

Immediate Post Intervention Effects of Two Brief Youth Suicide Prevention Interventions

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This study evaluated the immediate postintervention effects of two brief suicide prevention protocols: a brief interview—Counselors CARE (C-CARE)—and C-CARE plus a 12-session Coping and Support Training (CAST) peer-group intervention. Subjects were students “at risk” of high school dropout and suicide potential in Grades 9–12 from seven high schools ($N = 341$). Students were assigned randomly to C-CARE plus CAST, C-CARE only, or “intervention as usual.” The predicted patterns of change were assessed using trend analyses on data available from three repeated measures. C-CARE and CAST led to increases in personal control, problem-solving coping, and perceived family support. Both C-CARE plus CAST and C-CARE only led to decreases in depression, and to enhanced self-esteem and family goals met. All three groups showed equivalent decreases in suicide risk behaviors, anger control problems, and family distress.

Suicide is a leading cause of death among youths aged 15–19 years (American Association of Suicidology, 1997). Rates of completed youth suicides have increased dramatically over the past 20 years (Brent, 1995); moreover, these rates are considered to be underreported because of a tendency to mask youth suicides as accidents or drug-related fatalities. Among high school students in community samples, the reported frequency

of suicide ideation ranges from 11% to 49%, and the frequency of suicide attempts among this group ranges from 3.6% to 9% (Garrison, Jackson, Addy, McKeown, & Waller, 1991; Resnick et al., 1997).

Certain youths are at higher risk for suicidal behaviors than others (Eggert, Thompson, Randell, & McCauley, 1995). Potential high school dropouts represent a particular at-risk group in that about 40% of these

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youth typically screen in at risk of suicidal behaviors (Eggert, Thompson, Herting, & Nicholas, 1995; Thompson, Moody, & Eggert, 1994). Experiencing difficulties in school poses a significant suicide risk (Gould, Fisher, Parides, Flory, & Shaffer, 1996) in that (a) lower grades are linked with increased attempts, (b) suicides often follow absences from school, and (c) poor academic orientation and negative attitudes toward school are commonly associated with suicide ideation (Garrison et al., 1991; Thompson et al., 1994). Thus potential high school dropouts are youths at increased suicide risk who have a clear need for *indicated preventive* interventions (Silverman & Felner, 1995); as such, they are the focus in this study.

The challenges for prevention scientists and practitioners interested in reducing youth suicide and suicidal behaviors are to (a) identify youths who are disenfranchised from school and at risk of school failure (or other at-risk groups) in their natural environments; (b) screen them to determine suicide risk; (c) provide theoretically based, promising prevention services; and (d) test the efficacy of the interventions for reducing levels of suicide risk behaviors and related risk factors, as well as enhancing protective factors. Accordingly, one mission of the Reconnecting Youth Prevention Research Program has involved designing and testing indicated suicide prevention approaches for high-risk individuals—in particular, youths who are at high risk of school dropout.

Recommended prevention approaches stress the importance of recognizing risk factors; intervening in the broad context of mental health; and targeting individual high-risk youths in indicated prevention programs designed to counteract multiple risk factors and enhance protective factors (Coie et al., 1993; Thompson, Horn, Herting, & Eggert, 1997). Indicated prevention programs are designed to reduce the incidence of a disorder among individuals who already display risk factors or early warning signs associated with the disorder (Institute of Medicine [IOM], 1994). These efforts are of insufficient dose for a clinical population. Thus indicated sui-

cide prevention programs prevent escalation of suicide potential in individuals identified as being at high risk (Eggert, Thompson, Randell, & McCauley, 1995). Unfortunately, such school-based suicide prevention programs are rare; most school-based prevention programs have not been scientifically evaluated (Mazza, 1997).

Our prior studies demonstrated the efficacy of a school-based, semester-long class (Eggert, Nicholas, & Owen, 1995) that integrates social support and skills training elements (Eggert, Thompson, Herting, et al., 1995). In line with prevention science (Eggert, Thompson, Randell, et al., 1995; IOM, 1994), these interventions were designed to reduce posited antecedent risk factors and enhance protective factors related to youth suicide and suicidal behaviors. Remarkably, an individually focused, brief assessment protocol, delivered to youths at suicide risk in both experimental and control groups, worked to decrease suicidal behaviors and related indicators of emotional distress (Eggert, Thompson, Herting, et al., 1995; Thompson, Horn, Herting, & Eggert, 1997). This suggested that this single counseling session was nearly as effective as a semester-long class and potentially a more efficient and cost-effective means by which to reduce suicide risk behaviors.

Accordingly, the purpose of this prevention trial focused on two promising programs for reducing suicide potential among youths at risk of high school dropout. The first was Counselors CARE (C-CARE), a comprehensive, computer-assisted assessment of risk and protective factors that was followed by a brief intervention designed to enhance a youth's personal resources and social network connections. The second was Coping and Support Training (CAST), a brief, peer-group, life skills training program that was added to C-CARE. The central aim was to evaluate the efficacy of these two brief suicide prevention protocols—CAST and C-CARE together versus C-CARE only—for achieving the following outcomes: (a) reducing suicide risk behaviors and the related risk factors of depression and anger; (b) improv-

ing personal resources, namely self-esteem, personal control, and coping skills; and (c) reducing family distress and enhancing family support. It was hypothesized that (a) each preventive intervention would decrease suicide risk (reduce suicidal behaviors, depression, and anger control problems); and (b) C-CARE + CAST would result in more marked and pervasive changes in individual mediators (self-esteem, personal control, and problem-solving coping) and in family-related mediators (family distress, family goals met, and perceived family support). The goal was to test the efficacy of the two approaches and also to compare the effects of varying “doses” of social support and coping skills training in reducing adolescent suicide potential.

BACKGROUND

Several important findings in the literature have relevance to this study. First, we provide evidence of the interrelationship among suicide risk behaviors, depression, and anger—the cluster of coexisting problem behaviors considered here as the dependent variables. Second, we present findings in support of the individual and family factors that are posited as mediators amenable to change. Third, we argue that the individual and small-group interventions should modify these mediators and thereby influence changes in suicide risk behaviors, depression, and anger. Figure 1 illustrates these relationships and includes relevant antecedent risk factors.

Linking Suicide Risk Behaviors, Depression, and Anger Control Problems

No single factor sufficiently explains and predicts suicide risk in adolescents (Brent, 1995; Lewinsohn, Rohde, & Seeley, 1996). There is substantial evidence that suicide risk behaviors, depression, and anger are among the strongest predictors of suicide potential (Garrison, McKeown, Valois, & Vincent, 1993; Gould et al., 1996; Wagner,

Cole, & Schwartzman, 1996). For this reason we identify this cluster of behaviors as the dependent variables. The best predictor of suicide potential is direct suicidal behavior, especially prior attempts (Garrison et al., 1991; Lewinsohn, Rhode, & Seeley, 1994); however, suicide risk behaviors seldom exist in isolation. In community samples of high school students, suicide attempts were consistently associated with depression, anxiety, substance use, and disruptive behavior disorders including anger and aggression (Kashani, Goddard, & Reid, 1989; Wagner et al., 1996).

Depression is likely the most consistent predictor of suicidal behaviors in community samples (Lewinsohn et al., 1994; Wagner et al., 1996). Depressed mood appears to be fundamentally associated with suicide and thus is defined here for this nonclinical population of interest as primarily depressed affect. Depression alone, however, does not predict suicide risk behaviors (Lewinsohn, et al., 1996; Wetzler, et al., 1996).

Anger, anger control problems, and/or aggression are identified as correlates or predictors of suicide risk behaviors (Lehnert, Overholser, & Spirito, 1994; Plutchik, van Praag, & Conte, 1989). When comparing depressed adolescents with and without suicide risk behaviors, the most serious attempters showed elevations on measures of hostility. Nonsuicidal depressed youths could be differentiated from their suicidal peers in that they were less aggressive, less “touchy,” and less anxious (Wetzler et al., 1996). Both aggressiveness and anger have been associated with subsequent suicide attempts (Stein, Apter, Ratzoni, Har-Even, & Avidan, 1998).

Mediating Risk and Protective Factors

Promoting reductions in each of the coexisting problem behaviors (suicide risk behaviors, depression, and anger) calls for considering potential risk and protective factors that may be operating as mediators and are amenable to change. This approach is a response to the call for suicide prevention strategies that seek to modify the processes

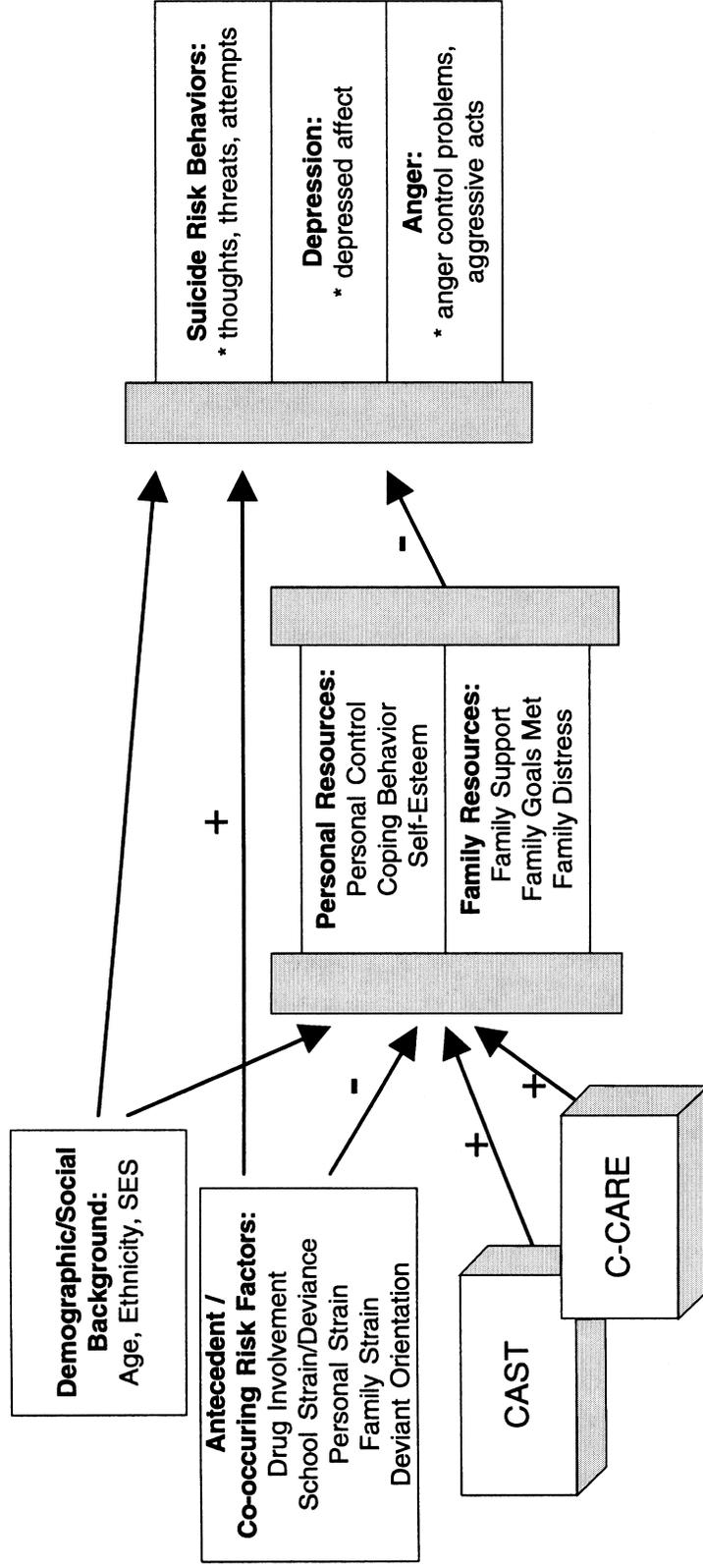


Figure 1. Heuristic model of intervention effects.

that lead to or maintain suicidal actions, thoughts, and tendencies (Silverman & Felner, 1995). Personal factors—self-esteem, personal control, and problem-solving coping—and family risk and protective factors—including family distress (conflicts, fights), family goals met, and perceived family support—are linked with suicide risk behaviors, depression, and anger.

Personal Risk and Protective Factors. Suicide-vulnerable youth seem to lack the personal resources to cope with the demands of their environment. Specifically, they endorse lower levels of self-esteem (Thompson et al., 1994) and report less problem-solving coping and/or a sense of “inadequacy and anxiety toward the future” (De Wilde, Kienhorst, Diekstra, & Wolters, 1993; Lewinsohn et al., 1996). Added evidence points to problem-solving coping skills as a protective factor and suggests that youths at suicide risk utilize fewer positive coping strategies and generally fail to seek help for the problems they face. For example, when compared with nonsuicidal peers, suicidal youths generated fewer cognitively mediated coping strategies (Asarnow, Carlson, & Guthrie, 1987) and were more likely to employ verbally aggressive conflict resolution strategies (Kashani et al., 1989). When reasons for attempting suicide were explored, two of the most frequently endorsed items were, “The situation was so unbearable that I had to do something and I didn’t know what else to do,” and “I wanted to escape for awhile from an impossible situation” (Kienhorst, De Wilde, Diekstra, & Wolters, 1995). In addition, these youths are reluctant to seek help for the problems that trouble them. Relatively low rates of treatment compliance are reported among adolescent suicide attempters (Summerville, Kaslow, & Doepke, 1996; Trautman, Stewart, & Morishima, 1993) arguing for outreach and services tailored to their needs.

Family Risk and Protective Factors Amenable to Change. A number of family factors are associated with adolescent suicide risk behaviors. Those seemingly most amenable to change in brief youth suicide prevention efforts were of greatest interest here; key

among these were family distress, family connectedness—a traditional family goal—and family support.

Parent-child conflict is a common precipitant for suicide and suicidal behaviors (Asarnow et al., 1987; Rotheram-Borus & Trautman, 1988). Brent and associates (1994) suggest that parent-child discord may differentiate those who actually attempt suicide from nonsuicidal psychiatric controls and from youth who merely have suicide ideation. Conversely, meeting family goals related to “connectedness” and receiving support act as protective factors. For example, the degree to which teens were satisfied with their families—that is, the family met the adolescent’s personal standard or family goals—was predictive of low levels of depression (Cumsille & Epstein, 1994; Resnick et al., 1997). In contrast, the lack of perceived parental support is a consistent theme in descriptions of the families of suicide-vulnerable youths (De Wilde, Kienhorst, Diekstra, & Wolters, 1994; Lewinsohn et al., 1994). Gould and colleagues (1996) have suggested that communication in families with suicide-vulnerable youth is less frequent and less satisfying.

Brief Social Network Support and Skills Training Preventive Interventions

The indicated prevention approaches depicted in Figure 1 (C-CARE and CAST) were designed to counteract selected personal and family factors. The evidence presented above provides strong support for the need to enhance personal and family factors among suicide-vulnerable youth.

Social support (Cauce & Srebnik, 1989; Cohen & Syme, 1985) combined with social learning theory (Abramson, Seligman, & Teasdale, 1978; Bandura, 1977) and social influence models (Dorn, 1984) provide the theoretic structure guiding the delivery of the brief counseling and skills training for suicide-vulnerable youths in this study. This social network support/influence approach includes two central elements: (a) expressive support/bonding (caring, belonging, positive

reinforcement) and (b) instrumental support ("aid" via coaching in life skills training). The benefits of social support are widely acknowledged (Sarason, Sarason, & Pierce, 1991); studies of resiliency (Blaney & Ganellen, 1991; Resnick et al., 1997) and social support (Cohen & Syme, 1985; Sarason et al., 1991) indicate that persons with greater personal and social resources fare better than those without, for many health-related problems.

There are also strong theoretical claims in support of the positive effects of brief intervention. Nursing theories of therapeutic use of self (Eggert, 1985), crisis intervention (Hoff, 1984), short-term counseling (Janis, 1983), and motivational interviewing (Miller & Rollnick, 1991) all provide strong rationale for the power of brief therapeutic interactions. It has been established that youths in general (Dubrow, Lovko, & Kausch, 1990) and suicide-vulnerable youths in particular (Trautman et al., 1993; Velez & Cohen, 1988) are hesitant to seek help. Thus brief interventions, which strive to achieve maximum benefit with the lowest investment of time, are well-suited to high-risk groups.

The models to be tested—C-CARE, and C-CARE followed by CAST—integrate the above with prevention approaches that are known to be effective with adolescents (Benard, 1986; Eggert & Kumpfer, 1997) and, specifically, for reducing suicide potential (Clarke, 1990; Eggert, Thompson, Herting, et al., 1995). Thus, we posit that expressive and instrumental social support interventions that (a) assist youths in enhancing self-esteem and personal control, and in acquiring requisite coping skills and simultaneously; (b) create support and understanding from family and important adults at school, are crucial prevention strategies for reducing suicide potential among potential high school drop-outs.

The proposed C-CARE intervention introduces the youth to an alternative perspective on his or her situation, acknowledges distress, reinforces strengths, actively interrupts suicide risk behaviors, and provides both a connection to and mechanisms for accessing sources of help and support

from caring adults at home and school. CAST provides specific skills training in enhancing self-esteem, mood management, drug-use control, and in how to seek support and help from parents and friends.

The goal in prevention is to promote change in the mediating factors, thus to promote change in each of the co-occurring behavioral outcomes. If the hypotheses of this study are borne out, the indicated C-CARE and CAST prevention models could assist in matching the needs of various high-risk youths with cost-effective interventions. By exploring the efficacy of these two brief approaches, this study provides longitudinal data not available elsewhere on potential changes in suicide risk behavior, depression, and anger in this group of high-risk adolescents. Also, because we assess the separate benefit of C-CARE and the added benefit of CAST, our understanding of the value, program feasibility, and acceptability of such comprehensive interventions should advance prevention science.

METHODS

Design and Sample

An experimental three-group, repeated measures design was used to test hypotheses related to this school-based prevention trial. Sampling involved random assignment by school to one of the two experimental conditions and the control condition. Changes in suicidal behaviors, depression, anger, personal protective factors, and family risk and protective factors were compared between groups at three points in time: at baseline (Time 1), at 4 weeks after baseline measurement (Time 2), and at 10 weeks after the baseline assessment (Time 3). Preliminary data for this study were available from 341 students representing the three study conditions:

1. C-CARE ($n = 117$): a 1.5–2-hour assessment interview followed by a brief counseling protocol and the fa-

cilitation of social support from school personnel and a parent (1.5–2 hours)

2. CAST ($n = 103$): C-CARE plus a 12-session, small-group skills-training program
3. Control ($n = 121$): a brief (15–30 minute) assessment interview followed by facilitation of social support at school and home; this was the “intervention as usual” protocol

Youths who participated in the study were in Grades 9–12 in one of seven Pacific Northwest urban high schools. Youths entered the study in cohorts over a three-year period, from 1995 to 1998.

Procedures

An identification process using a verified algorithm, developed and described in prior studies of the Reconnecting Youth Prevention Research Program (Eggert, Thompson, Herting, et al., 1995; Eggert, Thompson, Herting, Nicholas, & Dicker, 1994; Herting, 1990), was used to identify the pool of potential high school dropouts eligible for this study (Table 1). From this population, youths were randomly selected.

Once verbal and written informed consent were obtained from the youths and their parent(s) or legal guardian(s), the students completed the High School Questionnaire: Profile of Experiences (HSQ; Eggert, Herting, & Thompson, 1995). Embedded in the HSQ is the Suicide Risk Screen (SRS) described in Table 2 below. Specific validity studies for the SRS are reported elsewhere

(Eggert, Thompson, & Herting, 1994; Thompson & Eggert, 1999). All youths endorsing specific levels and combinations of these indicators were identified as being “at suicide risk.” Those youths screening in at suicide risk (on the SRS) were randomized to one of the three study conditions.

Study Sample and Retention. A total of 381 (38%) potential high school dropouts were identified as being at suicide risk and were assigned to study conditions. Study retention rates at Time 3 were high for all groups with CAST (97%) > Controls (93%) > C-CARE (89%), $\chi^2_{(2)} = 7.5, p = .02$. The exemplary CAST retention rate is attributable to the continuous contact with CAST youth participating in the small group intervention, and administration of the Time 3 assessment contemporaneously with completion of CAST. Youth in the C-CARE and CONTROL conditions had no contact with research staff between Time 2 and Time 3.

The Intervention Protocols

The content and modalities (individual and small group) used in both the C-CARE and CAST standardized suicide prevention approaches were derived from ethnographic and clinical work (Eggert, 1987, 1988; Eggert & Nicholas, 1992). These strategies are congruent with motivational interviewing (Miller & Rollnick, 1991) and short-term counseling (Janis, 1983). Youths in both the CAST and C-CARE conditions received the C-CARE assessment protocol, which is detailed first.

TABLE 1
Criteria for Identifying Youth at Risk of High School Dropout

Criteria A	Criteria B
Meet <i>all</i> the following criteria: Below expected credits for grade level Top 25th percentile for days absent/semester GPA ≤ 2.3 and/or pattern of slipping grades	Meet <i>one</i> of the following criteria: Prior school dropout status Referred by school staff for high-risk status and meeting one or more “A” criteria

TABLE 2
Case-Finding Model for Identifying Youth at Suicide-Risk

Criteria A	Criteria B	Criteria C
<i>Any</i> of the following: Prior suicide attempts (≥ 2) High suicide ideation (≥ 3)	<i>Two</i> of the following: Moderate suicide ideation (≥ 2) Indirect/direct suicide threats (≥ 2)	<i>Any</i> of the following: Moderate suicide ideation (≥ 2) Indirect/direct suicide threats (≥ 2)
High depression (1 SD > mean)	Prior suicide attempt (≥ 1) Moderate depression ($>2 < 3.4$) Drug involvement (alcohol & other drug use, polydrug use or drug use control problems)	Prior suicide attempts (≥ 1) Moderate depression ($>2 < 3.4$)

Note. Values in parentheses represent cut points for scales ranging from 0 to 6.

The C-CARE Experimental Condition. The C-CARE prevention protocol is an individual, computer-assisted interview that combines the Measurement of Adolescent Potential for Suicide (MAPS) assessment with the C-CARE counseling intervention. These two major elements of the protocol include (a) a 1.5–2-hour personalized, interactive interview (the MAPS) that provides a comprehensive assessment of direct suicide risk factors, related risk factors, and protective factors (Eggert, Thompson, & Herting, 1994; Walsh, Randell, & Eggert, 1997) and (b) a brief motivational counseling intervention designed to provide empathy and support, deliver relevant personal information, reinforce positive coping skills and help-seeking behaviors, and increase access to help and social support. The MAPS component of C-CARE includes a motivational introduction and then an assessment of the youths' stressors, depression, hopelessness, anxiety, suicidal behaviors, risky behaviors, drug involvement, personal resources and coping strategies, and social support resources. It is delivered at the students' school by specially trained, advance practice clinicians. Structurally, the assessment interview is followed by a counseling session and a social network "connection" intervention. During the *counseling session*, the assessment results are summarized with the youths, shared perceptions are validated and discrepancies are clarified, positive coping strategies are reinforced, and an action plan for enhancing support re-

sources is developed. The *social network intervention* follows during which (a) each youth is personally connected with a case manager in the school (counselor, school nurse trained by the research staff) and/or the youth's favorite teacher to foster communication between the youth and school personnel; and (b) a telephone contact/connection with the parent/guardian of the youth's choice is initiated. The intent of the school/parent contacts is to enhance social network connections, support, and future accessibility of help. The C-CARE protocol is completed in 3.5 to 4 hours.

The CAST Experimental Condition. CAST (Eggert & Nicholas, 1996) consists of a small-group skills training and social support model adapted from Reconnecting Youth (Eggert, Nicholas, et al., 1995). Youths in the CAST experimental condition first received the standardized C-CARE intervention. Approximately 3 weeks later, students began the 6-week CAST skills training program. It entails 12, 1-hour sessions over 6 weeks with six to seven students per group. This intervention is conducted twice weekly at the students' high school by specially trained group leaders and is rotated through the school schedule in order to avoid taking students out of the same class repeatedly. The 1st session consists of orientation and data collection; the 12th session includes "graduation" and celebration of successes. The 10 skills training sessions explicitly target three program goals: increasing mood management,

decreasing drug involvement, and increasing school performance. Toward this end, these sessions include (a) group support, (b) monitoring/setting goals, (c) building self-esteem, (d) decision making, (e) anger/depression management-1, (f) anger management-2, (g) "school smarts," (h) drug use control, (i) relapse prevention, and (j) recognizing progress/staying on track. Each session assists the youths in identifying the help and support they need to apply newly acquired skills in achieving program goals. The last three skill sessions, all of which are aimed at sustaining gains following program completion, focus on strategies for gaining support from family and other trusted adults.

The Control Condition. This third intervention was designed to simulate "intervention as usual" by adhering to policies and procedures that a high school might have in place to respond to youths evidencing suicidal behaviors such as serious threats or attempts. In this condition, a trained interviewer conducted a minimal assessment interview for safety and ethical reasons. The assessment interview employed Beck's Suicide Ideation and Intent Scales (Beck, Kovacs, & Weissman, 1979). The interviewer then implemented the school policy related to suicide risk using a brief standardized "social connections" procedure. Notification of parents and designated school personnel, usually the school counselor and an administrator, was initiated. Immediate assistance was provided in those rare instances when the risk of suicide was imminent. In non-emergency situations, school personnel and parents/guardians identified appropriate resources and obtained assistance as warranted.

Intervention Fidelity. The C-CARE intervention was assessed for fidelity of implementation by videotaping each assessment interview and the summary intervention with the youths. In addition, the interviewers rated the responses of each youth being interviewed; these were subjected to interrater reliability assessments by all interviewers and the C-CARE program coordinator. Over time and across eight different C-CARE interviewers, interrater reliability was maintained at 90% or above. In weekly supervi-

sion sessions, these videotapes also were assessed for the interviewer's consistency in implementing the assessment interview and intervention as designed.

The CAST small-group, skills-training program is a standardized protocol published in a leader's guide. Each of the 12 sessions has specific concepts, objectives, skills to be learned, and a small-group implementation plan that specifies the expected motivational preparation and coaching in skills-training activities to be delivered by the CAST leader.

Process evaluation included videotaping all sessions in order to measure and code the exposure to specific training content in each session; to assess the group leader's expressive and instrumental support; and to code the leader's skills training competencies in motivational preparation, skills acquisition activities, and skills application/practice coaching. Each group leader coded his or her videotape after each session and rated each student's demonstration of skills acquired. These were randomly reviewed by the principal investigator to evaluate interrater reliability and to monitor and evaluate the fidelity of the CAST program implementation. Group leaders also met for 2 to 3 hours weekly during the course of the CAST group implementation for a review of the videotapes and a group consultation with the principal investigator.

Each control condition assessment was also videotaped. After training and once competency was established, random reviews by the program supervisor of the videotaped sessions were conducted to monitor and evaluate the fidelity of implementation.

Repeated measures ANOVA (analysis of variance) tests, controlling for intervention group and baseline values of outcome variables detected no significant school, leader, or interviewer effects on any outcome measure.

Measurement

Key study variables were measured at four time points. Time 1 refers to baseline preintervention measurement; Time 2 refers to measures at 4 weeks (post-C-CARE inter-

vention or control “intervention as usual” protocol); and Time 3 refers to assessments at ten weeks, and coincides with CAST skills training completion and a C-CARE and control “booster.” Time 4 measures served as follow-up assessments at 9 months from baseline. Data for this study were available for Times 1, 2, and 3 only, as Time 4 measures for the final cohorts of youths were still being collected.

The HSQ (Eggert et al., 1995) was used at all measurement time points. It measures a broad range of risk and protective factors, including measures of the central constructs of interest in this study. Table 3 provides a summary description of the key measures; Cronbach’s alpha coefficients reported here revealed acceptable internal consistency across all measures. All items were measured using 7-point, Likert-type responses (0 = never to 6 = always/many times). All mean scale scores (total score/number of items in scale) ranged from 0 to 6 and maintained the original metric of the items.

Analysis

The pattern of predicted changes over time was assessed using trend analysis (Francis, Fletcher, Stuebing, Davidson, & Thompson, 1992; Stevens, 1996), which compares differences in the trajectories of change across time. A linear trend implies that change is proportional and that the relationship is consistently increasing or decreasing; whereas, a quadratic trend implies a U-shaped (or inverted U-shaped) curve, indicating a decline followed by improvement (or the reverse). A flat line indicates no change, whereas a significant Group \times Trend interaction effect indicates that changes in at least one of the three groups differ significantly from changes in the other two.

We hypothesized that CAST would have stronger effects than C-CARE for reducing suicide risk behaviors and the related risk factors of depression and anger. The “intervention as usual” control group was expected to show some decreases in suicide risk behaviors and related risk factors, albeit sig-

nificantly weaker than CAST and C-CARE. The personal protective factors—manifest in measures of self-esteem, personal control, and problem-solving coping—were predicted to mediate the C-CARE and CAST intervention effects and thus were also examined. Of interest here were the intervention effects on family risk and protective factors—measured as family distress, family goals met, and perceived family support.

The first empirical question addressed was whether any observed intervention effects for C-CARE would be evident at Time 2 and sustained at Time 3. Thus at Time 2 we expected that the trends for CAST and C-CARE would be similar and significantly greater than in the control group. A second question was whether added intervention effects due to CAST would be observed at Time 3—that is, that CAST would show greater improvements and/or declines in the variables of interest than would C-CARE and control. Hence we tested for significant linear trends across the three time points and explored quadratic trends that would reveal the anticipated changes across time.

RESULTS

Sample Characteristics

Participating youths were between 14 and 19 years of age and in Grades 9–12 (9th grade, 24%; 10th grade, 39%; 11th grade, 20%; and 12th grade, 17%). Ethnic/racial representation was 40% White, 13% mixed ethnicity, 12% African American, 13% Asian/Pacific Islander, 7% Hispanic/Latino, 2% American Indian/Alaska Native, 4% other, and 9% unknown. There was an even distribution of males and females and ethnic minorities in each of the three study conditions: 41–52% were male, and 53–58% were ethnic minorities.

At baseline, these youths evidenced a constellation of risk factors (e.g., family strain, school strain, poor school perfor-

TABLE 3
Key Measures and Internal Consistency

Dimension/Scales	Descriptors of Content Measured in the Scale	Item Number ^a	α
Suicide risk and related risk factors			
Suicide risk behaviors (Eggert et al., 1995)	Suicide thoughts in general and due to drug use, direct verbal and indirect (nonverbal) threats, frequency of prior attempts	7	.86
Depression (Radloff, 1977)	Depressed affect—feelings of loneliness, depression, sadness, that no one really cares, and can't shake off the blues	6	.76
Anger control problems (Eggert et al., 1995)	When really mad feel out of control, get easily angered, hit something or someone, shout and yell at others	4	.66
Personal protective factors			
Self-esteem (Rosenberg, 1965)	Have good qualities, feel useful, have respect for self, take a positive attitude toward self	4	.68
Personal control (Eggert et al., 1995)	Confidence in handling problems, ability to make good things happen, can learn to adjust/cope with problems, feel capable and in control, confident will feeling better eventually	5	.77
Problem-solving coping (Eggert et al., 1995)	Face problems head on until settled, imagine self solving the problem then handling it for real, think about options, choose the best and take action	3	.76
Family factors			
Family distress (Eggert et al., 1995)	Serious conflicts and tensions with parents, things so bad at home that youth thought about running away, parents disapprove of youth's friends, parental AOD use a problem in home	3	.53
Family goals met (Elliot et al., 1985)	Degree to which specific goals are met at home: having fair rules, doing things together, parents who recognize things teen does well, and parents that youth can talk to about most things	4	.83
Family support (Smilkstein, Ashworth, & Montano, 1982)	Satisfaction with close, comfortable family ties, open communication and sharing of problems, time spent together, acceptance and support from family, can turn to family for help	5	.86

^aAll mean scale scores (total score/number of items) ranged from 0 to 6.

mance, and emotional distress) and relatively low levels of protective factors (personal and social support resources). Death of one or both parents was experienced by close to 12% of these youths, 48% experienced parental divorce, and 57% reported having one or more school moves during their middle and high school years. The majority lived in

a variety of alternative family situations including single-parent homes (30%) and reconstituted families (23%) rather than living with both biological parents (36%). The remaining youths lived alone, with relatives, or with friends. Among the total sample, 25% reported some likelihood of dropping out of high school during the present or next school

semester. With the exception of age, there were no significant differences among the three groups in terms of background variables. CAST subjects tended to be slightly older, $F_{2,338} = 3.29, p = .04$. One-way ANOVA tests detected no significant differences in the suicide risk and related risk, protective, and family factor profiles of youths in each of the three study conditions at baseline.

Overall, these data illustrate that youths in the study (who screened in at risk of both school dropout and suicidal behaviors) evidenced a constellation of risk factors—emotional distress, family strain, school strain, poor school performance—and relatively low levels of protective factors in dimensions of personal and social resources. This confirms that the youths identified for the study were in need of the prevention efforts being tested. That is, they did not represent a clinical sample but evidenced behaviors that differentiated them from their “typical” peers thus demonstrating the need for indicated prevention efforts suited to high-risk individuals who have begun to show signs of problem behaviors.

Comparisons of Study Noncompleters

In spite of retention rates averaging over 90% across the three groups, we examined the potential effects of attrition. Preliminary comparisons were made among youths from all three groups who did not complete all three questionnaires. With the exception of family goals met, there were no significant differences: Study noncompleters were similar in demographic characteristics, suicide risk and related risk, personal protective, and family factors. CAST non-completers reported *higher* levels of family goals met than did C-CARE or control noncompleters. Thus differential attrition is not a threat to the study’s internal validity.

Within-group comparisons of study noncompleters to completers in the CAST group revealed no significant differences for any of the outcome measures under study. Thus study attrition did not influence the results for the CAST intervention. However,

in the C-CARE and control groups, non-completers had slightly lower, but significant, initial levels of the outcome measures. Therefore the results of this study should not be generalized beyond the suicide-risk youths represented in this study.

Trend Analysis Results

Results from the trend analyses, based on baseline, 4-week, and 10-week follow-up assessments, included subjects with data from each time point; those youths who dropped out of the study were excluded. Youths were retained in the analysis, however, if they provided data at each of the follow-up assessments, even though they did not complete all aspects of the C-CARE, CAST or control conditions due to family moves, school dropout, or lack of motivation (Table 4).

Effects on Suicide Risk Behaviors, Depression, and Anger. Youths in all three groups showed a significant decreasing trend over time in suicide risk behaviors (thoughts, threats, and attempts), $F_{Linear(1, 338)} = 62.58, p < .001$. The predicted differences between the experimental and control conditions did not occur. Rather, on average, youths in each condition improved, evidencing significant reductions in suicide risk behaviors. Moreover, the pattern of changes depicted in Figure 2 reveals that the reductions in suicide risk behaviors occurred between Time 1 and Time 2, and were sustained at Time 3 for youths in the C-CARE and control conditions. This suggests that the effects were primarily the result of the C-CARE and control individually focused interventions and that the added CAST skills training had little effect. When examined separately, the trends for suicide ideation mirrored those for suicide risk behaviors.

Regarding the predicted reductions in levels of depression, significant intervention effects did occur in the linear trends by group over time, $F_{Linear(2, 338)} = 4.66, p < .01$. Changes over time for CAST and C-CARE youths suggest that reductions in depression were primarily the effect of the C-CARE intervention and that the CAST skills training had

TABLE 4
Trend Analyses for Immediate Effects on Suicide and Related Risk Factors, Personal and Family Protective Factors, F Ratios for Trend Main Effects and Group by Trend Interaction Effects

	Time Main Effects			Group × Time Interaction Effects		
	Linear	Quadratic	df	Linear	Quadratic	df
Suicide risk and related factors						
Suicide risk behaviors	62.58***	42.68***	1, 338	1.14	1.46	2, 338
Depression	142.82***	73.52***	1, 338	4.66**	.25	2, 338
Anger control problems	105.77***	4.60*	1, 338	.63	1.35	2, 338
Personal protective factors						
Self-esteem	55.38***	36.80***	1, 338	7.57***	.46	2, 338
Personal control	19.29***	24.94***	1, 338	3.97*	1.22	2, 338
Problem-solving coping	3.29	.09	1, 329	7.60***	.55	2, 329
Family protective factors						
Family distress	101.44***	14.44***	1, 336	.35	.38	2, 336
Family goals met ^a	5.41*		1, 333	5.94**		2, 333
Perceived family support	7.57**	8.41**	1, 337	3.34*	.77	2, 337

^aData collected only at two time points, at Time 1 and Time 3.
 * $p < .05$. ** $p < .01$. *** $p < .001$.

little added effect. The graphic display of trends for depression shown in Figure 2 also suggests that the significant difference between groups was due to the slight rebound effect for the control group at Time 3.

The observed pattern of change for anger control problems also did not vary by study condition; the main effect of time, $F_{Linear(1, 338)} = 105.77$, $p < .001$, revealed a significant decline for all three groups. As shown in Figure 2, however, there was a steady decline from Time 1 through Time 3, indicating a consistent decline in anger control problems for all youths.

Effects on personal protective factors. The hypothesized intervention effects occurred for the indicators of self-efficacy; significant linear trend differences by group occurred for increases in self-esteem $F_{Linear(2, 338)} = 7.57$, $p < .001$, personal control $F_{Linear(2, 338)} = 3.97$, $p = .02$, and problem-solving coping $F_{Linear(2, 329)} = 7.60$, $p < .001$. An examination of these trends in Figure 3 reveals more specific effects. First, the pattern of changes over time in self-esteem reveals that youths in both CAST and C-CARE demonstrated equal increases between Time 1 and Time 2, which

were sustained for the C-CARE youth and continued to increase for CAST youth at Time 3. In contrast, control youth showed slight increases in self-esteem at Time 2 with a relapse at Time 3. This suggests that differences in the patterns of change were primarily the result of both C-CARE and CAST being significantly more effective than the control condition for enhancing self-esteem. The added CAST skills training between Time 2 and Time 3 resulted in a small improvement over the gains provided by the C-CARE intervention.

Second, when the trends for personal control are examined, results favor the CAST intervention; as displayed in Figure 3, both C-CARE and CAST show increases in personal control, whereas the control youths evidence only a slight change. Further, increases in personal control at Time 2 reveal the same pattern of increases for youth in both CAST and C-CARE; however, at Time 3, increased personal control is sustained for CAST youths while rebounding somewhat for C-CARE youths, which suggests the added effect of the CAST skills-training program.

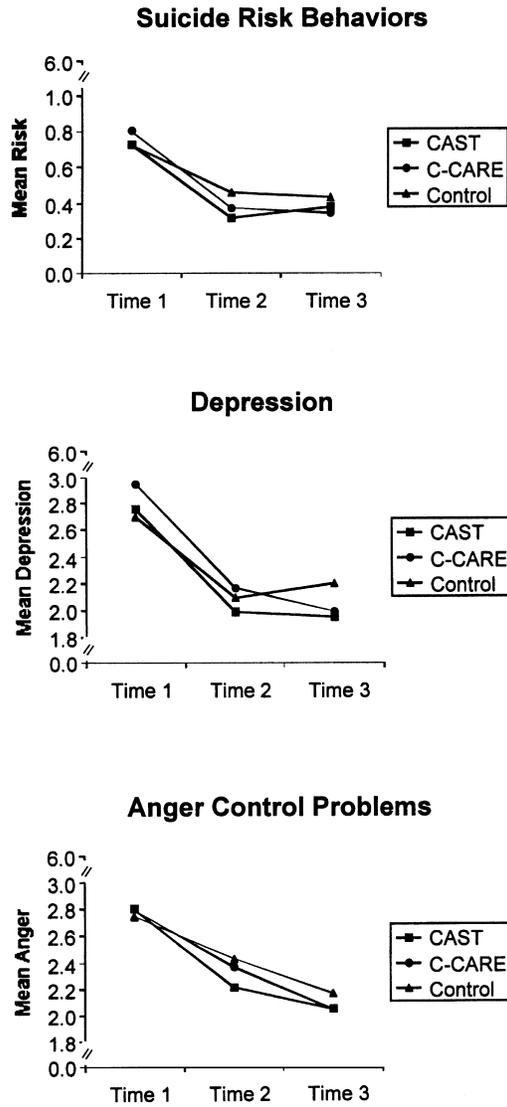


Figure 2. Trend comparisons for suicide risk and related risk factors.
 Note. Outcome variables measured with a 7-point frequency scale: 0 = never, 6 = many times/always. Time 1 = preintervention, Time 2 = 4 weeks post-C-CARE intervention, Time 3 = 10 weeks post-CAST intervention.

Third, the intervention effects for problem-solving coping revealed in Figure 3 support the hypothesis that the effects of CAST > C-CARE > BECK. Marked increases in coping are evident at Time 3 for the CAST group only. In contrast, those youths receiving C-CARE showed only

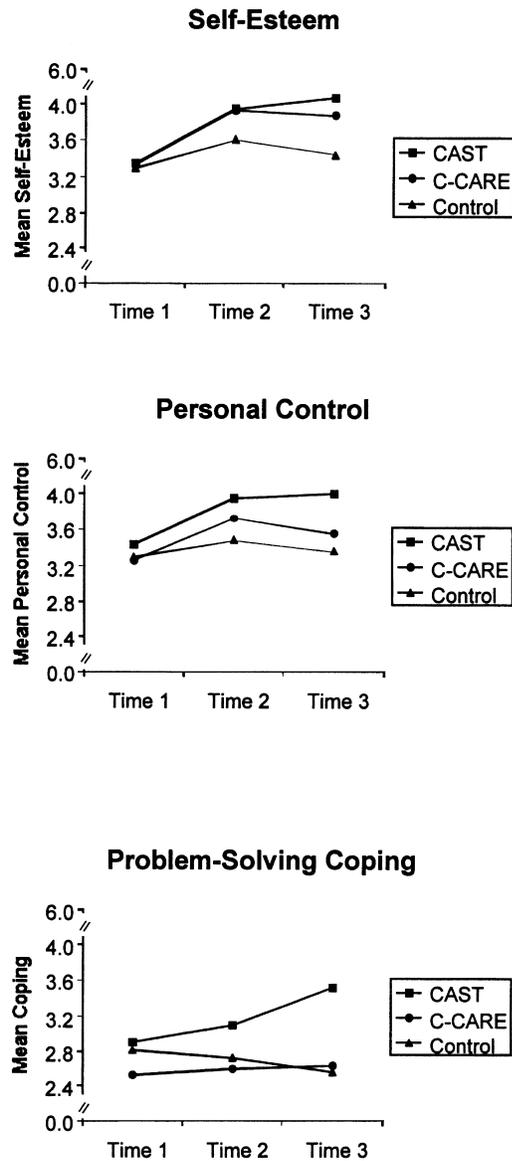


Figure 3. Trend comparisons for personal protective factors.
 Note. Outcome variables measured with a 7-point frequency scale: 0 = never, 6 = many times/always. Time 1 = preintervention, Time 2 = 4 weeks post-C-CARE intervention, Time 3 = 10 weeks post-CAST intervention.

slight increases over time, whereas the youths in the control condition showed actual declines.

Effects on Family Factors. Of special interest were the effects of the experimental

youth-focused preventive interventions on family risk and protective factors because all three study conditions involved relatively brief telephone contacts with the youths' parents. The CAST intervention, however, included specific skills training in seeking support from family and friends. Different patterns of change occurred over time with respect to family distress, family goals met, and family support. Each is detailed below.

First, all three study groups evidenced significant decreases in family distress between Time 1 and Time 2 that were sustained at Time 3, $F_{Linear(1, 336)} = 101.44, p < .001$. These positive effects (see Figure 4) can be attributed to the C-CARE and control assessment/interventions that included a parental phone call to facilitate parental support for the youths.

Second, with respect to youths' ability to meet conventional family goals, such as having parents they can talk to about almost anything, doing things together, and so on, there was a significant Time \times Group effect, $F_{Linear(2, 333)} = 5.94, p < .01$. Both CAST and C-CARE youths evidenced significant increases, whereas the control youths displayed declines between Time 1 and Time 3. These positive effects can be attributed to the greater feedback provided to parents as a result of the C-CARE assessment/intervention than that afforded by the brief control assessment.

Third, the hypothesized intervention effects were evidenced with respect to changes in perceived family support: significant linear trend differences by group occurred over the three points in time, $F_{Linear(2, 337)} = 3.34, p < .05$. An examination of these trends (Figure 4) reveals that youth in all three study groups showed increases between Time 1 and Time 2. By Time 3, however, family support drops below the baseline rate for the controls, drops slightly for the C-CARE youths, and continues to increase for CAST youths at Time 3. This suggests that the trend differences can be attributed to the added CAST intervention between Time 2 and Time 3 (see Figure 4).

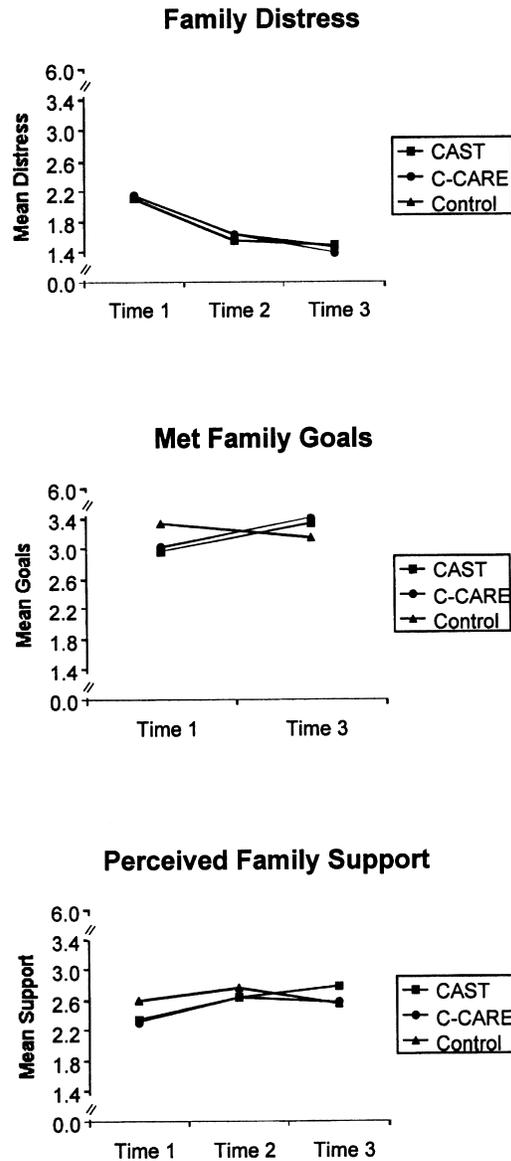


Figure 4. Trend comparisons for family factors.
 Note. Outcome variables measured with a 7-point frequency scale: 0 = never, 6 = many times/always. Time 1 = preintervention, Time 2 = 4 weeks post-C-CARE intervention, Time 3 = 10 weeks post-CAST intervention.

Comparison to Typical Sample

As a normative comparison, these high-risk youths' mean levels of suicide risk and related risk, personal protective, and

family factors, at both Time 1 and Time 3, were compared with those from a sample of typical youths ($N = 407$) studied in an earlier Reconnecting Youth project (Eggert, Thompson, Herting, & Nicholas, 1995). To facilitate this comparison, the raw means were transformed into effect sizes. As shown in Table 5, effect sizes (Cohen's d) for these comparisons ranged from .33 to .96 at Time 1, indicating moderate to large differences between the high-risk and typical samples on all outcome measures (Cohen, 1988). Although these participating youths do not represent a clinical population, these differences demonstrate that they do represent a sample of youth in need of indicated prevention—youths at high risk based on demonstrated evidence of problem behaviors. At Time 3, these differences were reduced in all instances. That is, over the course of the intervention, suicide risk and related risk factors (including family distress) were reduced, and protective and family factors were increased for high-risk youths vis-à-vis typical youths. These changes were reflected in effect sizes that ranged from .01 to .67.

TABLE 5
Effect Sizes for Comparisons of High-Risk Youths vs. Typical Youths

Variable	Time 1 <i>d</i>	Time 3 <i>d</i>
Suicide risk and related risk factors		
Suicide risk behaviors	.84	.43
Depression	.96	.32
Anger control problems	.52	.01
Personal protective factors		
Self-esteem	.52	.15
Personal control	.69	.45
Problem-solving coping	.33	.22
Family factors		
Family distress	.71	.16
Family goals met	.87	.67
Family support	.74	.59

DISCUSSION, CONCLUSIONS, AND IMPLICATIONS

This study provides preliminary evidence of the efficacy of two school-based, indicated, suicide prevention interventions for suicide-vulnerable youth. Youths in the study who screened in at risk of both school dropout and suicide evidenced suicidal behaviors, emotional distress, school strain, and problems with self-efficacy; that is, they could be identified as individuals at high risk. This supports the validity of our case-finding methods and demonstrates that youths in the study were in need of indicated suicide prevention efforts.

The trends in reduced suicide risk behaviors indicate significant changes over time for suicide-vulnerable youths, suggesting that all three interventions were effective. Common to each intervention are a risk assessment, brief crisis intervention, and enhanced connections with caring adults. The superiority of both the CAST and C-CARE interventions versus the control condition was evident in reductions in depression. Compared with the C-CARE and control interventions, the positive effects in improved self-efficacy—personal control and problem-solving coping—appear specific to the skills training component of the CAST intervention. The greater efficacy of CAST was especially evident in enhancing perceived family support. Youths in both the C-CARE and CAST study conditions evidenced improvements in both their self-esteem and ability to meet conventional family goals.

Students in all three groups evidenced significant declines in direct suicide risk behaviors over time. The same pattern was observed for anger control problems and the mediating factor of family distress. Importantly, at Time 3, when compared with typical youths, high-risk youths reported similar levels of anger control problems and family distress. The difference between high-risk and typical youths on suicide risk behaviors, though reduced, remained in the moderate range (as expressed in effect size). A brief assessment of suicide-vulnerable youth, which

is followed by a “social connection” to school personnel and a parent, appears to be an effective preventive intervention. Significant reductions in two sets of co-occurring risk factors (direct suicide risk behaviors and anger/aggression) commonly observed to be the best predictors of suicide potential (Garrison et al., 1993; Plutchik et al., 1989; Stein et al., 1998) were achieved. In addition, the added benefit of reducing youths’ perception of family distress, a risk factor commonly associated with suicide risk (Asarnow et al., 1987; Brent et al., 1994), was accomplished. Talking to youths at risk of suicide about their suicidal thoughts or behaviors, and opening that discussion to caring adults in the youths’ social network appears to significantly reduce critical risk factors.

C-CARE, alone and in combination with CAST, had the added advantage over the control condition of sustaining reductions in depression, enhancing self-esteem, and increasing perceptions of family goals met. At baseline, high-risk youths were quite different from typical peers on both depression and family goals met. At Time 3, this difference was markedly reduced for depression and self-esteem, the difference in family goals met remained apparent. The differences appear attributable to the C-CARE intervention as few additional declines or gains on these outcomes are achieved by participation in CAST. C-CARE when compared with the control assessment (a) increases the breadth and depth of the assessment, (b) adds a motivational counseling component, and (c) enhances the “social connection.” C-CARE, unlike the CONTROL assessment, provides youths with an assessment of their depression, assists them in identifying reasons for their depressed mood, and helps them to link their mood to suicide thoughts and behaviors. Additionally, the data gained from the comprehensive C-CARE interview, as compared with the brief control assessment, made possible a much richer dialogue during the parent telephone contact. The increased effectiveness of C-CARE relative to depressed mood, self-esteem, and family goals met can likely be attributed to these

differences. Thus C-CARE—a brief intervention that combines assessment with motivational counseling—was effective in (a) sustaining reductions in depressed mood, one of the strongest predictors of suicide potential (Lewinsohn et al., 1994; Wagner et al., 1996); (b) enhancing self-esteem, a personal resource believed to decrease vulnerability to suicide risk (De Wilde et al., 1993; Thompson et al., 1994); and (c) increasing perceptions of family goals met, a protective factor associated with decreased vulnerability to suicide (Cumsille & Epstein, 1994; Resnick et al., 1997).

Students participating in CAST, the small-group skills training experience, demonstrated sustained gains in self-efficacy (personal control and problem-solving coping) and perceived family support not realized by either C-CARE or the CONTROL condition participants. Dramatically, CAST participants demonstrate increases, both initially and over time, in problem-solving coping that are not observed in either of the other groups. Despite these gains, effect size estimates indicated that, overall, the high-risk youths in this study who reported lower levels of personal control than typical youths continued to evidence lower levels of this protective factor. This tendency was also apparent for selected familial factors; although making gains, the high-risk youths continue to lack the support and failed to meet the family goals attained by their typical peers. CAST, the 12-session, small-group, support and skills-training intervention, is more effective than either C-CARE or the control condition in impacting those personal protective factors (self-esteem, personal control, and problem-solving coping) associated with decreased vulnerability to suicide (Lewinsohn et al., 1994; Thompson et al., 1994). In each session youths identify specific problem behaviors, set goals relative to improving performance, and practice skills designed to increase personal competence. Repeated practice in applying this process to the program goals of increased mood management and school performance and decreased drug involvement appear to account for the im-

provement in personal protective factors. In addition, CAST appears to account for all sustained gains in family support, a factor also linked to protection from suicide risk (Asarnow et al., 1987; Lewinsohn et al., 1994). These gains are likely attributable to the focus through out the skills-training on identification of support needed to meet program goals and how to ask for that support from caring adults, specifically parents. These results then argue strongly for the inclusion of support and skills-training elements in youth suicide prevention efforts.

It is important to note that the data reported here were obtained using repeated measures. Two versions of the HSQ were used. At baseline (Time 1) and at 10 weeks (Time 3) the long version of the HSQ was administered, while the short version was used at 4 weeks (Time 2). All of the measures used in this paper were identical at all three time points. This variation in measurement was employed to reduce the effects attributable to repeated measurement. Other sources of data are available for levels of risk for students who participated in both the C-CARE and the CAST interventions (e.g., interviewer ratings, teacher observations) however, these data are not available on the controls. In future studies, it will be important to include comparable measures for the control condition. The validity of the SRS has been validated using the Reynolds suicide Ideation Questionnaire–JR (Reynolds, 1988) and is reported elsewhere (Eggert, Thompson, & Herting, 1994; Thompson & Eggert, 1999). Efforts were made to collect data on student visits to the school counselor over the course of the study. With frequent reminders, contact logs remained relatively unused despite anecdotal reports that counselors did see participating students. In future research it will be important to refine these strategies to ensure the reliability and validity of the counselor reports.

This study is limited to tests of the immediate effects of the C-CARE and CAST interventions. A reanalysis of the trends that includes follow-up assessments at 9 months after the baseline assessment is needed to

confirm these preliminary findings and to determine whether or not the effects of the CAST and C-CARE prevention efforts will be significantly better than those of the control condition. Another limitation is that the study does not address the question of what predicts the successful outcomes nor the question “for whom these brief interventions work best” (e.g., across gender and ethnicity or by degree of severity of suicide risk behaviors). These questions warrant exploration using an increased sample size. Also, the contact with parents in each of the interventions was brief and by telephone. An interesting question to address is whether the effects achieved could be strengthened by adding a parent intervention to C-CARE as well as a parent skills-training component to CAST. Adding a parent intervention to accompany C-CARE would be especially appealing. Enhancing parental support, communication, and the capacity to teach specific coping skills could help teens to develop a greater sense of personal control and problem-solving coping, two areas where the CAST intervention group was superior to the group receiving C-CARE only.

Despite the limitations, the findings provide preliminary support for the efficacy of these two brief interventions for reducing suicide risk and emotional distress, enhancing self-efficacy, and strengthening family factors among suicide-vulnerable youth. The results described here reflect the promise inherent in brief, school-based, preventive interventions for potential school dropouts who are at risk of suicide. The implications of these findings for school-based prevention efforts are noteworthy. Both the standardized C-CARE only and C-CARE plus CAST interventions are brief and designed to be administered within a school setting. Perhaps more important, they are consistent with the role of schools in suicide prevention, that is, identification, support and response, and education (Kalafat & Elias, 1995). This is especially critical given the low rates of treatment compliance among this group (Summerville et al., 1996; Trautman et al., 1993). Portable, brief interventions that can be taken where

youths congregate and that demand limited time commitments are ideally suited to suicide-vulnerable youths. The fact that the single-session C-CARE intervention was almost as effective as the 12-session CAST intervention (with the exception of enhancing personal control, problem-solving coping, and perceived family support) is especially important. If the present findings are replicated at follow-up and with a larger sample, these two brief interventions show considerable promise in abating youth suicidal behaviors.

The standardized content and structure of C-CARE, the computer-assisted assessment and brief motivational counseling session, makes this intervention a potentially cost-effective and transportable approach

that can be delivered in schools or other health promotional settings to reduce suicide potential among high-risk youths. Similarly, the brief standardized 12-session CAST skills-training program holds promise for decreasing suicide risk as well as enhancing self-efficacy and perceived family support among suicide-vulnerable youths in these same settings. These findings are critically important as we seek to identify efficacious, school-based, preventive activities for this high-risk population. The effects of C-CARE only and C-CARE plus CAST for reducing suicide potential illustrate the benefits of these brief interventions for suicide-vulnerable youths while simultaneously advancing the field of prevention science.

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