

Programmatic Prevention of Adolescent Problem Behaviors: The Role of Autonomy, Relatedness, and Volunteer Service in the Teen Outreach Program¹

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Explored the mechanisms by which a well-validated intervention to prevent school failure, suspension, and teenage pregnancy produces its effects, using site-level data from 66 sites involving over 1,000 students participating in national replication of the Teen Outreach Program. Multiple informants provided data on operating characteristics of each site. These were then used to explain differences across sites in levels of success in reducing youth problem behaviors using a pre-post design and a well-matched comparison group. In accord with predictions from developmental theory, middle school sites that promoted student autonomy and relatedness with peers and with site facilitators achieved significantly greater levels of success in reducing problem behaviors. Offering volunteer experiences perceived as teaching middle school students new skills

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and leaving them real choices about the type of work they did was also linked to program success. Although the program was equally successful with students from a wide range of sociodemographic backgrounds, links of program factors to site-level outcomes were found only for middle school but not high school sites. Implications of these findings for the development of programmatic interventions targeted at adolescents are discussed.

KEY WORDS: prevention; teen pregnancy; autonomy; volunteer; experience; school dropout.

Adolescent problem behaviors such as teenage pregnancy, school failure, and school dropout result in enormous costs each year both to individual adolescents and to the larger society (Burt, 1986; Carnegie Council on Adolescent Development, 1989; Dryfoos, 1991; Huesmann, Erron, Lefkowitz, & Walder, 1984; Loeber, 1983). Efforts are now increasing to prevent these problems, often via large-scale, school-based interventions (Dryfoos, 1991). Yet, recent evidence suggests mixed results to date, with some programs showing signs of real success and others with less clear outcomes (Conduct Problems Prevention Research Group, 1992; Dryfoos, 1991; Philliber & Allen, 1992; Weissberg, Caplan, & Harwood, 1991). As prevention efforts multiply, there is a need for research that examines not just program outcomes but also the processes by which programs produce change in participants (Allen, Philliber, & Hoggson, 1990; Gray & Braddy, 1988). Such knowledge is needed both to guide the inevitable processes of adaptation that occur when replicating promising programs on a large scale (Bauman, Stein, & Ireys, 1991; Blakely et al., 1987; Weissberg et al., 1991) and to begin to develop a technology for intervening to prevent serious adolescent behavior problems.

Optimally, such research should also be linked to an understanding of the social development of adolescents who are being targeted for intervention. Developmental risk research suggests that the most effective interventions will be targeted toward helping individuals meet the critical tasks of a given era of development (Sroufe, 1990). Recent research on adolescent development suggests that a critical task of social development is establishing autonomy in social interactions *while maintaining* a sense of relatedness with important others (Allen, Hauser, Bell, & O'Connor, 1994; Collins, 1990; Grotevant & Cooper, 1985; Hill & Holmbeck, 1986; D. Moore, 1987; Steinberg, 1990). When adolescents are unable to manage this task effectively, numerous problematic outcomes result (Allen, Hauser, Eickholt, Bell, & O'Connor, 1994; Steinberg, 1990). Several existing efforts to prevent problem behaviors might be seen as, in part, acting by promoting adolescents' autonomy and relatedness in social interactions (Conduct Problems Prevention Research Group, 1992). Yet, this developmental per-

spective has received only scant empirical attention in studies of preventive interventions.

The present study used this developmental perspective to assess a program with documented effectiveness in reducing adolescent problem behaviors, the Teen Outreach Program, sponsored by the Association of Junior Leagues International. The Teen Outreach Program has been identified by the National Research Council of the National Academy of Sciences (1987) in an extensive review of teen pregnancy prevention programs as representing one of only three approaches with documented effectiveness in reducing teenage pregnancies. Seven consecutive years of data on the program, involving over 6,000 Teen Outreach and comparison students, have indicated that it reduces teenage pregnancy and school failure and dropout rates by approximately 15 to 50% relative to matched comparison groups of students (Philliber & Allen, 1992). A random assignment control group strategy has been implemented recently at a subset of participating sites. Preliminary findings suggest that use of random assignment versus matched-comparison group designs was not related to the magnitude of reported program effects (i.e., prior findings do not appear to have resulted from inflation of effects in nonrandom assignment designs) (Philliber & Allen, 1993).

Teen Outreach is a school-based program that involves young people in volunteer service in their communities. The program links this volunteer work to classroom-based, curriculum-guided group discussions on a wide range of issues, from family conflict to human growth and development. This combination of volunteer work and classroom discussion clearly has the potential to enhance students' sense of autonomy while maintaining a sense of relatedness with facilitators, other students, and adults at volunteer sites by placing students in a help-giving (as opposed to help-receiving) role (Allen et al., 1990; Rappaport, 1987; Riessman, 1965). Because of its positive outcome data and its relatively noncontroversial focus upon promoting adolescent development, the program has grown over the past decade to the point where it has served over 4,000 students and is now implemented in more than 130 sites nationally.

Previous research on Teen Outreach has identified participation in its volunteer service component as one ingredient linked to its success (Allen et al., 1990). In addition, the program has appeared to be more effective with high-school age than with middle-school age students. Structural features of the program, such as use of specific parts of the curriculum, and implementation of the program during versus after school, have been examined, but have not been related to its success in prior analyses (Allen et al., 1990). Other than findings about the potential importance of performing at least some volunteer community service in the program, and

about the program's slightly greater success with older students, little information has been available about the processes by which this intervention might produce its effects.

One limit to prior evaluations was that no data were collected on either student or program facilitator impressions of the social and interactional qualities of the program as it was implemented at a given site. Based on developmental theory, we might expect that the program functions by enhancing students' sense of autonomy and relatedness with a combination of supportive classroom discussions and real-world volunteer experiences that provide opportunities to interact with adults in autonomous ways that enhance rather than threaten relationships with adults. Based on this theory, we might hypothesize that the success of any given Teen Outreach site in reducing problematic behavior would be directly related to the extent to which that site promoted student autonomy and relatedness and gave students the chance to perform autonomy-enhancing volunteer work. Given the almost complete lack of data relating the processes by which prevention programs, such as Teen Outreach, attain positive outcomes, these hypotheses have not yet received empirical examination. Yet, as national interest has grown in volunteer community service for youth (Moore & Allen, in press), understanding the conditions under which such service is beneficial becomes increasingly important. Further, although most analyses of successful interventions take place at the level of the individual student (because too few sites participate to permit analyses at the site level), analyses of site characteristics conducted at the site level are desperately needed, as these provide the only methodologically sound basis from which to draw conclusions about the relation of site-level characteristics to site-level outcomes.

This study utilized site-level data from 66 different implementations of Teen Outreach around the county involving over 2,000 Teen Outreach and comparison students. Our goal was to focus on critical tasks of adolescent social development in an attempt to identify factors that would explain the differing relative effectiveness of Teen Outreach programs in reducing levels of problem behavior at different sites. Because it is impossible to assign students randomly to different sites of a national program to examine *intraprogram* differences, an analytic framework was used to relate site-level characteristics to site-level outcomes while assessing and accounting for multiple potential confounding factors (Allen et al., 1990).

We examined program effectiveness in preventing problem behaviors by comparing mean levels of problem behaviors at exit from different sites, after first accounting for important potential preexisting differences between sites. This approach defines positive site outcomes as relatively fewer total problem behaviors at exit at a given site in comparison to other

sites, *after* accounting for levels of problem behaviors that would be expected given students' problem behaviors at entry, changes occurring in a matched non-Teen Outreach sample at the same school, and the demographic characteristics of students at the site. The primary question addressed was whether differences in the developmentally oriented characteristics of the program across different sites would predict which sites had better outcomes. Specifically, we examined whether positive site outcomes would be predicted by (a) the degree to which a site was seen by students and facilitators as supporting students' developmental need for a sense of autonomy and relatedness within the program; and (b) the extent to which the volunteer community service that students' performed was seen as autonomy enhancing in encouraging students to learn new skills, to think about their life goals, and to have input into the nature of the work performed.

METHOD

Settings

This study was embedded within a larger evaluation that employed a quasi-experimental design involving Teen Outreach students and a comparison group of students closely matched on various background characteristics (Philliber & Allen, 1992). Relevant characteristics of the Teen Outreach Program were evaluated at 66 different sites nationwide from 1987 through 1992. While site-level participation in outcome evaluation was a routine part of the program for all participating sites, participation in the extended process evaluation was at the discretion of facilitators at each site, as this participation took an extra class period away from regular program activities. The 66 sites that voluntarily participated in the extended process evaluation were a subsample of 123 larger sites that participated in outcome evaluations in this period. Students from the 66 sites did not differ in terms of race, gender, parents' educational background, or level of program entry or exit, nor in changes in levels of problem behavior from entry to exit, but were slightly older on average than students from the outcome-evaluation only sites (15.5 vs. 14.9 years, $t = 2.14$, $p < .05$).

The program was a collaborative effort between The Association of Junior Leagues International, Inc., local Junior Leagues, and local school districts across the United States. Teen Outreach participants, who were in Grades 7 through 12, engaged 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. Volunteer activities included work as aides in hospitals and nursing homes, participation in walkathons, peer tutoring, and a wide range of other types of work.

Students also participated in ongoing classroom-based discussions that occurred at least once weekly throughout an academic year. Classroom discussions are based upon the Teen Outreach Curriculum (Association of Junior Leagues International, 1993), which utilizes techniques for engaging students in discussions, group exercises, films, and informational presentations. The primary emphasis of the curriculum is 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. Classroom discussions were led by trained facilitators, who were often schoolteachers or guidance personnel.

Although all Teen Outreach sites share the common features described above, there is also significant diversity among programs around the country in terms of how different aspects of the program are implemented. These variations are the basis for analyses described below.

Participants

Participants in the process evaluation of Teen Outreach included 1,020 students who participated in the Teen Outreach Program and 1,013 comparison students. Students ranged in age from 11 to 19 years and were in 7th to 12th grade. Students entered the program through a variety of means: some as part of their "health" curricula; some as an academic elective; some via teacher/guidance counselor encouragement; and in some sites, the program recruits students to after-school implementations. These entry criteria are no longer closely monitored, in part because prior analyses have shown program outcomes to be unrelated to major characteristics related to student entry into the program, such as whether the program was offered during versus after school and for-credit versus not-for-credit. A small number of participants (approximately 7%) had been involved previously with the Teen Outreach Program.

Comparison/control students were selected in one of three ways. Either Teen Outreach students nominated other students whom they guessed "would fill out the entry questionnaire about the same way [they]

did," or school personnel matched classrooms of students participating in Teen Outreach to similar nonparticipating classrooms, or, when program enrollment was oversubscribed, students were randomly selected to participate. Preliminary analyses suggest that the level of program success is not significantly related to whether students were or were not assigned randomly into the program (Philliber & Allen, 1992). Attrition over the course of the study, as a result of student dropout from the program or from school, or from failure to fully complete exit questionnaires was 2.4% among Teen Outreach students and 2.7% among comparison students. Attrition effects never accounted for more than 0.5% of the variance in student demographic or problem behavior measures at intake.

Information on the demographic characteristics of both Teen Outreach and comparison students for whom entry and exit data were available is presented in Table I. These data indicate that the samples were extremely well-matched at entry demographically, with only a small, though statistically significant, effect for the Teen Outreach sample to have a slightly higher proportion of females than the comparison sample.

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

	Teen outreach (n = 1020)		Comparison (n = 1013)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Age (years)	15.7	1.3	15.7	1.3
Grade in school	9.8	1.2	9.8	1.3
% Grades 7-9	49.8		47.8	
% Grades 10-12	50.2		52.2	
Gender (%)				
Female	71.2		65.3 ^a	
Male	28.8		34.7	
Race/ethnicity (%)				
Black	40.3		38.0	
White	40.6		43.3	
Hispanic	15.2		14.2	
Other	3.9		4.5	
Mother's education level	2.28	0.94	2.33	0.93
Father's education level	2.32	0.97	2.36	0.98
% Live in two-parent household	53.0		52.8	

^a*p* < .001 (for tests of differences between groups).

Measures

Demographic Characteristics

Students filled out a brief self-report questionnaire indicating their age, grade level in school, race, predominant household composition (1- vs. 2-parent) and parents' education levels (1 = not a high school graduate, 2 = high school graduate, 3 = some college, 4 = college graduate).

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 teenage 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 (females) or caused a pregnancy (males), (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). The incidence of each of these three problem behaviors was summed to yield a problem behavior score for each student. This approach was taken for a priori theoretical reasons, based upon research suggesting that problem behaviors constitute a meaningful syndrome of problematic behavior (Donovan & Jessor, 1985; Donovan, Jessor, & Costa, 1988; Leadbeater, Hellner, Allen, & Aber, 1989). This approach was supported by findings of maximum likelihood factor analysis that one factor was sufficient to explain the variance among these problem behaviors. Results presented below were found not to differ if problem behaviors were examined separately.

Program Implementation

Variations in the implementation of Teen Outreach at different sites were assessed using questionnaires presented to both participants and facilitators during the final month of the program.

Student Ratings of Program Processes. Process questionnaires were administered at the end of the academic year. Items were measured on a 4-point scale using a format similar to the Perceived Competence Scale for

Children (Harter, 1982) which is designed to reduce the effects of a pull for social desirability. For each item, two contrasting stems were presented side by side, for example: "Some kids feel like their facilitator likes them a lot." and "Other kids feel like their facilitator just likes them 'OK'." Adolescents were asked to decide which item best described them and then to decide whether the statement was "sort of true" or "really true" for them. Two scales were created on a priori theoretical grounds by summing and averaging items relating to (a) program promotion of adolescent autonomy and relatedness and (b) quality of volunteer experiences likely to enhance students' sense of competence. Twelve items assessed the extent to which the program was viewed as *promoting adolescent autonomy and relatedness* with other students and facilitators. This scale included items sampling the extent to which young people were given choices of discussion topics in the Teen Outreach program, and were listened to, liked, and found their opinions respected by facilitators and other students. For example, items included: "Some kids get to help decide what their group will do, BUT other kids feel like their facilitator makes all the decisions."; "Some kids think their facilitator really listens to things they say, BUT other kids think their facilitator doesn't listen to things they say."; and, "Some kids think it's OK to talk about things like feeling lonely, BUT other kids think they would be laughed at if they ever talked about being lonely." Four items were summed and averaged to assess the *quality of the volunteer experiences likely to enhance students' sense of competence*, including items asking whether students felt they were learning new skills, finding volunteer work enjoyable enough to want to continue after the program ended, and were given time to discuss their goals and choices about the type of volunteer work they would do. These two scales (Promoting Adolescent Autonomy and Relatedness; Quality of Volunteer Experiences) each had adequate internal consistency ($\alpha = .87$ and $\alpha = .72$, respectively) and were moderately correlated with one another, $r = .53$.

Facilitator Ratings. A facilitator version of this questionnaire was administered to each Teen Outreach site facilitator. This questionnaire contained the same items as the student version and facilitators were asked to fill out the questionnaire as they thought their class on average would fill it out. This approach was used to obtain facilitator's best judgments about how the program was actually coming across to students. For the Promotion of Autonomy and Relatedness and the Volunteer Experience scales $\alpha = .81$ and $\alpha = .52$, respectively, and the scales were also moderately correlated with one another, $r = .43$. The lower alpha for the volunteer experiences questionnaire reflects the small number of items on the scale, and may also reflect the fact that the scale inventories different aspects of a positive volunteer experience that may not necessarily be highly

intercorrelated. The validity of this inventory approach has been established in other studies, in spite of its reduction of alpha levels (Freedman, Rosenthal, Donahoe, Schlundt, & McFall, 1978). *Hours of volunteer experience* of students at a site were reported by facilitators for each student. These figures were then averaged to produce a site-level average for the amount of volunteer work performed per student over the course of an academic year.

Reduction of Data to Site Level

All 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.

Procedure

Both the Teen Outreach program and its evaluation were typically administered as part of the regular school curriculum for student participants, with participation usually occurring as part of a class (typically health or social studies) taken for credit. Students were assessed at program entry at the start of the school year and then 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/control students. Students were told that none of their answers would be available to program facilitators or to other school officials and that no data which in any way identified them would be reported.

RESULTS

Preliminary Analyses

Preliminary analyses examined relations among measures of program implementation and student sociodemographic characteristics, and considered basic program outcome data for this sample as it related both to student characteristics and to previously reported findings with the Teen Outreach Program.

Program Implementation

Examination of means for ratings of program characteristics revealed that students and facilitators both rated the program relatively highly, although with significant variation across sites (Student mean ratings: Promotion of Autonomy and Relatedness: 3.06, $SD = 0.33$; Quality of Volunteer Experience: 3.01, $SD = 0.37$; Facilitator mean ratings: Promotion of Autonomy and Relatedness: 3.43, $SD = 0.43$ Quality of Volunteer Experience: 3.01, $SD = 0.60$, all on a 0–4 scale). Facilitators' estimates of student ratings were moderately correlated with students' ratings of the program ($r_s = .56$ and $.57$, for the autonomy/relatedness and volunteer scales respectively, both $ps < .001$). The average site gave its participants 33.5 hours of volunteer work ($SD = 25.5$, range = 1 to 156 hours); all except 6 of these sites provided students with an average of at least 1 hour of volunteer work per month. None of the measures of program implementation were related to students' level of problem behaviors at entry into the program. Both student and facilitator ratings of program promotion of autonomy and relatedness, and total amount of volunteer hours worked were positively correlated with average grade-level of students ($r_s = .33$, $.26$, and $.26$, $ps < .01$, $.05$, and $.05$, respectively), but not with other student characteristics. Given these findings, primary analyses considered main effects and interactions of students' grade level.

Changes in Problem Behaviors

The overall effectiveness of Teen Outreach in reducing levels of suspension, course failure, school dropout, and teen pregnancy has been documented previously with these data (National Research Council, 1987; Philliber & Allen, 1992). Although not the focus of this paper, a summary of these findings as they apply to the present subsample of sites, presented in Table II, provides a context for interpreting data on when and with whom Teen Outreach is most effective. As Table II indicates, Teen Outreach students significantly decreased in their levels of each problem behavior assessed, relative to the comparison group, from program entry to program exit. These findings have previously been found to be robust in analyses controlling for students' grade level, gender, racial/ethnic status, entry problem behaviors, and for parents' level of education and household composition (Philliber & Allen, 1992).

Teen Outreach students' total number of behavior problems (assessed at the site level) at exit were moderately correlated with their number of problems at entry ($r = .33$, $p < .01$). There were no interactions of the

Table II. Problem Behaviors Reported by Teen Outreach and Comparison Students at Program Entry and Exit^a

	Teen Outreach (<i>n</i> = 1020)	Comparison (<i>n</i> = 1013)
Program entry		
% Fail any courses in prior year	35.0	34.3
% Suspended in prior year	19.4	19.9
% Ever pregnant previously	4.8	6.3 ^b
Total problem behaviors		
<i>M</i>	0.61	0.64
<i>SD</i>	0.73	0.79
Program exit		
% Fail any courses during year	31.2	37.2 ^d
% Suspended during year	16.5	21.4 ^d
% Pregnant during year	3.2	5.4 ^c
Total problem behaviors		
<i>M</i>	0.48	0.67 ^d
<i>SD</i>	0.70	0.80

^aFor Program Entry, significance levels are from *t* tests of differences between groups. For Program Exit, significance levels are from logistic regressions testing differences between groups after accounting for behaviors at program entry.

^b*p* < .05.

^c*p* < .01.

^d*p* < .001.

relation between entry and exit levels of problem behaviors with student demographic characteristics, or any of the program factors examined in the study. These findings indicate the importance and validity of statistically accounting for students' levels of problem behaviors at entry prior to examining predictors of levels of problem behaviors at exit. This approach has the advantage of accounting for regression effects within the data, while providing a sensitive measure of behavior problem change (Cohen & Cohen, 1975).

Preliminary analyses also assessed whether unmeasured school-wide factors at each site might have influenced changes in problem behavior levels of both Teen Outreach and comparison students at individual sites. 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, $r(66) = .19$, $p = .14$. However, because the correlation ap-

proached the trend level of significance, a conservative approach was taken and a score for mean comparison student change in problem behaviors at a site (using residualized regression scores) was entered into all analyses as a covariate. Neither students' gender, grade level, residence in a one-parent family, parental years of education, nor racial/ethnic minority group membership were related to problem behaviors at exit after accounting for entry levels of problem behavior.

Primary Analyses of Correlates of Program Success

Hierarchical regression equations were used to examine the primary hypotheses of the study that site promotion of autonomy and relatedness and provision of volunteer experiences in a way that was likely to enhance students' sense of competence and autonomy would predict better site outcomes. In all cases, the number of problem behaviors at a site at exit was the dependent variable, with number of problem behaviors at that site at entry entered first into equations as a covariate, followed by students' grade level, and the change in problem behaviors in the comparison group at a site from entry to exit (using residualized scores from regression equations). Next, the primary variable of interest (e.g., student perceptions of site promotion of autonomy and relatedness) was entered into the equation. Finally, interactions of the primary variable with students' grade level were entered to determine whether the relation of this variable to site outcomes differed for younger versus older students.

Promotion of Student Autonomy and Relatedness

Students' perceptions of the extent to which Teen Outreach promoted their autonomy and relatedness were examined first as predictors of program outcomes. The results of this analysis, shown in Table III, indicate that program promotion of student autonomy and relatedness was predictive of lower levels of problem behaviors at exit. There was also a significant interaction of student grade level and program autonomy and relatedness in predicting outcomes. This interaction was examined by analyzing separately sites with predominantly middle school age versus high school age students in regression equations predicting problem behaviors. This analysis revealed that promotion of autonomy and relatedness was linked to lower levels of exit problem behaviors in middle school sites, though not in high school sites. Beta weights are also provided in Table III for these separate analyses. Overall, consideration of site promotion of autonomy and relatedness and its interaction with grade level contributed an additional 23%

Table III. Hierarchical Regression Predicting Exit Behavior Problems from Promotion of Autonomy and Relatedness and Students' Grade Level^a

Step	Behavior Problems at exit		
	β	ΔR^2	R^2
Equation for student-rated autonomy and relatedness			
1. Contextual factors			
Problem behaviors (Entry)	.35 ^d		
Student grade level			
Change in comparison group	-.05		
	.14	.10 ^b	.10 ^b
2. Promoting autonomy and relatedness	-.31 ^d	.08 ^c	.18 ^c
3. Promoting autonomy and relatedness \times grade level	.41 ^e	.15 ^e	.33 ^e
(Auton. & Rel. β Middle school = -.81 ^e)			
(Auton. & Rel. β High school = .15)			
Equation for facilitator-rated autonomy and relatedness			
1. Contextual factors			
Problem behaviors (Entry)	.45 ^e		
Student grade level	.02		
Change in comparison group	.11		
		.17 ^c	.17 ^c
2. Promoting autonomy and relatedness	-.11	.03	.20 ^c
3. Promoting autonomy and relatedness \times grade level	.30 ^c	.08 ^c	.28 ^d
(Auton. & Rel. β Middle school = -.63 ^d)			
(Auton. & Rel. β High school = .21)			

^aBetas for each equation are from the full model. Betas in parentheses for grade level interactions are for regressions conducted separately for middle and high school students. Model *df* = 5, 57 for student ratings and 5,53 for facilitator ratings.

^b*p* < .10.
^c*p* < .05.
^d*p* < .01.
^e*p* < .001.

of explained variance in outcome levels of problem behaviors, even after accounting for initial levels of problem behavior, change in comparison groups, and grade level of students at a site.

Facilitator ratings of autonomy and relatedness at Teen Outreach sites also interacted with grade level to predict exit problem behaviors.

These results are also depicted in Table III. As with student ratings, these interactions revealed that promotion of autonomy and relatedness was strongly linked to lower levels of problem behavior at exit in middle school, but not in high school sites.

Quality of Volunteer Work Performed

Students' perceptions of the quality of the volunteer work they performed were examined next using the approach described above. A significant interaction of grade and student ratings of volunteer experiences was again found, in which positive ratings were strongly related to lower levels of problem behavior for middle school students, with a nonsignificant trend toward the opposite relation for high school students. For facilitator ratings, an interaction was also obtained, with a trend toward more positive ratings of volunteer experiences predicting fewer exit problem behaviors for middle school students, and no relation between these factors for high school students.

Number of Hours of Volunteer Work Performed

The mean number of hours worked per student at a site was next used to predict outcomes using the same procedure described above. No significant main effects nor interactions with grade were obtained.

Assessing Combined Predictions from Process Measures

The analyses described above were followed up with analyses to determine whether the effect of volunteer experiences appeared to be direct, or may have been mediated by overall qualities of promotion of autonomy and relatedness within a site. To examine this, hierarchical regressions were examined in which Quality of Volunteer Experiences was entered into predictive equations *after* entering students' perceptions of Program Autonomy and Relatedness. Both measures were then followed by their interactions with grade, entered as a block. Significant improvements in prediction over results reported in Tables III and IV were found only for student ratings, with the total model including both student ratings of volunteer experiences and of program autonomy and relatedness and their interactions with grade accounting for an additional 32% of the variance in behavior problems at exit over and above the 10% of the variance accounted for by entry problem behaviors, student grade level, and comparison group change, $F_{\text{change}}(4, 55)$

Table IV. Hierarchical Regression Predicting Exit Behavior Problems from Quality of Volunteer Experiences and Students' Grade Level^a

Step	Behavior Problems at exit		
	β	ΔR^2	Total R^2
Equation for student-rated quality of volunteer experience			
1. Contextual factors			
Problem behaviors (Entry)	.37 ^e		
Student grade level			
Change in comparison group	-.18 .07	.10 ^b	.10b
2. Quality of volunteer experiences	-.27 ^c	.04	.14 ^b
3. Quality of volunteer experiences \times grade level	.52 ^e	.24 ^e	.38 ^e
(Qual. Vol. Exper. β Middle school = -.62 ^e)			
(Qual. Vol. Exper. β High school = .31+)			
Equation for facilitator-rated quality of volunteer experience			
1. Contextual factors			
Problem behaviors (Entry)	.53 ^e		
Student grade level			
Change in comparison group	-.02 .09	.17 ^c	.17 ^c
2. Quality of volunteer experiences	-.21 ^b	.06 ^b	.23 ^d
3. Quality of volunteer experiences \times grade level	.28 ^c	.06 ^c	.29 ^d
(Qual. Vol. Exper. β Middle school = -.49 ^b)			
(Qual. Vol. Exper. β High school = .01)			

^aBetas for each equation are from the full model. Betas in parentheses for grade level interactions are for regressions conducted separately for middle and high school students. Model $df = 5, 57$ for student ratings and $5, 53$ for facilitator ratings.

^b $p < .10$.

^c $p < .05$.

^d $p < .01$.

^e $p < .001$.

= 7.56, $p < .001$. Analyses revealed that the main effect of quality of volunteer experiences did not add to predictions of outcome behavior problems after accounting for program promotion of autonomy and relatedness ($\Delta R^2 = .00$, $p > .50$). Interactions with student grade level were again obtained, however. When separate analyses were conducted for middle school and high school students, program promotion of autonomy and relatedness

was significantly related to lower levels of problem behaviors at middle school sites, and quality of volunteer experience demonstrated a trend in this direction as well. No effects were found within high school sites.

DISCUSSION

This study finds that the success of an effective intervention to prevent adolescent problem behaviors is linked both to its promotion of students' sense of autonomy and relatedness and to autonomy-enhancing qualities of volunteer experiences provided to participants. These program characteristics were linked to program outcomes only for students in middle school sites; ratings of program components were not related to outcomes for students in high school sites. Overall, measures of program promotion of student autonomy and relatedness and volunteer experiences contribute to explaining an additional 10 to 32% of variation in site-level outcomes in student problem behaviors even after accounting for preexisting differences among sites.

The strongest findings in this study are that Teen Outreach middle school sites perceived by students as promoting their own autonomy and sense of relatedness with other students and with Teen Outreach facilitators had substantially better outcomes than sites where this perception was less prevalent. This effect was quite robust even after accounting for students' level of problem behaviors at entry at a site, and changes occurring among comparison group students at a site. Similar, though weaker findings were also obtained when *facilitators* rated the extent to which their site promoted student autonomy and relatedness, indicating that results are not simply an artifact of students providing self-reports of both problem behaviors and site characteristics. Ratings of site characteristics by students and facilitators were not related to students' levels of problem behaviors at entry. This increases confidence in these findings because it suggests that ratings of a site's characteristics are not simply a reflection of the overall level of functioning of the students entering a given program.

Qualities of students' volunteer experiences, but not the raw number of hours of student volunteer work, were also related to program outcomes for students in middle school sites. Volunteer work that students helped select, found enjoyable, and that challenged them to think about future goals and taught them new skills was associated with greater site success in demonstrating lower numbers of problem behaviors at exit than would be predicted from entry and comparison group data. One explanation of this finding is that high-quality volunteer experience provides students with opportunities to establish autonomy and practice competent behaviors in

environments that extend beyond the classroom in ways that increase the likelihood of students transferring skills and competencies into other life domains (Caplan et al., 1992). The quality of students' volunteer experience was moderately correlated with students' perceptions of program promotion of student autonomy and relatedness. When both factors were entered together into regression equations, program promotion of autonomy and relatedness appeared the better predictor of outcomes in middle school sites, whereas quality of volunteer experiences displayed only a trend toward such predictions. These findings suggest that student perceptions of site promotion of autonomy and relatedness and of quality of volunteer experience may actually represent different windows into the same underlying phenomenon: the extent to which a program is successful in promoting student autonomy and relatedness via both classroom discussions and high-quality volunteer experiences. These data also suggest that it may be possible to identify successful sites within a program such as Teen Outreach by examining them *either* in terms of the volunteer experiences provided, or their promotion of autonomy and relatedness: both approaches may ultimately identify the same programs.

The lack of relation between raw number of hours of volunteer work and program outcomes is in contrast to previous reports which found modest predictions from the number of volunteer hours worked to student outcomes (Allen et al., 1990). However, based upon these previous reports, the program has since placed a very high emphasis upon its volunteer service component. As a result and in contrast to prior implementations of the program, *all* sites in this study had students participate in volunteer work, with the vast majority of sites providing a substantial amount of volunteer experience. Ironically, when all sites consistently offer a program component, it becomes impossible to statistically assess the importance of offering that component. What can be said from these data, however, is that while offering at least minimal amounts of volunteer work may be important, as suggested by prior research, once this threshold is passed offering further amounts beyond this minimum amount may not provide additional benefits.

More intriguing is the finding that while strong predictions could be made regarding links between site characteristics and site outcomes in middle school sites, no such links were found in high school sites, even though high school sites have been found to have overall outcomes as positive or more positive than middle school sites (Allen et al., 1990). One explanation is that student autonomy and relatedness may be a necessary developmental prerequisite to benefiting from Teen Outreach, but older students may have already begun establishing autonomy and relatedness outside of Teen Outreach, and therefore may be less dependent upon this occurring within the program. This explanation receives further support from findings that sites

with older students generally reported higher levels of program autonomy and relatedness and higher qualities of volunteer experiences; older students may simply have already established enough of a sense of autonomy and relatedness to benefit from other aspects of the program. The basic presence of volunteer experience in conjunction with linked classroom discussions (common to *all* sites) may have been sufficient in and of itself to positively alter developmental outcomes for high school students, who may have been developmentally advanced enough to take advantage of this experience even if it was offered in a manner that would be less than optimal for middle school students. Alternatively, it could also be that the process measures used were simply not sensitive to critical developmental issues with high school students; further examination of these measures, including assessments of test-retest reliability and their relation to other indices of adolescent functioning would be useful in addressing this possibility. Overall, it is clear that while the Teen Outreach program is effective in high school sites, the factors associated with this effectiveness, though certainly widely present within high school sites given their positive outcomes, merit further inquiry.

Although these findings require further replication, they suggest that programs targeted at middle-school aged students might benefit from focusing upon these adolescents' developmental needs to establish themselves as capable, independent individuals within the context of positive relationships with peers and adults. Although adolescents' strivings for independence might at first appear to provide obstacles to efforts to help them, the Teen Outreach Program data suggest that these strivings might also be turned into a powerful tool if programs can align with these developmental pushes rather than trying to limit them. The notion emerging from the developmental literature that adolescents optimally must establish autonomy while maintaining important social relationships (Allen et al., 1994) suggests that developing interventions for teenagers in which they can experience autonomy within a program is clearly *not* a contradiction in terms but may actually be a means of facilitating a critical developmental task.

If replicated, these findings have important potential implications for social policies intended to enhance youth involvement in community volunteer service. For example, the recent growth of interest in volunteer programs has led some states to implement mandates in which volunteer work is required as a condition of high school graduation (C. Moore & Allen, in press). Aside from the conceptual confusion inherent in notions of "mandated volunteer service," data from this study suggest that taking away the element of student choice (i.e., autonomy) in volunteering may remove a critical ingredient of the experience at least for younger populations of students.

A number of important limitations must be noted regarding our findings. Most important, although these data are longitudinal, and carefully assess baseline levels of problem behaviors and other potential confounding factors such as student demographic characteristics, they still cannot support causal inferences. It is possible that measures of autonomy and relatedness at a site reflect students' status rather than influence it, although available evidence did not generally support this idea. Further research that samples site characteristics repeatedly over the course of an academic year would be important to assess the stability of the site characteristics observed in this study. It is also possible that unconsidered factors influence both site outcomes and the extent to which a program promotes autonomy and relatedness among students at that site. Obtaining measures from multiple informants and including items sensitive to both student and facilitator behavior lessens this possibility but does not eliminate it.

These data are also limited in that they were drawn from slightly over one half of active Teen Outreach sites. Although the sites participating in this process evaluation were scattered across the nation and did not differ appreciably from nonparticipating sites, it is unclear how these findings would generalize to nonparticipating sites. Similarly, because students often self-selected into the Teen Outreach program, unmeasured student characteristics may also bias the results reported. The fact that significant differences in outcomes have not been found for randomly assigned versus self-selected students reduces but does not eliminate this problem.

The strikingly high percentages of variance accounted for in exit problem behaviors in some analyses may not directly translate into strong predictions to individual students. By examining data at the site level, we increase generalizability of findings but we also average out fluctuations in levels of problem behavior among individual students over time. The result may be to average out "noise" in problem behaviors among individual students and allow a more powerful focus upon changes that might be influenced at the site level. This is not to minimize the importance of site-level findings, but rather to emphasize that these data tell us little about what would happen to any individual student in a Teen Outreach site.

Finally, a major question remaining from this study is whether our findings will replicate across other similar types of interventions. Further research is clearly needed to determine whether program promotion of student autonomy and relatedness is equally linked to successful outcomes for other types of preventive interventions. If replicated, these findings have implications not just for specific interventions but for existing systems, such as middle schools, that regularly seek to serve adolescents effectively. Sarason (1982) has frequently noted the need to take education "beyond the walls of the classroom." It may be that Teen Outreach, by helping adoles-

cents with the developmental tasks of becoming autonomous, well-connected individuals, provides some of the "real life" education of which Sarason has written. The results presented suggest some of the developmental mechanisms that may operate when the education of early- to mid-adolescents moves outside of school classrooms.

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