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## Reducing suicide potential among high-risk youth: Tests of a school-based prevention program

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### Abstract (Document Summary)

A study tested the efficacy of a school-based prevention program for reducing suicide potential among high-risk youth. Its potential efficacy was demonstrated for high school students.

### Full Text (9208 words)

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I have been thinking about suicide for a long, long time and I have promised myself lots of times that I would really do it, and I've even tried to, but I guess there is something inside of me that still must want to live.

--Male, potential school dropout, age 19

Adolescent suicide is a tragedy with emotional pain that reverberates, sometimes irreconcilably, through a young person's family, peer network, and community. As revealed in the quote above, suicidal behaviors (thoughts, threats, and attempts) are present in our youth and appear significantly higher among potential school dropouts (Eggert, Thompson, Herting, & Nicholas, 1994a; Lewinsohn, Rohde, & Seeley, 1993; Thompson, Moody, & Eggert, 1994). This particular subpopulation of youth, disenfranchised by traditional social systems, is more likely to remain on the periphery, becoming more and more difficult to reach. Innovative ways for recruiting these youth and providing them with prevention services are desperately needed. To this end, we developed and tested an experimental, school-based prevention program for youth at risk of school failure/potential dropout and suicidal behaviors. Drawing from prevention science (Coie, Watt, West et al., 1993), both suicide risk and protective factors were targeted in the intervention program (Eggert et al., 1994a).

Although there have been significant increments in knowledge concerning adolescent suicide risk and protective factors (Berman & Jobes, 1991; Brent, Perper, Moritz et al., 1993; Davidson & Linnolia, 1991; Garland & Zigler, 1993; Jessor, 1991; Pfeffer, 1991), the understanding needed to identify suicide-risk youth and to provide them with

effective prevention services has lagged considerably. Past efforts by school and mental health personnel targeted entire school populations. These programs generally focused on the common warning signs of suicide potential and strategies for seeking help (Garland, Shaffer, & Whittle, 1989). Only a few of these programs have been systematically evaluated (Overholser, Hemstreet, Spirito, & Vyse, 1989; Shaffer, Garland, Gould, Fisher, & Trautman, 1988; Spirito, Overholser, Ashworth, Morgan, & Benedict-Drew, 1988).

Evaluations of these initial prevention efforts of the 1980s revealed that student responses to schoolwide programs tended to be positive; however, the studies revealed discrepant effects, and sometimes no effects, on suicide-related knowledge and beliefs (Overholser et al., 1989; Shaffer, Garland, Vieland, Underwood, & Busner, 1991; Spirito et al., 1988). More importantly, when measured, there were no observed program effects on actual suicide-risk behaviors (Garland & Zigler, 1993). Also, concerns arose due to observed, though unintended, negative effects. For example, Shaffer and his colleagues (Shaffer, Vieland, Garland, Rojas, Underwood, & Busner, 1990) reported that youth with histories of prior suicide attempts, compared to those with no attempts, endorsed more negative attitudes and beliefs about suicide and expressed more negative responses to schoolwide suicide prevention programs. Also, males exposed to such prevention programs, compared to males not exposed, were more likely to endorse suicide as a "reasonable solution" (Shaffer et al., 1991). Similarly, Overholser and his colleagues (1989) observed that males, but not females, reported increased hopelessness and maladaptive coping following program exposure. These unfavorable outcomes are particularly disturbing because youth at greatest risk for suicide (i.e., prior attempters, males) appear to be least positively influenced by these programs. Thus, although schools appear to be a logical place for accessing teens, the advisability of general prevention programs remains questionable.

Findings from these "first-generation" prevention efforts yielded a set of recommendations from scholars in the field. Foremost among these are that school-based prevention programs should: (1) test theory-based prevention models that include social support enhancement and skills training; (2) focus on common and multiple risk and protective factors related to both suicidal behaviors and other adolescent "problem behaviors"; (3) target distinctly suicide-risk groups; and (4) be intensive and comprehensive, providing a sufficient "dose" to counteract known deficits (Bond & Compas, 1989; Coie et al., 1993; Davidson & Linnoila, 1991; Eggert et al., 1994a; Shaffer et al., 1988; Schotte & Clum, 1982).

Accordingly, the preventive intervention program tested in the present study: (1) was theory-based, incorporating life-skills training (Schinke & Gilchrist, 1984) and social support perspectives (Eggert, 1985, 1987; Lin, Dean, & Ensel, 1986), utilizing concepts and processes derived from an integrated model of strain, social learning, and social control theories (Elliott, Huizinga, & Ageton, 1985); (2) focused on both direct and related suicide-risk factors and protective factors; (3) was both comprehensive and intensive; and (4) targeted an identified at-risk group of adolescents within the school population, potential school failures or dropouts. We expected a significant portion of these youth to be at suicide risk (Thompson, Moody, & Eggert, 1994; Eggert, Thompson, & Herting, 1994).

The basic theoretic premise of the intervention program was that suicide-risk factors and protective factors do not develop nor are they maintained in isolation; rather, they emerge as a function of the individual within a network of social relationships. Earlier research (Eggert & Nicholas, 1992; Eggert & Parks, 1987) provided the rationale for the intervention process and context, a positive peer network structure within a high school setting. Prior research also demonstrated program efficacy for increasing school performance and decreasing drug involvement (Eggert, Seyl, & Nicholas, 1990; Eggert, Thompson, Herting, Nicholas, & Dicker, 1994b), and supported the posited mechanisms of social support on these outcomes (Eggert & Herting, 1991; Eggert et al., 1994a; Moody & Eggert, 1994). Hence, the overall purpose of the present study was to test the efficacy of the theory-based, social network, support prevention program for reducing suicide-risk and related-risk factors, and increasing protective factors among indicated suicide-risk youth.

## METHODS

### Design

A three-group, repeated measures design was used to test the efficacy of the school-based prevention program. Changes in direct suicide-risk factors, related-risk factors, and protective factors were compared among youth at suicide-risk participating in the experimental and comparison control groups.

## Subjects

The 105 suicide-risk students participating were from five urban high schools, in grades 9-12. Youth entered the study in cohorts across a 3-year period (1990-1993); data for each cohort were collected at baseline preintervention, and at 5- and 10-month follow-up assessments. By design, study participants were in one of three groups:

\* Group I: assessment protocol plus a 1-semester Personal Growth Class, PGCI (N = 36)

\* Group II: assessment protocol plus a 2-semester Personal Growth Class, PGC II (N = 34)

\* Group III: an assessment protocol-only (N = 35)

In addition, 202 "typical" students--defined as not at-risk for school failure--were randomly selected from the same five high schools, during the same time period, to serve as a normative comparison group for changes observed between preintervention and at follow-up. Prior to initiation of the study, all procedures were approved by the University's Human Subjects Review Committee.

## Procedures

A three-staged case identification process, developed for this project and consonant with recommendations in the literature (Lewinsohn, Garrison, Langhinrichsen, & Marsteller, 1990), was used to identify the sample of suicide-risk youth. Procedures for each stage are described below.

### Stage 1: Identification and Invitation to Study

The first step was to identify the sample pool. Combinations of the following criteria were used for identification of youth at high risk of school failure: (1) below expected credits earned for current grade level; (2) in the top 25th percentile for days absent per semester; (3) grade point average (GPA) < 2.3 with a pattern of declining grades, or a precipitous drop in GPA > 0.7; (4) prior school dropout status; and (5) referral from school personnel for being in serious jeopardy of school failure or dropout. This procedure was validated as a method of identifying and predicting outcomes for youth at high-risk of school failure in the same school district (Herting, 1990).

From this initial sample pool and within each school, randomly selected youth at high-risk of school failure were invited by research staff to participate in the study as: (1) a control subject in a survey of high school students or (2) an experimental subject in the prevention program. Invitation procedures were standardized for the experimental and comparison groups; written informed consent was obtained from each subject and his/her parent or legal guardian.

### Stage 2: Questionnaire Data Collection and Suicide-Risk Screening Protocol

Once students agreed to participate in the larger study as either a control or experimental subject, they completed the High School Questionnaire detailed later in the Measurement section. Embedded in the questionnaire were items, used for screening purposes, measuring suicide-risk behaviors, depression, and drug involvement. As summarized in Table 1, youth were identified as "at suicide-risk" based on levels and combinations of these variables. On average, 40% of the youth at high-risk of school failure also screened in as being at suicide-risk.

### Stage 3: Comprehensive Assessment Protocol

All youth identified as at suicide-risk in Stage 2 were then contacted by a trained psychosocial nurse specialist or counselor. The nurse/counselor conducted an in-depth assessment of each youth's suicide potential using the Measure of Adolescent Potential for Suicide, a comprehensive, 2-hour interview, referred to as the MAPS assessment protocol hereafter (Eggert, Thompson, & Herting, 1994). The MAPS assessment protocol was designed, for ethical reasons, to provide a positive, no-harm experience for all participants. Also, for ethical reasons and as part of the MAPS assessment protocol, each youth, whether in an experimental or comparison group, was personally introduced to a school "case manager" following the interview. These case managers, specifically trained for this project, were apprised of the youth's status and needs. Additionally, each student's parent of choice (or guardian) was contacted by telephone and similarly advised of the child's status and needs. Both students and parents were reminded of the 5- and 10-month follow-up assessments.

As discussed later, the MAPS assessment protocol, though intended to measure suicide-risk and related factors in detail, appears to have a potential effect in suicide-risk reduction.

### Refusal and Retention Rates

At Stage 1, refusal rates for experimental participants averaged 30% across cohorts; refusals to participate as controls averaged 16%. However, at Stage 3, refusal rates were low: Less than 4% of the youth across all cohorts refused to participate in the MAPS assessment interview. Moreover, refusal rates did not differ significantly across the three groups.

Across time, retention rates for study participants was essentially equivalent across all three groups (Group I, 75%; Group II, 87.5%; and Group III, 71.4%;  $\chi^2(2) = 3.49, p = .17$ ). These rates were influenced mostly by the inability to locate youth at the 10-month follow-up because of school dropout or family moves outside of a three-county area.

### Intervention Framework and Conditions

The content and strategies of the intervention were derived from an integration of strain, social learning, and social control theories (Elliott, Huizinga, & Ageton, 1985), specifically integrating the role of social support (Eggert, 1987; Lin, Dean, & Ensel, 1986), a positive peer group culture (Eggert, 1985; Vorrath & Brendtro, 1985), and life skills training (Schinke & Gilchrist, 1984) in alleviating adolescent problem behaviors. The school-based prevention program was structured as an elective high school offering, called the Personal Growth Class (PGC). Youth were encouraged to take the 1-semester class, PGC I (5 months or 90 class days in length) and PGC II (10 months or 180 class days) but had the option of taking PGC I only, conforming to existing school policies. Students who agreed to participate took PGC as one of their five or six regularly scheduled classes.

PGC was conducted in small groups of 12 students, with 1 group per high school. The intervention was delivered by trained school personnel (e.g., teacher, counselor, or school nurse) who functioned as group leaders. These individuals were recruited based on their previous identification as "natural helpers" by students and peers, their experience or expressed interest in working with youth at risk of school failure, their familiarity with experiential learning strategies, and their willingness to cooperate with program content, training, and research procedures. The class was taught as one of their five assigned daily classes. PGC groups met daily for 55-minute periods in regular classrooms, and students received an elective credit each semester for course completion.

### PGC I and II Similarities

The fundamental program components in both PGC I and II were: (1) a small-group work component characterized by social support and help exchanged in group leader-to-student and peer-to-peer relationships; (2) weekly monitoring of activities targeting changes in mood management, school performance and attendance, and drug involvement; and (3) life skills training in self-esteem enhancement, decision making, personal control (skills training in anger, depression, and stress management), and interpersonal communication. The group methods and skills training were standardized (Eggert, Nicholas, Owen, & Associates, 1993); but unique to this intervention was that group support and skills training were integrated, and that skills training was applied in response to specific real-life problems emerging from the youth. Most importantly, skills training occurred in the context of a positive peer culture characterized by caring and help.

Specific attitudes toward suicide (e.g., beliefs that suicide is a viable solution to life problems) and suicidal behaviors (thoughts, threats, attempts) were negated in the decision-making skills unit (e.g., in personal problem-solving activities and rehearsals); and counteracted in the personal control skills training unit (e.g., by teaching depression and anger management skills), and in the interpersonal communication unit (e.g., by engaging external support networks). Both PGC process and content were aimed at countering positive views of suicide and promoting healthy alternative attitudes, behaviors, and social contexts. The PGC group leader was responsible for modeling and facilitating this supportive group environment and activating skills training in response to the subjects' personal circumstances (see Eggert, Thompson, Herting, & Nicholas, 1994a, for a review of the program).

The overall course goals were the same for both PGC I and II. Students were expected to: (1) decrease depression and suicidal behaviors; (2) decrease drug involvement; and (3) increase school performance in terms of GPA, credits earned, and attendance in all their classes. To foster goal attainment, sequencing of skills training progressed naturally from establishing motivation, to skills building, and then to skills practice, application, and transfer in concert with early, middle, and late group development stages (Eggert, Nicholas, Owen et al., 1993).

### PGC I and II Differences

Regarding group support, PGC I emphasized bonding to the PGC group, training youth to give and receive social support in this closely supervised setting. PGC II emphasized broader school bonding, training youth to transfer their skills and providing and seeking social support by joining and participating in existing school clubs and activities that matched their interests.

Regarding skills training, PGC I focused on motivating the youth to change and acquire essential skills. Skills building, practice, and application occurred within the PGC group; real-life issues rehearsed in the group setting focused primarily on problems with friends, school-teachers, and parents. PGC II extended skills acquisition by encouraging transfer and application of skills learned in PGC I to more difficult real-life situations at home and school. PGC II also fostered development of pleasant, health-promoting recreation and social activities to counter suicidal thoughts and behaviors, anger and/or depression, and drug involvement.

### Intervention Fidelity

Skills training was standardized in terms of definitions, objectives, and suggested group discussion and activities. Process evaluation included measuring exposure to specific skills training content on a daily basis by PGC teachers and weekly by an observer. The teachers' expressive and instrumental support and group leadership skills were also observed and recorded weekly. These data were used to monitor and evaluate the fidelity of program implementation.

### Measurement

Measures reflecting the domains of interest--direct suicide-risk factors, related-risk factors, and protective factors--were administered at three time points. Hereafter, for simplicity, Time 1 refers to the baseline preintervention

measurement; Time 2 refers to assessments at 5 months, coinciding with PGC I completion; and Time 3 refers to assessments at 10 months, coinciding with PGC II completion. That is, Time 3 measures served as follow-up assessments for the assessment-only and PGC I participants; they served as an additional post-intervention assessment for PGC II participants.

## Inventory of Experiences

The High School Questionnaire (HSQ) measured a broad range of risk and protective factors. Because the HSQ was used as a preliminary screening device, it also included brief measures of the central constructs of interest. Measures described below were either derived from previously developed scales (Eggert, Seyl, & Nicholas, 1990) or constructed for the purposes of this research program (Eggert et al., 1994a, 1994b; Eggert, Thompson, & Herting, 1994). All have received standard reliability and validity assessments within this project in addition to such assessments in previous studies. Cronbach alpha coefficients reported are those obtained with high-risk youth. Except where indicated otherwise, all scales were measured using a 7-point, Likert-like scale (ranging from 0 = never to 6 = always/many times).

## Measures of Suicide-Risk Factors

The Brief Suicide Risk Behavior Scale is a 5-item scale measuring the frequency of suicide thoughts, direct and indirect suicide threats, and suicide attempts; attempts were self-reported number of attempts by the respondent. This scale forms the core of the suicide-risk screening protocol (see Table 1). Construct validity was also established using confirmatory factor analysis techniques; additionally, scale scores correlated significantly with depression ( $r = .43$ ), hopelessness ( $r = .49$ ), family distress ( $r = .37$ ), school dissatisfaction ( $r = .27$ ), and drug involvement ( $r = .39$ ; all  $p$  values  $< .05$ ). Internal consistency of the Brief Suicide Risk Behavior Scale was established (Cronbach alpha = .86).

## Measures of Related-Risk Factors

Depression was measured with a 5-item scale capturing depressive affect adapted for use with adolescents from the CES-D (Radloff, 1977). Internal consistency reliability was established (alpha = .85). Hopelessness was measured as a separate dimension in this study because of its reputed independent association with suicidal behaviors (Beck, Steer, Beck, & Newman, 1993). Feelings of hopelessness were measured with three items (alpha = .81). Anger, operationalized as responses to three items, reflected irritability, loss of control when angry, and physically striking out (alpha = .69). Perceived stress was measured with four items tapping degree of perceived stress and pressure from others (alpha = .79).

## Measures of Protective Factors

Sense of personal control was defined by self-confidence in handling problems and the ability to effect positive outcomes; it was measured with a 4-item scale (alpha = .75). Self-esteem, defined as internalized self-regard and self-worth, was assessed using a 4-item version of Rosenberg's (1965) Self-Esteem Scale (alpha = .77).

Perceived social support was indexed by averaging across ratings of six network support sources (favorite teacher, school counselor, classmates, parents, siblings, best friend). Instrumental support (e.g., providing help, showing different ways to handle problems) and expressive support (e.g., listening, motivating, encouraging) provided by each source was rated on a scale ranging from -10 to 0 to +10 (from "nonsupportive" to "supportive").

## Methods of Analysis

Trend analysis (Francis, Fletcher, Stuebing, Davidson, & Thompson, 1992; Stevens, 1986) was used to test the effectiveness of the interventions by comparing patterns of change among the three groups and testing for differences in trends across time. A linear trend implies that the pattern of change is proportional and that the relationship is consistently increasing or decreasing. On the other hand, a quadratic trend implies a U-shaped (or inverted U-shaped) curve, suggesting, for example, a decline followed by improvement (or improvement followed by relapse). A flat line indicates no change. Significant Group x Trend component interaction effects imply that changes for at least one group differ significantly from changes from the others. The linear and quadratic components in trend analyses are orthogonal, representing independent partitions of the variance (Stevens, 1986). Trend analyses were carried out with the SPSS multiple analysis of variance (MANOVA) program using the unique sums of squares solution (regression method).

It was anticipated that youth in the assessment-only group (III) would show some decreases in suicide-risk and related-risk factors, but that the effects for youth who also participated in PGC (Groups I and II) would be stronger. Three protective factors--personal control, self-esteem, and social support--were hypothesized to mediate the PGC intervention effects and thus were also examined.

Whether any observed intervention effects would be sustained at Time 3 remained an empirical question. Thus, we tested for significant linear trends across the three time points and explored quadratic trends that would reveal relapse or other unanticipated changes across time. When significant Group x Linear trend component interaction effects were observed, simple trend analysis for each group and graphic displays were used to evaluate their nature. In addition, because of known gender differences (Gore, Aseltine, & Colten, 1993; King, Raskin, Gdowski, Butkus, & Oipari, 1990; Lewinsohn, Rohde, & Seeley, 1993), gender was entered as a study factor to explore for the main and interaction effects of gender on trend differences.

Intervention group means were compared with data from typical youth collected during the same time periods. Effect sizes were calculated comparing differences between typical and high-risk youth group means preintervention and at 10-month follow-up.

Prior to analyses, graphic representations and appropriate statistics (including kurtosis, skewness) were used to examine the distributional properties of all variables. Only one variable, Time 3 suicide-risk behaviors, demonstrated kurtosis greater than 2. As trend analysis is robust with regard to moderate deviations from normality, transformations were not used. Corrections to degrees of freedom for deviations from sphericity were made, however, for outcomes with Greenhouse -- Geisser values of .95 or less (Stevens, 1986, p. 413).

## RESULTS

### Sample Characteristics

Table 2 compares baseline characteristics of the 105 youth. (Table 2 omitted) Except for age and prior social support, there were no significant differences among the three groups. Group I subjects tended to be slightly older ( $F_{sub}(2,102) = 3.37, p = .04$ ) and reported less social support than Group III ( $F_{sub}(2,103) = 3.06, p = .05$ ) but not less than Group z II. There was an even distribution of males to females in each group ( $\chi^2_{sup} 2_{sub}(2) = .53, p = .77$ ).

Though not significant, the level of self-esteem for youth in Group II tended to be lower ( $F_{sub}(2,102) = 2.25, p = .11$ ) than in Groups I or II. This tendency may reflect a selection bias operating among youth participating in the 2-semester program, possibility influencing outcomes and addressed in the discussion. Thus, trend analysis was the analytic strategy of choice, given the potential selection biases related to these baseline differences.

### Initial Comparisons of Study Noncompleters

To assess the potential effects of attrition, preliminary comparisons were made among subjects from all three groups who did not complete all three questionnaires. The same series of baseline variables described in Table 1 were examined using chi-square and one-way analysis of variance (ANOVA) with Fisher's LSD, a liberal test for post hoc comparisons. With the exception of social support, there were no significant differences: study noncompleters in all three groups were similar in age, in direct suicide-risk factors, in related-risk factors, and in protective factors. Group III noncompleters reported higher levels of social support than did Group I or II noncompleters. Note that similar patterns of differences in social support were evident among the three groups of study completers (see Table 2).

Comparisons of study noncompleters to completers revealed that noncompleters tended to be older ( $t_{sub(134)} = 4.07, p < .001$ ), reported higher levels of unmet school goals ( $t_{sub(132)} = 2.09, p = .039$ ), and had significantly lower grades the semester prior to participation ( $t_{sub(130)} = -2.29, p = .024$ ). There were no differences, however, between completers and noncompleters for any risk or protective factors under study. Thus, it is unlikely that study attrition influenced the trend analysis results. Noncompleters, however, tended to be older and more disenfranchised with respect to school; this limits the generalizability of the findings to youth similar to the suicide-risk youth represented in the analyses.

Results for trend analyses, based on preintervention and 5- and 10-month follow-up assessments, included only cases with data for each time point. That is, the study noncompleters were, by necessity, excluded from the trend analyses. However, if participants dropped out of the Personal Growth Classes due to family moves or school dropout, and if the 5- and 10-month follow-up data were available, these participants were retained in the analysis. Including such cases helps to standardize the retention of subjects in all groups and is the more conservative analytic approach.

The results for suicide-risk and related-risk factors are summarized in Table 3 and Figure 1; results for protective factors, in Table 4 and Figure 2. (Tables 3 and 4 and Figures 1 and 2 omitted) Group means and standard deviations are displayed in Table 5. (Table 5 omitted) Except for hopelessness, there were no significant three-way interactions observed, indicating that trends did not vary by gender. Consequently, the data reported are pooled across male and female subjects. Sample sizes shift slightly due to missing data among the outcome variables.

### Results Related to Suicide-Risk Behaviors

The observed patterns of change for suicide risk behaviors did not vary among the three groups; the main effect ( $F_{sub(1,102)} = 104.14, p < .001$ ) revealed a significant decline for all three groups. There was also a significant quadratic trend ( $F_{sub(1,102)} = 40.68, p = .001$ ) associated with an initial decrease in suicide risk behaviors at Time 2 and a slight rebound effect for Groups I and II at Time 3. However, at Time 3, the mean differences among groups were not statistically significant and the rebound scores were well below preintervention levels. A simple trend analysis indicated that the decreases in suicide-risk behaviors were statistically significant for each group. When suicide ideation was examined separately, the results mirrored those for suicide-risk behaviors.

These results revealed that Groups I and III reported the greatest reductions in suicide-risk behaviors from Time 1 to Time 3 (Table 5). Over 85% of the youth in Groups I and III decreased suicide-risk behaviors by 25% or more, whereas about 65% of Group II showed similar improvements. In each group, changes from Times 1 to 3 decreased a minimum of 0.6 SD. Based on a metaanalysis of interventions with youth in which effect sizes typically range from 0.3 to 0.5, improvements of 0.6 could be considered clinically significant (Bruvold, 1993; Tobler, 1986; Yeaton & Sechrest, 1981). The value of 0.6 SD is used only as a point of reference here because no research on preventing suicide-risk behaviors was found to estimate the clinical significance of this improvement.

As a normative comparison, mean levels of suicide-risk behaviors were compared those of typical youth ( $N = 202$ ), randomly sampled from the same schools during the same time frame. Mean scores for all three study groups were at least 1 SD above the typical youth's mean score at Time 1, and at Time 3 their scores were within, or close to, 1 SD of the typical youth group mean. The effect size for differences between the suicide-risk and typical youth at Time

1 as 1.28 and 0.57 at Time 3. All three suicide-risk groups' responses moved toward the normative typical adolescent group mean, suggesting that on average the decreases in suicide risk behaviors were clinically as well as statistically significant (Jacobson & Truax, 1992).

Further, two observations suggest that being involved in other treatments did not account for the observed outcomes. First, 30% (n = 31) of the suicide-risk youth participated in alternative treatments during the 10-month study time frame; these youth were proportionally distributed across the three groups. Thus, there was no association between intervention group and alternative treatment ( $\chi^2(2) = .125, p = .939$ ). Second, using hierarchical regression methods and controlling for intervention group and baseline values of outcome variables, participation in alternative treatment had no effect on outcomes including depression ( $\beta = .021, NS$ ), self-esteem ( $\beta = .080, NS$ ), suicide ideation ( $\beta = -.009, NS$ ), or suicide risk behaviors ( $\beta = .065, NS$ ).

In general, all three groups of suicide risk youth showed significant decreases in suicide-risk behaviors over the 10 months. Gender was not a factor in these patterns of change; male and female program participants were equally likely to report decreases in suicide risk behaviors and decreases in suicide ideation. Further, it appears these positive effects cannot be attributed to involvement in alternative forms of treatment.

### Results for Related-Risk Factors

Youth in all three groups also evidenced improvements over time in problems with depression, hopelessness, stress, and anger. Results for each are detailed below.

#### Depression

The top, right graph in Figure 1 shows that the observed patterns of change did not vary among the three groups. The main effect revealed significant decreasing trends in the predicted direction for depression ( $F_{\text{sub Linear}}(1,101) = 88.93, p < .001$ ) for all three groups (see also Table 3).

Examination of the means for each group (see Table 5) revealed that over 65% of the youth in all groups showed a 25% or greater drop in depression scores, with Groups I and III showing the greatest declines. Changes from Time 1 to Time 3 decreased a minimum of 0.6 SD in all three groups. Prior to intervention, mean scores of all three groups were at least 1 SD above the typical youth's mean score; whereas by Time 3, the mean scores were within 1 SD of the typical youth's mean. The effect size difference between suicide risk and typical youth at Time 1 was 1.12 and at Time 3 was .31.

#### Hopelessness

The general pattern of change for hopelessness ( $F_{\text{sub Linear}}(1,102) = 55.81, p < .001$ ) was similar to that described for depression. That is, all three groups showed consistent and decreasing levels of hopelessness over time. There was, however, a significant Gender x Group x Quadratic trend interaction effect ( $F_{\text{sub Quad}}(2,99) = 3.14, p < .05$ ), indicating that the effects varied by gender. Inspection of these trends revealed that Group I females compared to all other youth had the most dramatic decreases in hopelessness at Time 2, more so than their male counterparts and more so than males or females in either Group II or Group III. This decrease was coupled with a slight increase at Time 3. Caution was exercised not to overinterpret this result because it was the only significant interaction involving gender and may have represented a statistical artifact rather than a true effect.

Further, all three groups showed declines of at least 0.6 SD at Time 3; and over 60% of the high-risk youth in each group reported declines in hopelessness across time. At baseline all three suicide-risk groups had mean scores at least 1 SD above that of the typical youth; and by Time 3, there were no statistical differences among the three suicide-risk groups' average hopelessness scores and these scores were within 1 SD of the typical youth group

mean.

## Stress

For perceived stress, the observed pattern of change did not vary among the three groups. The main effect revealed significant decreasing trends ( $F_{\text{sub Linear}(1,100)} = 27.70, p < .001$ ); these changes were statistically significant and in the predicted direction for all three groups (see Table 3 and Figure 1). Declines in perceived stress were not as remarkable as those observed among the other outcome indicators; only 45% of the youth in all three groups revealed a 25% or greater reduction. By Time 3, there were no significant differences among the three groups.

At baseline, the average scores on perceived stress for all three groups were similar to the mean levels reported by typical youth, and at Time 3 the similarities with typical youth remained. The effect size for differences between suicide-risk and typical youth at Time 1 was .28 and at Time 3 was .01.

## Anger

The pattern of results for anger compared to other outcomes was distinctive. First, there was a significant Group x Linear trend component ( $F_{\text{sub Linear}(2,102)} = 4.13, p < .019$ ) indicating that the pattern of changes varied among the three groups. As illustrated in Figure 1, linear reductions in anger were more dramatic for Groups I and III than those observed for Group II. Second, more than 65% of the youth in Groups I and III, compared to only 44% in Group II, revealed at least a 25% reduction in anger. Consistent with these observations, Groups I and III, but not Group II, decreased mean levels a minimum of 0.6 SD. Third, at Time 3 there were significant mean differences between Groups I and II (see lower right graph, Figure 1).

In comparison with typical youth, baseline levels of anger for all three groups were close to 1 SD above the typical group mean; whereas by Time 3 anger levels were within 1 SD of the typical group mean, with Group II the most distant from the normative group. The effect size for differences between the suicide-risk and typical youth at Time 1 was .91, and at Time 3 was .30.

## Results Related to Mediating Protective Factors

As hypothesized under our general theoretic framework and as designed in the Personal Growth Class prevention program, changes in personal and social resources were expected to mediate changes in suicide-risk and related-risk factors. Thus, if the Personal Growth Class model operated as hypothesized, changes in personal control, self-esteem, and network social support were expected to complement the trends observed for depression and suicide risk behaviors described above.

## Perceived Personal Control

In sharp contrast to most of the outcome measures, there were different patterns of change across the three groups, indicated by a significant Group x Linear trend component interaction ( $F_{\text{sub Linear}(2,102)} = 3.76, p < .027$ ). As revealed in Figure 2, the Personal Growth Class groups account for this effect. Groups I and II revealed significant increases in personal control across time, whereas Group III did not ( $F_{\text{sub Linear}(1,101)} = 6.15, p = .70$ ).

Over 44% of the youth in Groups I and II showed improvements in personal control, compared to only 20% of Group III. Similarly, Groups I and II increased personal control 0.6 SD or greater whereas Group III did not. These findings suggest that both the 1- and 2-semester Personal Growth Classes fostered improvements in a sense of personal control. In contrast, the personal control factor was not addressed in the MAPS assessment protocol; that is, the therapeutic elements of the MAPS pertained more to social support and not to any skills training (e.g., anger or

depression management) that would be related to increases in personal control.

## Self-Esteem

The patterns of change in self-esteem were similar for all three groups as indicated by the nonsignificant Group x Linear trend component interaction. Overall there were significant increases in self-esteem across all three groups ( $F_{\text{sub Linear}(1,101)} = 60.17, p < .001$ ). Also, simple trend analysis indicated significant changes in the expected direction for each group. As illustrated in Figure 2, changes in self-esteem for Groups I and III are parallel; Group II reveals the same trajectory, although this group consistently reports lower levels of self-esteem. At baseline Group II reported a tendency toward lower self-esteem compared to Groups I and III (see Table 1); at Time 2 Group II reported significantly lower self-esteem ( $F_{\text{sub}}(2,103) = 6.59, p = .001$ ); and at Time 3 differences among the three groups were similar to observed baseline differences ( $F_{\text{sub}}(2,103) = 2.33, p = .10$ ).

## Social Network Support

As indicated by the nonsignificant interaction term, patterns of change in social support did not differ among the three groups. Rather, there was a consistent pattern of increasing social support across time ( $F_{\text{sub Linear}(1,100)} = 32.08, p < .001$ ). Further analysis of the component sources of network social support (from school persons, family, peers) revealed that the "favorite teacher" and "parents" accounted for these increases. At baseline, Group I reported significantly lower mean levels of social support (see Table 2); whereas at Time 2 and Time 3 there were no significant differences in network social support among the three groups.

In brief, observed increases in self-esteem and social support were similar for all three groups. Consistent with the experimental Personal Growth Class program goals, however, the PGC youth (Groups I and II) reported significant increases in personal control, whereas the MAPS assessment-only youth (Group III) did not. This pattern of differences in a posited mediating factor suggests that the ameliorating effects of the experimental Personal Growth Class may differ from those of the MAPS assessment protocol.

## DISCUSSION

This study provided preliminary support for the efficacy of a comprehensive, school-based prevention program designed to reduce suicide potential among youth at suicide-risk; in addition, it suggests the potential value of targeted, but brief, supportive interventions. Specifically, the experimental Personal Growth Class prevention program appeared effective in reducing suicide-risk behaviors, depression, hopelessness, stress, and anger; and in increasing the protective factors of personal control, self-esteem, and social support resources. These program effects were evident immediately postintervention and were generally maintained at follow-up, one full semester or 5 months later.

The striking and unanticipated finding--that the MAPS assessment protocol appeared essentially as effective as the Personal Growth Class in reducing suicide-risk behaviors and related-risk factors, as well as increasing self-esteem and social support--suggests this brief assessment protocol has, in fact, substantial value for preventing suicidal behaviors. The MAPS protocol was designed to provide a detailed measurement of suicide potential, but for ethical reasons the protocol does not manipulate and activate social support, albeit at a minimal level compared to the Personal Growth Class. Because social support is one of the underpinnings of the theoretic framework driving the Personal Growth Class intervention, it is possible that a less extensive intervention would be sufficient.

A noteworthy difference was that Personal Growth Class participants, but not the MAPS assessment-only youth, showed significant increases in perceived personal control, a key element of life skills training in the Personal Growth Class. This suggests that there were gains for experimental program participants beyond those observed in the assessment-only group. Moreover, these gains were related to beliefs about one's ability to cope and problem solve

effectively, a particularly important outcome in suicide prevention efforts (Berman & Jobes, 1991). Problem-solving repertoires provide youth with the skills necessary for coping with conflictual relationships and life stressors frequently associated with suicidal behaviors (Puskar, Hoover, & Miewald, 1992). Thus, although the MAPS assessment protocol appeared effective in reducing suicide-risk and related-risk factors, and in enhancing some protective factors, it is not clear what the long-term differences might be for these MAPS-only youth contrasted to the experimental Personal Growth Class program youth. Research addressing this question is urgently needed and is currently planned by the authors to determine the necessary and sufficient components in comprehensive, school-based prevention programs for youth at risk for suicide and suicidal behaviors.

Several study findings necessitate further comments and highlight the need for more field research. First, the program appeared least effective in reducing suicide-risk and related-risk factors for youth in the 2-semester Personal Growth Class. This may have been due to an ineffective 2nd-semester program or to a self-selection bias (e.g., of youth with lower levels of self-esteem or less motivational readiness). The pilot test of the 2nd-semester Personal Growth Class curriculum resulted in an improved prevention model; important revisions were made that warrant further testing before concluding that the 2-semester Personal Growth Class is unnecessary.

Second, there may be individual-by-situation interactions that could account for the unanticipated outcomes. Two research design improvements would be: (1) to randomly assign youth to the current 1-semester versus the revised 2-semester Personal Growth Classes; and (2) to measure motivation to change (cf. Prochaska & DiClemente, 1985). These modifications would temper the effects of selection bias, or potentially control for it, and would permit evaluation of the relative effectiveness of the Personal Growth Class based on both program length and individual differences in motivational readiness. It should be noted, however, that in the present study such random assignment would have countered existing school policy, a common obstacle for experimental field studies (Linney, 1989).

Third, there are potential threats to our interpretation of the findings. Students were selected on the basis of more extreme scores (e.g., on suicide ideation, threats, attempts, depression, and drug involvement), which suggests that regression to the mean may be an alternative explanation of the observed results. However, there are patterns in the data that suggest the observed effects are true gains and not merely regression effects. Specifically, the data show that: (1) improvements for these youth were observed across multiple and diverse outcomes and not just one outcome; (2) improvements for all subjects were substantial and tended to hold across time at follow-up; and (3) in contrast to the MAPS assessment-only youth, the Personal Growth Class youth evidenced gains in perceived personal control, indicating improvements specific and central to the PGC skills training in decision making and depression, anger, and stress management. The results thus indicate that there were indeed improvements reflecting decreased suicide potential, although regression to the mean cannot be definitively ruled out.

Further, our interpretations must be guarded due to the strength and pervasiveness of Group III's (MAPS-only protocol) improvements. These findings just may suggest that "doing something" or providing attention or minor interventions to this targeted group of youth may activate some unknown mechanisms that generate improvement. We cannot fully rule out such a claim. Rather, we point out that the MAPS protocol contains deliberate, theory-based interventions designed to empower youth and to activate social support by connecting youth to a caring person readily available to them in their high school, contacting and instructing parents in providing support and understanding, and providing a supportive environment during the assessment process. These elements are also integral parts of the Personal Growth Class intervention, and the MAPS protocol may provide these elements at sufficient levels to produce improvements. In part, this interpretation seems reasonable because observed changes in personal control were specific to the Personal Growth Class, observed only in Groups I and II, and not in Group III, the MAPS-only control group. Additionally, the strength of the outcomes observed is consistent with claims made for short-term intensive strategies used in other contexts [e.g., crisis intervention (Hoff, 1989) or motivational interviews (Miller & Rollnick, 1991)], which gives credence to the observed changes and supports the efficacy of brief, targeted interventions. Clearly the improvements made among this targeted group of youths warrant further attention to: (1) the specific content of the MAPS versus other less therapeutic assessments and interventions; and (2) longer follow-up studies to observe differences between long- and short-term interventions. Future investigations will address these issues. Further, it should be noted that in the present field study, and specifically when addressing suicide

potential, it would have been unethical and very difficult to provide either "no help" or other conditions that provide no assessment of suicide risk.

Our findings also demand a specific investigation of just how the posited effects of personal and social resources mediate changes in depression and suicide-risk behaviors. Although not tested in this study, it appears that personal control may be a sufficient, but not necessary, mediating factor because the assessment-only youth showed equivalent decreases in depression and suicide-risk behaviors without concomitant increases in personal control. Future research, using structural equation modeling, will test the pathways through which the program is hypothesized to achieve its effects. Future investigations will include a broader range of related-risk factors (Davidson & Linnoila, 1991) including anxiety (Shaffer et al., 1988), risky behaviors (Garrison, McKeown, Valois, & Vincent, 1993), victimization (Pfeffer, 1991), family distress, and drug involvement (Davidson & Linnoila, 1991; Garrison et al., 1993; Thompson, Moody, & Eggert, 1994) to examine their differential effects on prevention outcomes.

## CONCLUSIONS

In addition to evidencing the efficacy of a school-based prevention program, this study contributed to broader interdisciplinary research efforts for suicide prevention programs in several important ways. First, the study illustrated the importance of targeting a high-risk population for indicated prevention efforts. In contrast to universal prevention programs targeting entire school populations (Garland et al., 1989), this study demonstrated that youth at suicide-risk: (1) were identified within the school population, (2) were specifically targeted and recruited for prevention research, and (3) responded positively to an indicated prevention intervention program.

Second, the results suggest that providing even a minimum intervention, such as the MAPS assessment protocol, may be effective for suicide-risk youth, at least within the 10-month time frame used here. These latter results should stimulate the study of prevention programs that combine the therapeutic elements characteristic of the MAPS assessment protocol with core skills training units from the experimental program. In this way, the present study provides a model and impetus for future prevention program research.

Finally, this school-based prevention intervention program generated results relevant to the development of cost-effective approaches, school-based programs, and institutional policies. Health promotion and prevention programs are considerably less costly than outpatient or inpatient treatment programs required for diagnosable, clinical depression, and suicidal behaviors. Moreover, suicide prevention efforts have the potential benefit of warding off the debilitating emotional and economic costs experienced by families, schools, and communities, particularly when a youth completes suicide. The study established the feasibility and efficacy of a school-based prevention approach for reducing suicide potential and promoting healthy adolescent behaviors among identified at suicide-risk youth. The program delivery departed from the more common universal, 1-3 hour, "information only" suicide awareness programs. Instead, the prevention program identified vulnerable youth and employed theoretically based and intensive interventions. The acceptance and success of the program within five high schools demonstrated that the school context is a practical setting for delivering comprehensive, yet cost-effective, prevention programs. At a societal level, this research lays groundwork for health policy development targeting prevention services for youth expressing the self-directed violence of suicidal behaviors.

### Table 1

#### Criteria (A or B) for Identifying Suicide-Risk Youth

A. Evidencing any of the following:

1. Prior suicide attempts (2 or more)

2. High suicide ideation (3 or greater on a 0-6 scale)
3. Serious depression (3.4 or greater on a 0-6 scale; 1 SD above the mean.)

B. Evidencing any two of the following:

1. Moderate suicide ideation (2 on a 0-6 scale)
2. Indirect/direct threats of suicide (2 or greater on a 0-6 scale)
3. Prior suicide attempt (1 on a 0-6 scale)
4. Moderate depression (between 2 and 3.4 on a 0-6 scale)
5. Specific levels of alcohol or other drug use, polyuse, or drug use control problems.

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