Mediating Effects of an Indicated Prevention Program for Reducing Youth Depression and Suicide Risk Behaviors

ELAINE A. THOMPSON, PhD, RN, LEONA L. EGGERT, PhD, RN, FAAN, AND JERALD R. HERTING, PhD

This study explored the intervention processes of an indicated prevention program for high-risk youth. It was hypothesized that intervention effects would be influenced by the direct and mediating effects of teacher social support on both peer group support and perceived personal control. In turn, personal control was hypothesized to mediate between teacher and peer group support, contributing to reductions in depression and suicide risk behaviors. The hypotheses were tested using a three-wave, longitudinal design incorporating data from preintervention, 5-month follow-up, and 10-month follow-up assessments of 106 high-risk youth divided into three comparison groups: two experimental, one control. For the two intervention groups, there were direct and/or indirect effects of teacher and peer group support on personal control, depression, and suicide risk behaviors. The general hypothesis that personal control mediates between support resources and reductions in depression and suicide risk behaviors received partial support across the study groups.

"The children of America are hurting... every 9 seconds a child drops out of school,... every 4 hours a child commits suicide."

Suicide among adolescents and young adults in the United States has increased at alarming rates for the last two decades, with western states reporting the highest rates. Among teens ages 15–19 years, rates increased by 27%. For the country as a whole, youth suicide among those 15-24 years is the leading cause of death (Potter, Powell, & Kachur, 1995).

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In response to these emerging trends, school and mental health professionals have designed and implemented school-based prevention programs across the nation. Typically these have been universal prevention programs, targeting entire school populations by providing information about suicide warning signs and related risk factors and by building strategies for obtaining help within the school or community (Garland, Shaffer, & Whittle, 1989). Concerns regarding the efficacy of school-based programs—particularly for youth at highest risk—have been raised (e.g., Garland & Ziegler, 1993; Kalafat & Elias, 1992; Overholser, Hemstreet, Spirito, & Vye, 1989; Shaffer, Garland, Veland, Underwood, & Busner, 1991; Shaffer et al., 1990; Spirito, Overholser, Ashworth, Morgan, & Benedict-Drew, 1988). Recent studies, however, indicate that school-based programs can be effective in enhancing knowledge, altering faulty attitudes about youth suicide, and promoting expectancies for engaging in help-seeking behaviors (Ciffone, 1993; Kalafat & Elias, 1994).

There is a necessity, nevertheless, to address the needs of youth at greatest risk for suicidal behaviors, those who are likely to benefit from more focused and intensive intervention. Prevention researchers proposed implementing selective prevention programs for known high-risk groups (for example, youth exposed to suicidal behaviors) and indicated school-based prevention programs for high-risk individuals showing signs related to suicide risk (Institute of Medicine, 1994). Recommendations were that prevention programs should do the following: (1) test theory-based prevention models linking risk and protective factors related to adolescent suicidal behaviors; (2) identify and target known high-risk groups or individuals; (3) incorporate empirically verified health-promotion strategies including social support enhancement and life-skills training; and (4) be intensive and comprehensive, providing a sufficient “dose” to build new behavioral repertoires (Cote et al., 1993; Davidson & Lmnsall, 1991; Eggert, Thompson, Herting, & Nicholas, 1994; Garland et al., 1989; Schotts & Clum, 1982; Shaffer, Garland, Gould, Fisher, & Trustman, 1988).

**A PREVENTIVE INTERVENTION FOR HIGH-RISK YOUTH**

Suicide risk behaviors—thoughts, threats, and attempts—as well as related risk factors, including depression and drug involvement, are more prevalent among potential school dropouts than among other groups of high school students (Eggett, Thompson, & Herting, 1994; Lewinsohn, Rohde, & Seeley, 1993). To reduce depression and suicide risk behaviors among high-risk youth, as indicated, school-based prevention programs, the Personal Growth Class (PGC), was designed and implemented. Consistent with the aforementioned recommendations and central to this study, this intervention was theory-based, incorporating concepts derived from an integrated model of strain, social learning, and social control theories (Eggett, Thompson, Herting, & Nicholas, 1994; Elliott, Huisinga, & Ageton, 1985; Lo, Dean, & Ensel, 1986), and social support perspectives (Eggett, Seyl, & Nicholas, 1990). Additionally, designed for at-risk youth, the program was both intensive and comprehensive. It focused on strengthening protective factors and reducing suicide risk factors and related risk factors, and incorporated social support enhancement and skills training (Eggett, Nicholas, & Owen, 1995).

The PGC intervention integrated two essential components: social support and life-skills training (Eggett, Nicholas, & Owen, 1995; Thompson, Herting, & Eggert, 1997). Social support elements framing the preventive intervention include (1) a network component built upon prosocial relationship bonds emerging between the teacher and students and within the intervention peer group, and (2) a social support process derived from the group interaction processes and life-skills training. The underlying rationale for the approach was that suicide risk and protective factors emerge and are maintained as a function of the individual within a network of so-
emements are posited to enhance personal resources such as personal control and self-esteem, and to solidify social resources, including strengthened ties to school and increased sense of social support. The second component, life-skills training, is composed of four elements: self-esteem enhancement, decision making, personal control, and interpersonal communication. Each unit's presentation is sequenced, beginning with skill introduction or focus, skill development, application, and finally skill transfer (generalization) and relapse prevention. Problem-related skills are integrated in each unit, and are applied to the central program goals, which include increased mood management (i.e., decreased depression, suicide risk behaviors, anger control problems), improved school performance, and decreased drug involvement.

EFFICACY OF THE INTERVENTION PROGRAM

In a recent study, detailed elsewhere (Eggett, Thompson, et al., 1995), trend analyses were used to describe PGC intervention effects for high-risk youth. Briefly, three groups of youth were compared: youth who participated in either one semester (Group I) or two semesters (Group II) of PGC, and youth who participated in the comprehensive assessment-only condition (Group III). All youth described in the study had "screened-in" for suicidal risk behaviors; thus, each youth participated in the comprehensive suicide risk assessment (Measure of Adolescent Potential for Suicide (MAPS)). Only Groups I and II, however, participated concurrently in the PGC prevention program. In comparison to the comprehensive assessment-only youth (see Table I), PGC participants also received intensive social support and life-skills training within the context of the PGC group in which their progress toward program goals was systematically monitored.

Among all three groups the trend analysis revealed significant decreases in suicide risk behaviors (thoughts, threats, and attempts) and in related risk factors, including depression, hopelessness, stress, and anger (Eggett, Thompson, et al., 1995). Of particular interest to this study was that PGC youth, but not assessment-only (or "control") youth, showed significant increases in personal control across time. This outcome suggested that the more comprehensive, skill-building PGC program had a facilitating effect on personal control for PGC participants. Increased personal control may have long-term protective effects for high-risk youth; that is, altered self-efficacy beliefs may help stabilize reductions in depression and suicide risk behaviors across time. The previously observed reductions in depression and suicide risk behaviors, and concomitant increase in personal control, were theoretically consistent and laid the groundwork for examining the potential mediating effects of personal control.

EXPLORING INTERVENTION PROCESSES

The present study is a direct extension of the aforementioned investigation, which focused on intervention outcomes. The purpose of the present study is, in contrast, to examine the processes by which the preventive intervention was hypothesized to reduce depression and suicide risk behaviors among high-risk youth. Figure 1 illustrates the specified model, in which both social support (teacher support and peer group support) and personal control are central factors influencing and mediating changes in depression and suicide risk behaviors.

Social Support

Building prosocial relationships with a caring adult and among peer group members is a central feature of this intervention model. The interpersonal relationships between the teacher and youth in the peer group constitute the core of the school-network support component. Expressive and instrumental ex-
TABLE 1
Comparison of Intervention Elements for Personal Growth Class (PGC) versus MAPS Assessment

<table>
<thead>
<tr>
<th>Intervention Elements</th>
<th>Personal Growth Class Assessment</th>
<th>MAPS Assessment Only</th>
<th>Setting/Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information/assessments/feedback</td>
<td>*</td>
<td>*</td>
<td>School/nurse or teacher</td>
</tr>
<tr>
<td>Access to help</td>
<td>*</td>
<td>*</td>
<td>School/case manager</td>
</tr>
<tr>
<td>School-based counselor</td>
<td>*</td>
<td>*</td>
<td>School/community</td>
</tr>
<tr>
<td>School/community Crisis Response Plan</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Initial motivation/social support from MAPS assessment interviewer</td>
<td>*</td>
<td>*</td>
<td>School/MAPS interviewer</td>
</tr>
<tr>
<td>School nurse/favorite teacher</td>
<td>*</td>
<td>*</td>
<td>School/regular staff</td>
</tr>
<tr>
<td>Parental involvement</td>
<td>*</td>
<td>*</td>
<td>Home/parent or other adult</td>
</tr>
<tr>
<td>PGC teacher</td>
<td>*</td>
<td>*</td>
<td>School/PGC teacher</td>
</tr>
<tr>
<td>Peer group support</td>
<td>*</td>
<td>*</td>
<td>School/PGC peer group</td>
</tr>
<tr>
<td>Skills training</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Coaching in four major units</td>
<td>*</td>
<td>*</td>
<td>School/PGC teacher</td>
</tr>
<tr>
<td>Monitoring target behaviors</td>
<td>*</td>
<td>*</td>
<td>School/PGC teacher</td>
</tr>
</tbody>
</table>

Note. MAPS, Measure of Adolescent Potential for Suicide (Eggert, Thompson, & Herling, 1994). The asterisks (*) in the respective columns for PGC groups (I & II) versus the MAPS assessment-only comparison group (III), indicate that subjects received this intervention element.

Changes are fostered in the process of daily small group activities, which include skill demonstrations, group discussion, experiential learning, practice, feedback from teacher and peers, and ultimately application and transfer of skills to "real world" settings. Skills are learned and applied specifically to promote three program goals increased mood management, increased school performance, and decreased drug involvement.

Figure 1. Hypothesized intervention model.
Expressive support is reflected in caring behaviors such as acceptance, empathy, group belonging, positive reinforcement, and positive peer pressure communicated in teacher-student and student-student interactions. Instrumental support is represented by helping behaviors, such as providing information and advice, problem-solving skills training, and direct assistance, such as in organizing and participating in pleasurable pro-social activities (Eggert, Nickolis, & Owen, 1994). These facets of support are consistent with social support models (c.f., Cohen & Syme, 1985; Lin et al., 1986) and existing professional helping models (c.f., Janis, 1983; Wills, 1985). The support functions within PGC match the social support provisions described by Weiss (1974), including attachment, shared concerns and experiences, self-esteem enhancement, reliable helplessness, guidance, and social integration or sense of belonging.

From a theoretical perspective, expressive and instrumental elements of social support reduce uncertainty, strain, and skill deficits, thus enhancing perceptions of personal control (Albrecht & Adelman, 1987) and reducing suicidal behavior and depression among youth (Dubow, Kausch, Blum, Reed, & Bush, 1989; Lin et al., 1986; Ross & Mirosky, 1986). Social support also meets basic needs for acceptance and belonging, thereby providing a prototypical environment for adaptation, change, and growth (Boyce, Schaefer, & Uitti, 1985; Greenberg, Siegel, & Leitch, 1983; Hirsch & DuBos, 1992; Larson, 1983). In addition, for adolescents, peers and teachers are principal socializing agents. Thus, facilitating teacher and peer group support within the school context is a meaningful strategy for enhancing adolescent support resources.

**Personal Control**

Personal control and self-esteem are two crucial personal resources known to enhance coping abilities and to reduce emotional distress (Deas, 1986; Thoits, 1995). Here the focus is on personal control as a key mediating factor in the intervention model (see Fig. 1). Personal control is defined as perceived self-competency to handle difficult circumstances and to manage stress, anger, and depression. It is thought to mediate between social support resources—in this case teacher and peer group support—and suicide risk and depression. Personal control is related to other psychological constructs including locus of control, perceived self-efficacy, hardness, and aspects of attributions (i.e., controllability) and attributional style. Each has purported effects on enhancing emotional well-being and reducing depression (Blaney & Gonsell, 1990; Dem, 1986; Johnson & Sarason, 1978; Petersen & Stunkard, 1984). Among adolescents, personal control predicts self-esteem across time; further, low levels of self-efficacy and support are associated with adolescent depression (Ehrenberg, Cox, & Kooiman, 1991; McFarlane, Bellisimo, & Norrman, 1995).

Enhanced personal control is an intended outcome for PGC participation. Life-skills competencies, building self-esteem, self-management skills, and communication skills all enhance as individual's sense of personal control. Role modeling, role play, successive reinforcement of skills, and direct feedback delivered within PGC as expressive and instrumental support represents the major means by which personal control is shaped and reinforced within the intervention. Enhanced self-management of stress, interpersonal communication, and decision-making skills are among the behavioral changes expected to boost perceived personal control. These changes are captured in the needs of one PGC youth: "I see a major difference in the way I was and the way I am now. I was a wreck—I couldn't handle stress and I couldn't handle other people's problems... Now I'm in control... and have more self-confidence."

**HYPOTHESES**

Based on the integrated theoretical model proposed by Eggert and colleagues
(Eggert et al., 1990; Eggert & Herting, 1991, Eggert, Thompson, & Herting, 1994), and empirical studies relating adolescent depression, suicide risk behaviors, social support, and personal control. Five hypotheses were proposed in explanation of the PGC intervention processes. The path labels identify the corresponding paths depicted by the directional arrows in Figure 1.

For PGC participants:

Hypothesis 1: PGC Teacher support will have a direct, positive effect on personal control. (Path B1)

Hypothesis 2: PGC Teacher support will have a direct, positive effect on PGC peer group support. (Path B2)

Hypothesis 3: PGC Teacher support, thus, will indirectly enhance personal control through the direct effect of peer group support. (Path B2 x B3)

Hypothesis 4: Personal control will have a direct, negative effect on depression. (Path B4)

Hypothesis 5: Personal control will have a direct, negative effect on suicide risk behaviors. (Path B5)

All youth participating in this study screened-in as at risk for suicidal behaviors and received an in-depth suicide risk assessment. In addition, youth in Groups I and II participated in the PGC intervention. Group III did not participate in PGC and constitutes the control group. For the purpose of comparison to the PGC groups, each youth in Group III was asked to identify his or her "favorite class" and then to evaluate teacher support and classmate support in this class. This form of comparison is conservative because, for control subjects, perceived teacher and classmate support in their "favorite class" are likely to reflect the most positive school experiences.

The hypothesized model (Fig. 1) depicts PGC intervention processes, relevant for Groups I and II. For Group III, however, process differences were expected. In particular, it was anticipated that teacher support would facilitate classmate support, as this is likely to occur in most learning contexts. Thus, H2 was expected to hold, though the effects were not predicted to be as strong as those observed in the more intensive PGC class experiences. For the control, it was predicted that favorite teacher and classmate support would not have direct or indirect effects on personal control, because, unlike PGC, Group III was not exposed to specific curriculum content designed to enhance personal control. Thus, H1 and H3 were not expected to hold in the Group III model. The effects of personal control on depression and suicide risk behaviors theoretically may be independent of intervention effects. Thus, Hypotheses 4 and 5 were expected to hold for Group III, although the links between these variables were expected to be weaker because Group III was not exposed to PGC.

METHOD

Design

A three-group, repeated measures design was used to test the preceding specified intervention and mediating effects of a high school-based prevention program designed to reduce depression and suicidal behaviors among high-risk youth. The impact of teacher support, peer group support, and perceived personal control was examined for the two experimental intervention groups and one assessment-only control group.

Participants and Procedures

The 160 high-risk study participants 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 pretreatment, and at 5-month and 10-month follow-up assessments. By design, all study participants received a suicide risk assessment and were in one of three groups.

Group I: A one-semester (5 months) Personal Growth Class, PGC I (n = 36);
Group II: A two-semester (10 months) Personal Growth Class, PGC II ($n = 35$); Group III: An assessment-only comparison group ($n = 35$).

A three-stage protocol that identified the sample of high-risk youth at risk for suicidal behaviors is outlined briefly (c.f., Eggert, Thompson, Herting, & Nicholas, 1994), as follows:

**Stage 1: Identification and Invitation to Study.** A pool of youth at risk for school failure or dropping out were identified using a validated method (Herzig, 1990). Combinations of the following criteria were used for study participant identification: (1) prior school dropout status; (2) below-expected credits earned for current grade level; (3) in the top 25th percentile for days absent per semester; (4) grade point average (GPA) < 2.3 with a pattern of declining grades, or a precipitous drop in GPA > 0.7; and (5) referral from school personnel as being in jeopardy of school failure or dropping out. From this pool, randomly selected high-risk youth were invited by research staff to participate as one of the following: (1) a control subject in a survey of high school students or (2) an experimental subject in the Personal Growth Class prevention program. Standardized invitation procedures were used for the groups, and both verbal and written informed consent was obtained from each study participant and his or her parent or legal guardian.

**Stage 2: Questionnaire Data Collection and Suicide Risk Screening Protocol.** Students agreeing to participate in the study completed the High School Questionnaire. The Suicide Risk Screen embedded in the questionnaire and measuring depression, drug involvement, and suicide risk behaviors was used to identify youth "at suicide risk" based on specified levels and combinations of these variables (Eggert, Nicholas, & Owen, 1995).

**Stage 3: Comprehensive Assessment Protocol.** All high-risk youth meeting Stage 2 criteria were assessed by a trained nurse clinician or school counselor using the Measure of Adolescent Suicide Potential (MAPS), a comprehensive, 2-hour interview (Eggert, Thompson, & Herting, 1994). As part of the MAPS assessment protocol, each youth, whether in the experimental or control group, was personally introduced to a trained school-based "case manager." Following the interview, both the case manager and the student's parent or guardian were contacted and informed about the youth's current status and needs.

**Refusal and Retention Rates.** At Stage 1, refusal rates for intervention group participants averaged 30% across cohorts; refusal rates for assessment-only controls averaged 16%. At Stage 3, however, refusal rates were low—less than 4% of youth across all cohorts refused the initial MAPS assessment interview.

Across time, retention rates for study participants were essentially equivalent across all three groups (Group I, 75%; Group II, 87.5%; and Group III, 71.4%; $\chi^2 = 3.49, df = 2, p = .17$). Attrition rates were influenced primarily by the inability to locate youth at the 10-month follow-up because of school dropout or family moves beyond a three-county area. Program attrition was least likely to occur among Group II participants, those electing to take the two-semester PGC.

**Intervention Conditions.**

The school-based intervention program (Eggert, Thompson, Herting, & Nicholas, 1994) was structured as an elective high school offering called a Personal Growth Class (PGC) in five high schools (one group per school per semester). The intervention was delivered by trained school personnel (e.g., teacher, counselor, or school nurse) who functioned as group leaders. PGC group leadership was considered part of each leader's assigned school responsibilities. PGC was conducted as a small group (12 students) and met daily for 55 minutes in regular classrooms; students received elective credits. Students were encouraged to take two semesters of PGC, that is, both PGC I (18 weeks) and PGC II (18 additional weeks), but were given the option of taking PGC I only, con-
sistent with existing school policies regarding elective courses.

**PGC I and II Similarities.** Program elements for both PGC I and II were as follows: (1) group processes characterized by social support and help exchanged within teacher–student and peer–group relationships; (2) weekly monitoring of activities related to mood management, school performance and attendance, and drug involvement; and (3) life-skills training focused on four core program components (self-esteem enhancement, decision making, anger, depression, and stress management; and interpersonal communication). Youth set personal goals for the targeted behavioral change during the first 10 days of the "Getting Started" phase. Self-monitoring skills were taught using self-assessment tools such as personal attendance graphs, mood diaries, and daily assessment of drug use/consequences. Developing self-awareness laid the foundation for identifying program and personal program goals. Ongoing monitoring, self-assessment, and the provision of interpersonal support for goal achievement within the PGC group were methods used to identify and reinforce goal achievement. Goal attainment was fostered sequentially, paralleling group development stages (i.e., early, middle, late). Skills training progressed from establishing motivation to skills building, and then to skills practice, application, and transfer. Both PGC I and II fostered development of health-promoting recreation and social activities.

**PGC I and II Differences.** With respect to group support, PGC I emphasized training the youth to give and receive social support in the closely supervised PGC group setting. PGC II emphasized transferring social support skills into other school settings and bonding via participation in existing school clubs and activities. With respect to 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, and parents. PGC II expanded skills acquisition by incrementing transfer and application of skills learned in PGC I to real-life situations at home and school.

**Measurement**

Study variables were measured at three time points. Time 1 refers to the baseline preintervention measurement; Time 2 refers to postintervention assessment immediately following completion of PGC I intervention; and Time 3 coincides with the completion of PGC II. Time 3 represents a follow-up assessment for Group I and Group III. For Group II, which involved two semesters of PGC, Time 3 represents a second postintervention assessment.

The High School Questionnaire is a self-report survey measuring a range of risk and protective factors. Key variables described in the following paragraphs are incorporated in this instrument. Reliability (internal consistency) and validity have been established with adolescent populations for each of the scales used in this investigation and are described next. Cronbach's alpha values reflecting internal consistency based on the current sample are included in parentheses with each scale description below. Unless indicated otherwise, all measures were based on a 7-point Likert-type rating scale ranging from 0 to 6.

**Teacher Support.** Teacher social support measured the degree of instrumental and expressive support received from the PGC group leader. Scale scores were based on the average of 14 items (α = .95) including "The PGC teacher...gives me support and encouragement, ...encourages a climate of mutual respect,...offers useful points of view about topics," and "gives advice or information I need." For the experimental Groups I and II, the measure of teacher support reflected support provided by the PGC teacher; for Group III teacher support reflected support provided by the student's "favorite" teacher.

**Peer Support.** Peer support tapped the degree of instrumental and expressive support received from peers within the classroom.
of the PGC group and was measured at Time 2, postintervention. The content of the items paralleled the preceding teacher support scale items. Scale scores were based on the average of 14 items (α = .95). For Groups I and II, PGC was the referent for peer group; on the other hand, for Group III, the assessment-only control group, “favorite class” was the referent. Thus, for Groups I and II, the peer support source was members of the PGC group. For Group III, the peer support source was classmates in a favorite class. To distinguish between differences in the referent sources, models for Groups I and II (see Figure 2A) include a variable called PGC Peer Support, whereas the parallel variable for Group III (see Figure 2B) is Peer Support.

Personal Control. Personal control was operationalized as self-confidence to handle or cope with problems and the ability to influence positive outcomes. It was measured using a seven-item scale (α = .75) that included: “I feel confident I can handle my problems,” “When I try, I can make good things happen for me,” “No matter how bad things may be, I know that eventually I’ll feel better,” and “I can learn to cope with my problems.”

Depression. Depression was measured with items adapted from the CES-D (Radloff, 1977) for use with adolescents (α = .86). The mean scale score was constructed from six items that asked subjects to respond from “never” to “always” for items including: “I feel depressed,” “Nobody cares,” “I can’t shake off feeling ‘down’ or blue,” “I feel lonely,” “I feel that people dislike me,” and “I feel sad.” The validity of student reports was corroborated by teacher ratings on depression (r = .76).

Suicide Risk Behaviors. Suicide risk behaviors were measured using a brief, five-item scale with indicators of the frequency of suicide thoughts, direct and indirect suicide threats, and suicide attempts (α = .86). Because this is a new measure and a major outcome variable, results from earlier measurement studies are relevant. Convergent validity was supported with empirical correlations between suicide risk behaviors and depression (r = .43), hopelessness (r = .49), family distress (r = .37), school dissatisfaction (r = .27), and drug involvement (r = .39). In addition, construct validity was established using confirmatory factor analysis in which indicators loaded significantly, ranging from .46 to .82 (Thompson, Connelly, & Eggett, 2000). Confirmatory factor analysis for the present sample indicates a single factor with loadings ranging from .55 to .80. Correlation between the Suicide Risk Behavior (SRB) scale and subsequent clinician ratings of suicidal thoughts and intent was .55, establishing predictive validity.

Analysis

Structural equation modeling (SEM) was used to test PGC intervention effects on depression and suicide risk behaviors. SEM simultaneously estimates each hypothesized path while incorporating corrections for measurement error. In addition to estimates of model effects, SEM procedures produce both specific and general indicators of goodness-of-fit for evaluating hypothesized models (Herting & Cotter, 1985). To manage potential small sample estimation problems, the number of effects estimated by SEM was minimized by using single indicators for each variable. In addition, the error variance of each indicator was estimated by multiplying the indicator variance by 1 - reliability of the indicator based on scale reliabilities (Bollen, 1989; Hayduk, 1989).

The analysis was carried out in three stages. First, descriptive statistics and scatterplots were used to examine for deviations from distributional assumptions underlying structural equation modeling. In a few cases, Time 2 teacher support or peer group support data were missing; mean substitution, a conservative procedure, was used. Second, separate models were examined using variance/covariance matrices in LISREL VII. Third, comparisons with the hypothesized intervention model (Fig. 1) were described for the three study groups.

Model fit was guided by theoretical reasoning and a combined assessment of both general and specific fit indices (Herting, 1985). Following standard recommendations...
risk behaviors, and personal control. Except for age, there were no statistically significant differences in background among the three groups of youth. The proportion of males was equivalent across groups, as was the proportion of youth representing minority ethnic groups. Similarly, at Time 1, the three groups did not differ on the hypothesized mediators of variable (personal control) or on the distal outcomes variables (depression and suicide risk behaviors). Two additional protective factors were examined: self-esteem and "general" social support. (General support was a Time 1 composite indicator of amount of social support from multiple sources, including parents, siblings, friends, counselor, teacher, and classmates and was distinct from Time 2 indicators measuring the intervention social support examined in this study.) There were no group differences in self-esteem, but there were significant differences in general social support, F(2, 105) = 6.15, p < .003. Group III reported significantly higher levels of general social support (M = 3.35) compared to either Group I (M = 0.99) or Group II (M = 1.82). The issue of differences in baseline general support is discussed with results under post hoc analyses. Overall, the data suggest that at baseline there was considerable similarity among the three groups.

Baseline Comparisons between Study Completers and Study Noncompleters

To assess for study attrition effects, comparisons were made between study completers and study noncompleters (participants for whom data were missing at follow-up and/or at Time 2). A series of baseline variables were examined, including those displayed in Table 2 using either chi-square or one-way ANOVA with Fisher's least significant difference (LSD), a liberal test for planned comparisons. Tested were differences in age, gender, and minority representation, as well as baseline depression, suicide
study completers and noncompleters in terms of the variables under study.

Comparisons of study noncompleters across the three groups revealed that noncompleters were similar in age, depression, suicide risk behaviors, and related risk factors, including hopelessness, stress, and anger. Only one difference among the three groups of study noncompleters was observed. Similar to the pattern observed for Group III subjects who completed the study (Table 2), Group III noncompleters tended to report more "general" support than did study noncompleters from the other two groups. It is unlikely that study attrition influenced the estimation path coefficients reported here, but generalization of the results should be judicious.

**Structural Equation Modeling of Intervention Mediating Effects**

**Assessing Model Fit.** The final model fit statistics are summarized in Table 3. For all final models, nonsignificant $\chi^2$ values were obtained. The goodness-of-fit indices were .92, .91, and .92 for Group I, Group II, and Group III, respectively. Similarly, CFI reflected an acceptable fit between the data and the proposed models at 1.00, .97, and .94, respectively, for Groups I, II, and III. Standardized root mean square residual (RMSR) values were small at .086, .068, and .11, respectively. For the PGC intervention models (Groups I and II), all standardized residuals were less than 2.0 and all modification indices were less than 7.00. The negative $\chi^2$ values implied the final models would be preferred to fully saturated models. Generally, the correspondence between the results and the paths hypothesized in Figure 1 was more consistent for Groups I and II than Group III. These findings were logical and anticipated because the hypothesized effects were specific to the PGC intervention groups and only partially applicable to the control group.

The final structural models differed from the hypothesized model in two significant ways. First, for all groups, modification indices suggested freeing for estimation a di-
TABLE 3
Summary Statistics for Structural Equation Models

<table>
<thead>
<tr>
<th>Model statistics</th>
<th>Group I Experimental 1-semester PGC</th>
<th>Group II Experimental 2-semester PGC</th>
<th>Group III Assessment-only control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final model 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \chi^2 )</td>
<td>11.42</td>
<td>12.98</td>
<td>12.30</td>
</tr>
<tr>
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<td>11 df, p = .29</td>
<td>11 df, p = .34</td>
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<tr>
<td>GFI</td>
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<td>.91</td>
<td>.92</td>
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<tr>
<td>CFI</td>
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<td>.94</td>
</tr>
<tr>
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<td>-.27</td>
</tr>
<tr>
<td>RMSR</td>
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<td>.068</td>
<td>.11</td>
</tr>
<tr>
<td>( R^2 ) suicide risk behaviors</td>
<td>.97</td>
<td>.55</td>
<td>.33</td>
</tr>
<tr>
<td>( R^2 ) depression</td>
<td>.73</td>
<td>.66</td>
<td>.34</td>
</tr>
<tr>
<td>( R^2 ) personal control</td>
<td>.30</td>
<td>.61</td>
<td>.36</td>
</tr>
<tr>
<td>( R^2 ) peer support</td>
<td>.27</td>
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<td>.16</td>
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<td>( \chi^2 )</td>
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<td>19.33</td>
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<tr>
<td>df, p value</td>
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<td>12 df, p = .08</td>
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<tr>
<td>CFI</td>
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<td>.86</td>
<td>.69</td>
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<tr>
<td>RMSR</td>
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<td>.11</td>
<td>.14</td>
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<td>Hypothesized model 1</td>
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<td></td>
<td></td>
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<tr>
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<tr>
<td>df, p value</td>
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<td>13 df, p = .0004</td>
<td>13 df, p = .01</td>
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<tr>
<td>GFI</td>
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<td>.80</td>
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</tr>
<tr>
<td>CFI</td>
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<td>.66</td>
<td>.40</td>
</tr>
<tr>
<td>RMSR</td>
<td>.12</td>
<td>.19</td>
<td>.17</td>
</tr>
<tr>
<td>BIC</td>
<td>-.31</td>
<td>-.9</td>
<td>-.19</td>
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<tr>
<td>Null model</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>( \chi^2 )</td>
<td>106.56, 21 df</td>
<td>97.59, 21 df</td>
<td>44.49, 21 df</td>
</tr>
<tr>
<td>BIC</td>
<td>.13</td>
<td>.18</td>
<td>-.30</td>
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</table>

*Note:* PGC, Personal Growth Class; GFI, goodness-of-fit index; CFI, comparision fit index; BIC, Bayesian inference coefficient; RMSR, standardized root mean square residual.

Rect path from Time 1 depression to Time 3 personal control. This path was included for each group, significantly improving the fit between the model and the empirical data. Second, group-specific modifications to the hypothesized model were required for Groups II and III. A direct path was freed for estimation between peer group support and change in suicide risk behaviors for Group II; a path was included between Time 1 suicide risk behaviors and Time 3 change in depression for Group III. These modifications, summarized in Table 4, are discussed in the following sections.

**Mediating Effects.** Shown in Figure 2 are unstandardized structural equation coefficients for each hypothesized path linking the intervention/mediating dimensions of teacher support, peer group support, and personal control to depression and suicide risk behaviors at Time 3. To estimate changes in depression and suicide risk behaviors, Time 1 depression and Time 1 suicide risk behaviors were included in the analysis as baseline control variables. For clarity of presentation, their estimates are not depicted in Figure 2, but are reported in Table 4, complementing Figure 2.
TABLE 4

Parameter Estimates for Final Model

<table>
<thead>
<tr>
<th>Effects</th>
<th>Model path</th>
<th>Group I B (β)</th>
<th>Group II B (β)</th>
<th>Group III B (β)</th>
</tr>
</thead>
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<tr>
<td>Teacher Support on</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Personal Control</td>
<td>B1</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
</tr>
<tr>
<td>Peer Support</td>
<td>B2</td>
<td>.56 (.52)**</td>
<td>.71 (.72)**</td>
<td>.32 (.40)**</td>
</tr>
<tr>
<td>Peer Support on</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal Control</td>
<td>B3</td>
<td>.39 (.41)*</td>
<td>ns</td>
<td>ns</td>
</tr>
<tr>
<td>Suicide Risk Behaviors</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Personal Control on</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>B4</td>
<td>-.32 (-.29)*</td>
<td>-.71 (-.49)*</td>
<td>ns</td>
</tr>
<tr>
<td>Suicide Risk Behaviors</td>
<td>B5</td>
<td>-.22 (-.10)**</td>
<td>ns</td>
<td>-.11 (-.40)*</td>
</tr>
<tr>
<td>Baseline Depression on</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Depression, T3</td>
<td></td>
<td>-.63 (-.60)**</td>
<td>.48 (.38)</td>
<td>.31 (.39)*</td>
</tr>
<tr>
<td>Personal Control</td>
<td></td>
<td>-.34 (-.41)**</td>
<td>-.64 (-.73)**</td>
<td>-.45 (-.38)**</td>
</tr>
<tr>
<td>Suicide Risk Behavior on</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression, T3</td>
<td></td>
<td>.59 (.88)**</td>
<td>.30 (.39)**</td>
<td>.10 (.39)**</td>
</tr>
<tr>
<td>Depression, T3</td>
<td></td>
<td></td>
<td></td>
<td>-.47 (-.48)**</td>
</tr>
</tbody>
</table>

Note. Estimates are unstandardized (B) with standardized (β) estimates reported in parentheses. Baseline Depression and Suicide Risk Behavior controlled. Abbreviation ns means estimate was not statistically significant; ni means path not included in model estimation. T3. Time 3.

*p ≤ .05, **p ≤ .01, ***p ≤ .001.

An important feature of Figure 2 is the number of observed effects for the two intervention groups (Fig. 2A) relative to the lack of similar effects for the assessment-only group (Fig. 2B). That is, although teacher support is generally important in promoting peer support, only for intervention groups—where peer support was specifically targeted—is teacher and peer group support linked, indirectly and directly, to personal control and to reductions in suicide risk behaviors and depression. Specific pathways are discussed and compared to the hypothesized model.

The Effects of Teacher Support. It was postulated that PGC teacher support would directly influence personal control (H1) and PGC peer group support (H2). PGC teacher support, guidance, instruction, and feedback were provided in the process of PGC group facilitation and life-skills training. There were, however, no significant direct effects of PGC teacher support on personal control at T3 for Groups I and II. The effect of favorite teacher support on personal control in Group III, the assessment-only control group, was, as predicted, nonsignificant (B = -.06, ns).

As predicted by H2, however, PGC teacher support had a direct, positive, and strong effect on peer support (B = .56, t = 3.35, p ≤ .001, and B = .71, t = 5.58, p < .001, for Groups I and II, respectively). Compared with the one-semester intervention, the effect of teacher support on peer support was greater in the two-semester program. As anticipated, for the assessment-only control (Group III), the effect of favorite teacher support on classroom support was positive though not as strong (B = .32, t = 2.33, p < .01).

The Effects of PGC Peer Group Support. PGC peer group support was hypothesized (H3) to directly enhance personal control for the intervention groups. This hypothesis received partial support in the analysis. As Figure 2A illustrates, peer support had a significant direct effect on personal control for Group I (B = .39, t = 2.07, p < .05), but not
Group II (B = .05, n). As predicted, for Group III, the assessment-only control group, classmate support did not influence personal control (B = -.08, n). An unanticipated finding was the direct negative effect of peer group support (B = -.38, t = 3.40, p < .001) on suicide risk behaviors for Group II, the two-semester PGC intervention group. These results indicate that for Group I, but not Group II, the effects of teacher support on personal control were mediated by peer group support. That is, the PGC teacher support indirectly influenced a greater sense of personal control by enhancing PGC peer group support. On the other hand, for Group II, peer group support did not influence personal control, but directly influenced suicide risk behaviors. Thus, for Group II, teacher support indirectly reduces suicide risk behaviors through peer group support.

The Effects of Personal Control. Hypotheses 4 and 5 predicted that personal control would have an ameliorating effect on both depression and suicide risk at Time 3. The effects of personal control varied by study group. For instance, for Group I, personal control had a direct and significant ameliorating effect on depression (P = .32, t = -1.86, p < .05), and suicide risk behaviors (B = -.22, t = -2.72, p < .01), supporting the hypotheses. Similarly, for Group II, personal control had a direct ameliorating effect on depression as predicted (B = -.71, t = 1.80, p < .05) and on suicide risk behaviors in the predicted direction, though not statistically significant (B = -.32, t = -1.38, p < .10). For Group III, personal control had no effect on depression (B = -.08, n), and a significant though comparatively weaker ameliorating effect on suicide risk behaviors (B = -.11, t = -2.11, p < .05). In brief, across the three study groups, there was evidence supporting Hypotheses 4 and 5 that personal control directly influenced reductions in suicide-risk.
behaviors and depression. The pattern and strength of effects, however, differed across groups.

**Post Hoc Analysis.** As described earlier, baseline comparisons revealed significant differences among the three study groups for "general" support (Table 2). Follow-up group comparisons using Fisher's LSD, a liberal test, revealed that Group III reported significantly greater general support than did either Group I (mean difference = 2.36, p < .001) or Group II (mean difference = 1.53, p ≤ .03). There were no statistically significant differences between Group I and Group II.

Additional analyses were undertaken to examine for potential confounding effects that might be attributable to group differences in baseline general support. Within each group and in separate equations, suicide risk behavior or depression (controlling for their baseline levels) was regressed onto general support. There were no significant effects of general support on suicide risk behaviors or depression for any of the three groups. PGC peer support was added to the regression equation to elucidate the relative effects of general support versus peer support on suicide risk behaviors and depression, particularly relevant to the findings for Group II (Fig. 2A). The analysis revealed that with peer support and general support both in the equation, the ameliorating effects of peer support (Fig. 2A) on suicide risk behavior did not change. In sum, the post hoc analysis suggests that (1) baseline differences in general support did not appear to confound the study observations; and (2) for Group II in particular, the effects of peer support on suicide risk behaviors was independent of and unaffected by general support.

**DISCUSSION**

The purpose of this study was to explore the intervention mechanisms contributing to the observed positive effects of an indicated, school-based prevention program for high-risk youth (see Eggert, Thompson, et al., 1995). Within the context of the Personal Growth Class (PGC), youth at risk for school failure or dropping out were provided with social support resources and life-skills training for reducing depression, suicide risk behaviors (thoughts, threats, attempts), and drug involvement and for improving school performance (grades, attendance). This study focused on a subset of these high-risk youth—those identified through screening procedures—as also at risk for suicidal behaviors.

Teacher support, a primary intervention component, enhanced peer group support as hypothesized. This observation is consistent with an earlier intervention study (Eggert & Herting, 1991), which revealed a similar effect of teacher support on peer group support. Of particular interest is that, compared to the assessment-only group (Group III), the effect of teacher support on the development of peer group support is stronger for the PGC program participants and strongest for youth who participated in the two-semester PGC program. This suggests two possibilities: First, the magnitude of the teacher effect may be intensified by the quality and specificity of teacher support as provided in PGC. Second, the magnitude of the effect may be increased by the duration or length of exposure to the PGC teacher, as the strongest effects were observed among youth participating in the two-semester program.

The results provide evidence that group leader support is critical for building a positive peer group culture, and particularly important for life-skills training. The findings are consonant with other evidence indicating that the effectiveness of group interventions rests on the skill and experience of the group leader (Eggert, 1985; Schiack & Gilchrist, 1984; Vorrath & Brendtro, 1985). That the effects were strong for PGC teachers in this study is not surprising. The PGC teachers were experienced and trained in the interpersonal skills necessary for working with high-risk youth. They were selected because they liked working with these youth, often disregarded or shunned by other adults.
in the schools. Additionally, teaching PGC requires participation in ongoing, weekly teacher training sessions and videotaped evaluations. In essence, it required skill and strong commitment, both of which were likely to facilitate peer group support processes.

Leader facilitation in building peer group support is likely to be central to peer group success in school-based prevention programs. Yet the effect of group leader behaviors in the delivery of school-based interventions remains understudied. Typically, program fidelity checks are based on simple per-episode of time spent on curriculum or the proportion of the curriculum delivered. Rarely, however, are the leader's competencies in delivering the program assessed. The present results imply a need to systematically measure and evaluate leader behaviors as a routine component of prevention program evaluation, particularly for programs targeting high-risk youth.

Also evident in this study were the ameliorative effects of peer group support for PGC participants. For Group I, peer group support directly increased perceived personal control across time. For Group II, peer group support directly reduced suicide risk behaviors. These effects were unique for PGC intervention groups. That is, among the assessment-only control group, classroom support did not influence personal control, nor did it contribute directly or indirectly to reductions in depression or suicide risk behaviors.

Somewhat puzzling are the differences in the direct effects of peer group on personal control for Group I and on suicide risk behaviors for Group II. One explanation may be, as it has been argued, that social support and personal control may "substitute" for one another as resources or protective factors (Thott, 1995). This premise has had some empirical support (Ross & Mirowsky, 1980), but the question remains why one resource would dominate in one type of intervention group versus the other. One explanation is that self-selection factors could be influencing the observed differences. That is, it could be that youth who chose to participate in the two-semester program did so because of a propensity to seek group support and/or because of reduced personal resources. For example, youth participating in the two-semester program tended to report lower baseline self-esteem (though these differences were not statistically significant). To the extent that self-esteem is linked to the need for social support, the unexpected direct effects of PGC peer group support on suicide risk behaviors may be due to peer support substituting for personal control as a protective factor.

Another explanation is that a more prolonged exposure to peer group support, as in the two-semester PGC intervention (Group II), may promote greater reliance on the peer group. Alternatively, extended peer group support may be required before such direct peer group effects emerge. Typically, youth are reluctant to disclose their suicidal thoughts and behaviors. Thus, prolonged group exposure may be necessary to build the trust necessary to such disclosure. Of course, any or all of these factors could be operative in the current study. Clearly, additional research is needed to disentangle their intriguing relationships.

The intervention model predicts that teacher and peer social support reduces suicidal behaviors and depression indirectly through personal control. There was, however, no evidence that PGC teacher support directly influenced personal control in either of the intervention groups. However, in Group I, but not Group II, PGC peer support did enhance personal control. In addition, several important patterns were observed related to the effects of personal control on depression and suicide risk behaviors. Specifically, personal control directly influenced both depression and suicide risk behaviors. The effects were in the predicted direction, differing in strength by study group. For the two intervention groups, the patterns were sufficiently similar to assume that personal control does have an ameliorating effect on depression. The lack of a direct effect of personal control on depression in
the comparison group, however, is an enigma, as this hypothesis was theoretically derived, independent of the intervention processes. Personal control also reduced suicide risk behaviors for Group I and Group III. For Group II, the magnitude of the effect of personal control on suicide risk behaviors was similar to that of Group I, suggesting that the effect may not have been detected due to insufficient power related to the small sample size.

In general, the results suggest that personal control may have a pivotal, but not unique, role in reducing levels of depression and suicide risk behaviors. This observation is consistent with theoretical statements in both the adult and adolescent literature (Dean, 1986; Ehrenberg et al., 1991; McFarlane et al., 1995; Peterson & Snunkard, 1989; Ross & Mirowsky, 1989; Thoits, 1995), suggesting that personal control is an important resource buffering life stressors and protecting against mental health problems, particularly depression. That the effects of personal control and peer group support also contribute to reductions in suicide risk behaviors among high-risk youth provides important new information for prevention planning.

The results from the current analyses uncovered two important aspects about carryover influences among high-risk youth. First, strong “inheritance” patterns were indicated by the path coefficients between Time 1 and Time 3 depression and Time 1 to Time 3 suicide risk behaviors (see Table 4). Although all youth showed significant declines in depression and suicide risk behaviors continued to have higher levels at follow-up. Second, baseline depression levels were consistent and significant predictors of personal control across time. For all youth, higher levels of depression at Time 1 predicted lower levels of personal control at follow-up. Thus, prevention efforts, particularly skills-training protocols, must incorporate strategies to address the fact that existing depression may counter or suppress attempts to enhance adolescent personal control. Additionally, intervention programs must not only examine for patterns of change in depression and suicide risk behaviors, but also must evaluate for residual levels of depression and suicide risk over time. Because the latter may reflect persistence of risk factors and insufficient protective factors, these youth warrant careful follow-up and may be the most appropriate candidates for extended prevention efforts.

Limitations and Context for Interpretation

The results of this study lend partial support to the hypothesized intervention processes. The study was, nevertheless, exploratory, and thus careful consideration of study limitations is warranted. First, the results are based on a relatively small sample of youth (n = 106), which, for analysis purposes, was partitioned into three groups. Small sample sizes may yield unstable path coefficients, which call for circumspection in their interpretation. Similarly, small sample sizes limit generalizability of the results and preclude testing for important interaction effects involving variables such as ethnicity and gender. The small sample sizes also preclude testing alternative models, including those that specify reciprocal effects between depression and suicide risk behaviors. The results, however, do provide a foundation for further specification and testing of the intervention processes. For example, do alternative intervention outcomes such as enhanced social support resource contribute equally to reductions in suicide risk behaviors or depression? Do patterns of intervention effects differ across ethnic groups? Or, do personal resources such as personal control or self-esteem serve to moderate program outcomes? And, importantly, does enhancing personal control have long-term implications for reductions in depression and suicide risk among high-risk youth?

Second, study attrition rates and self-selection into the two-semester PGC group (Group II) may bias the reported results and limit their generalization. Active recruitment
of youth through personal invitations and systematic, labor-intensive gathering of follow-up data were used to offset study attrition. Compared to many studies involving adolescents in which high-risk youth are typically underrepresented, the data are remarkably complete for this high-risk population. Baseline comparisons provided little evidence of potential attrition biases. As discussed, self-selection of participants into Group II may account for systematic differences observed in the two intervention processes. However, because there is always a voluntary component to participation in intervention studies, results from Group II highlight the importance of understanding motivation to participate and that such motivations may shape intervention processes and outcomes.

Third, the indicators used in this study were brief measures of personal control, depression, and suicide risk behaviors. Thus, they may not be as valid, reliable, or as sensitive to change as more comprehensive measures of these same constructs. Any weaknesses in these measures relative to others could obscure observation of intervention effects.

Conclusions

The study results partially support the intervention model proposed by Eggert and colleagues (Eggert et al., 1990; Eggert & Herting, 1991; Eggert, Thompson, Herting, & Nicholas, 1994) and underscore important aspects regarding preventive interventions. For instance, the PGC teacher's support played a central role in promoting prosocial behaviors and building positive peer group culture and support. Reductions in suicide risk behaviors appear to be influenced by an enhanced sense of personal control and/or by peer group support. Consistent with self-efficacy and social support models, enhanced personal control contributed independently to reductions in both depression and suicide risk.

Overall, the study provided an initial evaluation of program intervention and mediating effects. The results strongly suggest that school-based intervention programs need to be carefully constructed not only in terms of curriculum content, but also with respect to the context within which the curriculum is delivered. The Personal Growth Class group leaders or teachers required ongoing clinical supervision, support, and process evaluation to ensure program fidelity, to enhance facilitation of a supportive peer group, and to prevent teacher "burnout." These implementation efforts are likely to have contributed to the observed positive outcomes, particularly in teacher and peer group support.

When, how, and if suicide prevention programs should be introduced into schools has raised considerable debate. Participants in this study were involved in an indicated prevention program for youth at risk for both dropping out of school and suicidal behaviors. This study illustrated that it is possible to identify youth at risk for suicidal behaviors and to offer an extended, intensive, and comprehensive prevention program integrated within the regular high school curriculum. It was also shown that school personnel could be trained to respond to the needs of high-risk youth, and that they could effectively enhance the development of personal control skills within the context of a supportive peer group. The enhanced personal control and peer support served to decrease depression and suicidal behaviors among the high-risk youth. In sum, the results clearly accentuate the need for systematic studies of indicated prevention approaches to further elucidate the processes fundamental to promoting youth suicide prevention.

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