, and films and informational presentations. The primary emphasis of the curriculum was on the promotion of meaningful discussions of developmental tasks faced by adolescents. Topic areas included understanding yourself and your values, communication skills, dealing with family stress, human growth and development, and issues related to parenting. Although the program was partially directed at prevention of teen-age pregnancy, materials relating to sex education constitute less than 10% of the overall curriculum and are incorporated within the general program emphasis upon making good decisions about important life options. Classroom discussions were led by trained facilitators, who were often schoolteachers or guidance personnel.

An additional role of the classroom-based discussions was to introduce and tie together the volunteer experiences which are at the heart of the Teen Outreach Program. Teen Outreach participants are all expected to participate in a range of volunteer activities provided to them by their facilitators, working in conjunction with volunteers of local Junior Leagues. Volunteer activities were developed to be sensitive to the needs and capacities of local communities, and thus varied substantially in their nature, and in the amount of commitment they required of students. The one common feature of all of the volunteer work was that students ratified it as meaningful to them. Volunteer activities included work as aides in hospitals and nursing homes, participation in walkathons, volunteer work at school, and a wide range of other types of work. Although all programs share the common features described above, there is significant diversity among programs around the country in terms of populations of students, curriculum use, and intensity of the program.

Although there was tremendous diversity in the implementation of Teen Outreach Program, certain elements were common to all programs. For example, all programs involved both classroom and volunteer activities. The classroom activities involved meeting at least once weekly for a period of 1 hour. Although the type of volunteer work students performed varied considerably, a minimum of an average of  $\frac{1}{2}$  hour per week of volunteer activity was expected of students in all implementations of the programs.

### *Participants*

Participants in the study included 632 students who participated in the Teen Outreach Program and 855 comparison students. Students ranged in age from 11 to 19 years and in grade level from 7th to 12th grade. At any given site, students tended to be at or near the same grade level; across sites, however, the target grade levels of the program varied depending upon the interests of those running the program locally. Teen Outreach students entered the program in a variety of ways. At some sites, students elected to participate in response to schoolwide announcements. At other sites, they were targeted by program facilitators if they were considered at risk of school dropout or pregnancy, although they may not have yet exhibited any negative behaviors. A small number of participants (approximately 6%) had been previously involved with the Teen Outreach Program. Finally, at some sites, students were arbitrarily assigned by facilitators and guidance counselors.

Comparison students were selected in two ways. Either Teen Outreach students nominated other students whom they guessed "would fill out the entry questionnaire about the same way [they] did," or facilitators or guidance counselors responsible for selecting Teen Outreach students sought students from similar sociodemographic backgrounds and with similar levels of problems as Teen Outreach participants. Background characteristics of Teen Outreach participants and comparison students at program entry are presented in Table I. Participation in the evaluation was a requirement of the Teen Outreach Program. Thus, all participating students were included in the evaluation at entry. Attrition over the course of the study was 2.4% among Teen Outreach students and 4.8% among comparison students. Incomplete program and exit data were obtained for an additional 6.5% of Teen Outreach students, who were also excluded from the analyses. However, there were no significant effects of loss-to-follow-up on the demographic or problem behavior measures presented in Table I, nor were there significant interactions of loss-to-follow-up with membership in the program versus comparison group for any of these measures.

### *Measures*

*Demographic Characteristics.* Students filled out a brief self-report questionnaire indicating their age, grade level in school, race, predominant household composition (one-vs. two-parent) and parents' education levels (1 - not a high school graduate, 2 - high school graduate, 3 - some college, 4 - college graduate). These data, reported in Table I, indicate significant diversity in the Teen Outreach sample but a close match between Teen Outreach and com-

**Table I.** Background Characteristics of Teen Outreach and Comparison Students at Entry

	Teen outreach <i>n</i> = 632 <sup>a</sup>		Comparison <i>n</i> = 855 <sup>a</sup>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Demographic factors				
Age (years)	15.6	1.3	15.7	1.4
Grade in school	9.8	1.3	9.8	1.3
Grade (%)				
7-9	44		47	
10-12	56		53	
Gender (%)				
Female	70.3		67.1	
Male	29.7		32.9	
Race (%)				
White	49.5		51.7	
Black	32.6		31.4	
Hispanic	9.7		7.7	
Other	8.2		9.2	
Mother's education level	2.29	1.01	2.33	1.02
Father's education level	2.29	1.07	2.44 <sup>b</sup>	1.08
Live in two-parent household (%)	53.5		62.7 <sup>b</sup>	
Problem behaviors				
Fail any courses in prior year (%)	53.9		44.3% <sup>b</sup>	
Suspended in prior year (%)	21.8		17.4	
Pregnant previously (%)	4.9		5.1	
Total problem behaviors at entry (0-8)	0.80	0.77	0.66 <sup>b</sup>	0.76

<sup>a</sup>*N*'s vary somewhat due to missing data for some variables.

<sup>b</sup>*p* < .05.

parison students. However, Teen Outreach students were significantly less likely to report having lived in a two-parent household for most of their lives than were comparison students; they also reported that their fathers had slightly lower levels of education than comparison students' fathers (median education level in both groups was high school graduation).

**Problem Behaviors.** Self-report questionnaires were used to assess students' problem behaviors. When sensitively collected, anonymous self-report instruments have been found to be among the *least* biased means of assessing adolescent problem behaviors such as teen-age pregnancy, with substantial evidence available to support their overall reliability and validity (Elliott & Ageton, 1980; Farrington, 1973; Patterson & Stouthamer-Loeber, 1984). At

entry, we asked students (a) whether they had ever been pregnant (female) or caused a pregnancy (male), (b) whether they had failed any courses during the prior year at school, and (c) whether they had been suspended in the prior year at school. At exit we asked the same questions of students (except that the pregnancy question was modified to refer only to the academic year of the program) and also added a question about whether a student had dropped out of school in the prior year or intended not to return to school in the fall. Because each of these problem behaviors had sufficiently low base rates to make estimation of program effects upon them difficult, and because they were significantly intercorrelated, problem behaviors were combined into an overall problem behavior syndrome scale which was a 0–3 scale at entry and a 0–4 scale at exit.<sup>4</sup> This approach is consistent with extensive evidence that these specific problem behaviors constitute a meaningful syndrome of problematic behavior (Donovan & Jessor, 1985; Donovan et al., 1988; Kandel & Raveis, 1987; Leadbeater et al., 1989). Additionally, use of a syndromal measure prevents fluctuation in the *form* of expression of problematic behavior (e.g., school failure vs. school dropout) from confounding the results. Although this approach does not permit estimation of program effects on individual problem behaviors, it does provide a maximally sensitive indication of program effects on an important and theoretically relevant syndrome of problem behaviors, while minimizing the number of partially redundant hypotheses being tested.

### *Program Implementation*

Variations in the implementation of Teen Outreach at different sites were assessed by the collection of various measures from Teen Outreach facilitators.

*Intensity* measures consisted of facilitators' reports of the number of volunteer hours worked by participating adolescents as well as the number of group discussion hours for each student. Although these measures were obtained for each student, data were summed and averaged within individual Teen Outreach sites for all analyses. This was done to provide the best measures of the program offered to students at a site, while minimizing the extent to which these measures were confounded with motivational differences among individual students at a site.

*Structural* program measures assessed whether Teen Outreach was offered during versus after school, and as a for-credit versus a not-for-credit

<sup>4</sup>Maximum-likelihood factor analysis revealed that a one-factor solution was sufficient to account for the common variance in the measures.



activity. These measures were judged particularly likely to be sensitive to differences in the motivation levels of students in different Teen Outreach programs. Students in during-school and for-credit versions of the program might be expected to have somewhat less intrinsic motivation to participate in the program (because they were receiving credit and/or avoiding other courses) than students in after-school and not-for-credit versions. This effect may be mitigated by the fact that in-school versions of the program sometimes involved after-school volunteer activities, whereas after-school versions sometimes involved school-based volunteer activities.

*Curriculum-use* was measured in two ways. All facilitators completed a survey of how much they used the 11 units of the curriculum, using a 4-point Likert scale ranging from (1) *none of this unit*, (2) *a little of this unit*, (3) *a lot of this unit*, to (4) *almost all of this unit*. A measure of overall curriculum use was the average use of all units of this curriculum. However, an iterated principal factors analysis of usage of these 11 units (using a Varimax rotation and using squared multiple correlations for initial estimates of communality) also suggested an interpretable four-factor solution of curriculum factors. Using standardized scores of variables with loadings above .40 to produce factors yielded the following four curriculum-use factors: (a) An *orientation* section (consisting of introductory units as well as material explaining the volunteer experience); (b) a *self-awareness* section including units on understanding yourself and life pressures; (c) a *social awareness* section including units on life planning, family, values, relationships, and communication; (d) a *developmental* section including units on growth, parenting, issues related to parenting, and community resources. Units within each of these four factors were largely contiguous in the curriculum. Thus, each factor represented a discrete section of the curriculum.

### *Procedure*

Students were assessed at program entry at the start of the school year and again at program exit in the late spring. The Teen Outreach Program was conducted during this same period. Questionnaires were administered by Teen Outreach facilitators during an early Teen Outreach class, or in study halls and other school settings for comparison students. Students were told that none of their answers would be reported to other school officials and that no data that identified them in any way would be reported. Student consent and parental consent were obtained both for participation in the program and in its evaluation.

### *Design*

This study was designed to assess individual and programmatic factors that were related to the behavioral changes of Teen Outreach participants.

Because of the double-nested nature of the design (students within sites), the study treated program differences as fixed instead of random) effects. Although this makes it impossible to establish the generalizability of the reported findings, it does allow identification of features that are related to the programs' success and that can be examined in future replications. All program inputs were considered in terms of the average program input received by students at a given site. For some program inputs, such as volunteer experience, individual students varied in their amount of experience within a site. This individual variation was *not* used, as it was considered likely to be highly sensitive to student motivational differences within a site (its use could artifactually enhance the relation between volunteer experience and behavioral outcomes). Thus, the *average* amount of volunteer experience at a site was used to provide a measure of the volunteer experience available at a site. In contrast, behavioral outcomes were analyzed at the level of individual students, as each student provides an independent test of the effect of the specified level of program inputs on behavioral outcomes, and motivational differences appear appropriately as error variance in this analysis (e.g., within-site variation in outcomes provides a background against which between-site variation could be gauged).

## RESULTS

### *Program Implementation*

There was substantial variation in the implementation of the Teen Outreach Program across different sites in both the in-class and volunteer components of the curriculum. The mean score for the use of the curriculum was 2.99 ( $SD = 0.82$ ), which corresponds to using "a lot" of the material in each of the units of the curriculum. There was some variation across sites in how much various subsections of the curriculum were used, with the developmental section (including issues on human growth and development, and parenting) the least consistently used (mean use = 2.55,  $SD = 0.69$ ) and the section on self-awareness being the most consistently used (mean use: 3.32,  $SD = 0.73$ ). The average participant in the program received 72 hours of classroom-based discussion time ( $SD = 33.0$ ), over a range of from 28 to 165 sessions during the year.

There was also substantial variation across sites in the amount of volunteer experience received by students. The average site gave its participants 32.2 hours of volunteer work ( $SD = 24.4$ , range = 1.15 to 125 hours); 90% of sites provided students with an average of at least 1 hour of volunteer work per month. These data on variations in program implementation—

though not unusual for a nationally oriented program tailored to local needs—highlight the importance of examining the relation between different implementations of the program and its success at various sites.

### *Preliminary Analyses of Changes in Problem Behaviors*

The overall effectiveness of Teen Outreach has been previously documented for these data, with the finding that Teen Outreach participants had significantly lower levels of suspension, school dropout, and pregnancy, and insignificantly lower levels of failure in courses than comparison students, even after controlling for levels of problem behavior at entry and significant demographic factors (National Research Council, 1987; Philliber et al., 1989). Although not the focus of this paper, a brief summary of these findings provides a context for interpreting data on why and when Teen Outreach is effective. At entry, Teen Outreach students in this study had an average of 0.80 of a possible 3 problem behaviors whereas comparison students had 0.66 problem behaviors, a statistically significant difference,  $T(628, 853) = 3.45, p < .001$ . However, at exit, Teen Outreach students had an average of 0.70 of a possible 4 problem behaviors, whereas comparison students had 0.80 problem behaviors, and this difference was also significant,  $T(615, 815) = 2.16, p < .04$ . These findings are robust even when controlling for entry problem behaviors and preexisting group differences in fathers' level of education and household composition.<sup>5</sup> Thus, Teen Outreach students went from having significantly more problem behaviors than comparison students at the beginning of the program to significantly fewer problem behaviors by the program's end.

Initial analyses for this study also examined the continuity in levels of behavior problems within both the Teen Outreach and comparison group students over time. Students' total number of behavior problems at exit were significantly correlated with their number of problems at entry within both the Teen Outreach ( $r = .44, p < .001$ ) and comparison groups ( $r = .51, p < .001$ ). This finding indicates the importance of statistically accounting for students' levels of problem behaviors at entry prior to examining the correlates of levels of problem behaviors at exit.

<sup>5</sup>Analysis of problem behaviors individually supports these findings, with significant differences found between the Teen Outreach and comparison groups in levels of school failure, teen-age pregnancy, and school dropout, after controlling for entry levels of problem behavior and group demographic differences in logistic regressions (Philliber et al., 1989). When a combined problem behavior factor was created using only school dropout, failure, and pregnancy data at both entry and exit, comparable results for program effectiveness were obtained.

There were no interactions of the relation between entry and exit levels of problem behaviors with student demographic characteristics, or any of the program factors examined in the study. This indicates that it is statistically valid to remove the effects of entry level of problem behaviors from measures of exit levels when examining predictors of exit levels of problem behavior.

Next, analyses were performed to assess whether schoolwide factors at each site significantly influenced changes in problem behavior levels of both Teen Outreach and comparison students at individual sites. These analyses served to decrease the likelihood that relative differences in the success of Teen Outreach programs at different sites would inadvertently be confounded with unrelated schoolwide influences at these sites. Change in problem behaviors was measured as the residual in Time 2 problem behaviors over and above what could be predicted in a regression equation by Time 1 problem behaviors. This method accounts for both the slightly different metrics of the measures at Times 1 and 2, and for regression effects within the data, while providing a sensitive measure of behavior problem change (Elliott & Voss, 1974; Luborsky et al., 1980; Weisz, 1986). Use of residualized change scores, rather than simple Time 2 scores, also reduces the influence of preexisting differences in the populations of Teen Outreach students at different sites on outcomes at those sites.

Next, we examined the relationship between residualized change scores of Teen Outreach and comparison students at the same sites. No correlation was found between change in number of problem behaviors in Teen Outreach participants and change in comparison students at the same site using site level data ( $r(35) = .02$ , ns) and residualized measures of change. This lack of correlation suggests that the success of Teen Outreach students at a given site was unlikely to be an artifact of schoolwide factors unrelated to the program. Based on these data, it was not considered necessary or useful to use comparison student change at a site as a covariate in further analyses. Further analyses were conducted using only data from the sample of Teen Outreach participants.

Multiple regression equations were used to examine relationships between student outcomes at program exit and four sets of student entry characteristics and program factors thought likely to predict these outcomes: (a) student demographic characteristics at program entry, (b) the amount of various components of the program received by students at a site, (c) the structure of the program, and (d) use of the prescribed curriculum. Regression equations were set up with the number of behavioral problems at exit as the dependent variable. As discussed above, the number of behavior problems at entry was entered first in all equations to remove its effects. Then, each of the four groups of factors listed above was entered as a block and assessed

for the significance of its contribution to predicting the number of students' behavior problems at exit. Finally, for each group of program factors assessed, interactions of these factors with relevant demographic variables were also considered as a block.

### *Demographic Factors*

The role of three demographic factors—students' gender, grade level, and minority status—and two child-rearing environment factors—parents' years of education, and living in a one versus two-parent family—were assessed using the technique described above. Table II presents the results of this equation in which entry level of problem behaviors was entered first, followed by a block of demographic factors followed by the block of child-rearing environment factors. Only the block of demographic factors added significantly to the prediction of Teen Outreach students' problem behaviors at exit,  $F_{change}(3, 544) = 3.89, p < .01$ . Examination of individual demographic factors within this block reveals that students' grade level was the sole significant predictor of problem behaviors at exit,  $F(1, 544) = 9.90, p = .002$ . Teen Outreach students in higher grades were significantly more likely to have fewer problem behaviors than would be predicted based on entry data than were Teen Outreach students in lower grades. This effect remains equally strong even when school dropout was excluded from analyses (due to its potential confound with grade level). When the comparison group was examined, neither grade in school, nor the blocks of demographic or child-rearing environment factors, were significantly related to problems at exit. Examination of the relation of grade to amount of volunteer ex-

**Table II.** Hierarchical Regression Using Demographic Factors to Predict Behavior Problems at Exit

Step	Variables entered	$\beta$	Change in $R^2$	Total $R^2$
1	Behavior problems (entry)	.45 <sup>c</sup>		
	Total for step		.19 <sup>c</sup>	.19 <sup>c</sup>
2	Grade	-.12 <sup>b</sup>		
	Sex	-.03		
	Minority status	.02		
	Total for step		.02 <sup>b</sup>	.21 <sup>c</sup>
3	Parents' education	.00		
	Live in two-parent family	.08 <sup>a</sup>		
	Total for step		.01	.22 <sup>c</sup>

<sup>a</sup> $p < .05$ .

<sup>b</sup> $p < .01$ .

<sup>c</sup> $p < .001$ .

perience, number of classroom-discussion hours, overall curriculum use, and structural features of the program revealed only a small significant relation of grade with number of volunteer hours worked ( $r = .10, p < .02$ ).

Given these findings, all further analyses included the effects of grade level of students as well as the interaction of grade level with various program factors.

### *Intensity Factors*

Two intensity factors representing the amount of classroom-based discussion and volunteer service experiences at a site were considered next. These were entered as a block in a hierarchical regression to predict number of problems at exit, after entering number of problems at entry and students' grade level. Results are presented in Table III. This block significantly contributed to the prediction of problems at exit,  $F_{change}(2, 570) = 3.34, p < .05$ . The average number of hours of volunteer work at a site was the single significant predictor within this block. This equation reveals that students in programs where more volunteer work was performed had fewer problems at exit after controlling for problem behaviors at entry than did students in programs where less volunteer work was performed. Further, entry of a block of interaction effects of these two Intensity factors with students' grade levels also significantly added to the predictive power of the equation,  $F_{change}(2, 568) = 3.1, p < .05$ . Within this block, only the interaction of number of classroom hours with grade was significantly related to problem behaviors. This interaction indicated that more classroom hours were related to fewer problems for younger students but not for older students.

**Table III.** Hierarchical Regression Using Program Dosage Factors to Predict Behavior Problems at Exit

Step	Variables entered	Beta	Change in $R^2$ <sup>a</sup>	Total $R^2$ <sup>a</sup>
1	Behavior problems (entry)	.45 <sup>c</sup>		
	Grade	-.13 <sup>c</sup>		
	Total for step		.21 <sup>c</sup>	.21 <sup>c</sup>
2	Classroom hours	-.02		
	Volunteer hours	-.09 <sup>b</sup>		
	Total for step		.01 <sup>b</sup>	.22 <sup>c</sup>
3	Class hours * Grade	.10 <sup>b</sup>		
	Volunteer hours * Grade	.00		
	Total for Step		.01 <sup>b</sup>	.23 <sup>c</sup>

<sup>a</sup>Values for  $R^2$  and change in  $R^2$  are rounded.

<sup>b</sup>.01 <  $p$  < .05.

<sup>c</sup> $p$  < .001.

### *Structural Factors*

Two structural factors—whether a program was offered during versus after school and for-credit versus not-for-credit were entered in the next equation using dummy variables. As with intensity factors above, these were entered as a block in a hierarchical regression to predict number of problems at exit, after entering number of problems at entry and students' grade level. Entry of this block did not significantly improve the predictive power of the equation nor did entry of a block of interaction effects of these two structural factors with students' grade level.

### *Curriculum Use*

A hierarchical regression to predict students' number of problems at exit was next examined. The total curriculum-use score was entered after number of problems at entry and grade level. Because logistical difficulties in data collection resulted in significant missing data for curriculum use, these analyses were conducted in equations separate from those described above. Although total curriculum use was not a significant predictor of problems at exit, the interaction of curriculum use with grade was significant when next entered into the equation. Examination of total curriculum use separately for younger and older students (below 10th grade and at/above 10th grade) revealed that higher levels of curriculum use had a stronger relationship to decreased problem behaviors for younger students than for older students, though in neither group was this relationship significant. Thus, the substantive meaning of the interaction of curriculum use with grade in predicting outcomes appears to be minimal.

Finally, we used a hierarchical regression equation to examine the four more specific curriculum-use factors entered as a block following problems at entry and grade level. Neither this curriculum-use block, nor a subsequent block of interactions of curriculum use with grade level, significantly added to the equation.

## **DISCUSSION**

The results of this study indicate that Teen Outreach sites were most successful when they worked with older (vs. younger) students, and when the volunteer component of the program was more intensively (vs. less intensively) implemented at a site. In addition, sites that worked with younger students tended to be more successful when they had more rather than less intensive classroom components. Several potential markers of students' moti-

vation levels were related to students' characteristics at entry across sites but were not related to change over the course of a program. Finally, students' gender and minority status appeared unrelated to their success in the program.

Because these findings about different program and student factors were not based upon an experimental design (which would have required randomly assigning participants to different sites around the country), several procedures were undertaken to increase our confidence that the findings were not artifactual in nature. Students' entry levels of problem behaviors were examined and controlled, and comparison students' change over time was also examined for its possible relation to the findings presented. This approach reduces, but does not eliminate, the likelihood that student differences at entry and extraprogrammatic effects in schools might have produced the relationships described above.

In addition, examination of structural variables (e.g., whether a program was for-credit vs. not-for-credit) that were most likely to be related to students' motivation levels reduced the likelihood that observed program effects were simply a result of motivational differences between students at different sites at entry. Significantly, these structural variables were related to exit problem behaviors *prior to* controlling for entry problem behaviors. Controlling for problem behaviors at entry thus appears to be at least a moderately effective strategy for handling important differences among students entering the program. This approach decreases the likelihood that findings about the effects of Teen Outreach and its various components are artifacts of preexisting student characteristics at different sites and in program versus comparison groups.

Although these attempts to eliminate confounding factors are far from foolproof, they increase our confidence in our findings by ruling out several of the major alternative explanations for them. Any interpretation of these findings, however, must begin with the statement that none are *demonstrably* causal in nature, and that all require replication in other programs, in other sites, and in studies using methods other than self-reports. Given these limits, however, we believe this study offers several contributions to our understanding of programs targeted at preventing adolescent behavior problems.

The finding that Teen Outreach appears to be more effective with high school than with junior high school students highlights the need to be developmentally sensitive in both targeting and evaluating prevention programs for children and adolescents (Leadbeater et al., 1989). Clearly, even an apparently successful prevention program was not equally successful with all age groups. These findings further document the importance of considering differential effects of interventions for different subgroups of participants (Allen, 1989). The findings also suggest the need to be alert to possible limits to the approach of "intervening early" in preventive programming; making



interventions age-appropriate may be more important than simply making them early. For example, although it appears that the volunteer component of the Teen Outreach Program may partially account for its success, particularly with older students, there is some evidence that increased emphasis upon the classroom-based portion of the program (classroom hours and curriculum use) was related to better outcomes among younger students. Alternatively, the age effects reported might reflect differential sensitivity of the outcome measures to changes in students of different ages. For example, among younger students, who are not legally permitted to drop out and who are less likely to become pregnant, poor attendance patterns may be a more appropriate outcome measure. In either case, the importance of sensitivity to developmental differences within a program's target population is clear. Future studies are needed to assess Teen Outreach in terms of outcomes which are more developmentally relevant for younger children (e.g., skipping school) and which follow younger participants over time.

The relation between the extent of the volunteer component and fewer behavior problems at exit supports a central premise of the program and current theories of empowerment and ecological development (Bronfenbrenner, 1979; Rappaport, 1987): that volunteer experiences—the opportunity to be help-givers—may be essential formative experiences for at-risk adolescents. This study cannot, of course, demonstrate a causal relation between volunteer experiences and student success; some other factor, such as a highly skilled program facilitator, might account both for more extensive volunteer experiences and for more student success at a site. In addition, the effect of number of volunteer hours performed on student outcomes was quite small in absolute terms. It must be remembered, however, that the measure of volunteer experience—raw number of hours—is relatively crude. Further studies that assess types and qualities of volunteer experiences may help to better specify the nature of this effect. For example, the different quality of volunteer activities open to older students may partially explain the relatively greater success of Teen Outreach within that age group. Also, given that most sites provide students with volunteer activity in amounts at least equal to that provided by many short-term interventions with school-age children (e.g., 10–20 hours), it is most appropriate to interpret the effect of volunteer work on outcomes as reflecting the effect of large versus moderate amounts of volunteer work and not as the effect of some versus no volunteer work. Given that the volunteer component of Teen Outreach is one of its most distinguishing features, and that Teen Outreach is one of the only school-based, non-contraceptive-focused programs to demonstrate reductions in teen pregnancy (National Research Council, 1987), the current findings regarding the volunteer component are particularly significant and are important to investigate further.

An important caveat in interpreting negative results in this study is that analyses are relatively insensitive to effects of program factors that were consistently implemented across sites (e.g., have little variance). For example, because most sites used most of the curriculum units, it is impossible to assess the importance of the curriculum to the success of the program. Yet, while sex education curricula have generally been found to have little effect on adolescent behavior (National Research Council, 1987), it may be that the broader life skills curriculum of Teen Outreach, *in combination* with relevant volunteer experience, does indeed contribute to the program's success. This question can only be addressed by evaluating future implementations of the program in which the curriculum is less fully utilized.

Research is currently being conducted to explore further the relation between volunteer service in a Teen Outreach program and lower levels of problem behaviors of students in that program. For example, does volunteer service foster the development of relationships with adults who are not authority figures, who do not threaten adolescents' sense of autonomy as a teacher might (Allen, Aber, & Leadbeater, 1990), and who can thus positively influence adolescents' values and behaviors? Or, does volunteer service empower adolescents and provide them with the chance to try out adaptive adults roles as help-givers? Research in progress is also beginning to address some of the methodological limitations of this study, such as the wide variety of means of selection of students for comparison groups. Research to increase our understanding of the connection between volunteer service and adolescent problem behavior is essential to determining how and whether other preventive interventions might effectively incorporate volunteer service components.

Overall, this study illustrates the value of an analytic strategy that focuses upon why and how a program works, rather than just whether it works. In addition, this study demonstrates the usefulness of an analytic strategy that seeks to rule out possible confounding factors in the absence of random assignment, while capitalizing on the natural variations in program implementation that occur in the replication of many successful programs. The results of this study also suggest that the Teen Outreach Program, especially its volunteer component, may provide important lessons for other preventive interventions targeted at adolescents. Further research is now being conducted to determine why volunteer activities were associated with success in Teen Outreach, and why the program appears more effective with older students, and to replicate the basic findings about the success of the program using a random assignment experimental design. Research of this type is essential if we are to move beyond identifying a host of fragile programs, which work under some conditions and not others, and toward the development of a truly useful technology for preventive interventions.

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