

Prevention of Depressive Symptoms in Adolescents: A Randomized Trial of Cognitive–Behavioral and Interpersonal Prevention Programs

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This study evaluated the efficacy of 2 programs for preventing depressive symptoms in adolescents. Participants were 380 high school students randomly assigned to a cognitive–behavioral program (CB), an interpersonal psychotherapy–adolescent skills training program (IPT–AST), or a no-intervention control. The interventions involved eight 90-min weekly sessions run in small groups during wellness classes. At postintervention, students in both the CB and IPT–AST groups reported significantly lower levels of depressive symptoms than did those in the no-intervention group, controlling for baseline depression scores; the 2 intervention groups did not differ significantly from each other. The effect sizes, using Cohen's *d*, for the CB intervention and the IPT–AST intervention were 0.37 and 0.26, respectively. Differences between control and intervention groups were largest for adolescents with high levels of depressive symptoms at baseline. For a high-risk subgroup, defined as having scored in the top 25th percentile on the baseline depression measure, the effect sizes for the CB and the IPT–AST interventions were 0.89 and 0.84, respectively. For the whole sample, sociotropy and achievement orientation moderated the effect of the interventions. Intervention effects were short term and were not maintained at 6-month follow-up.

Keywords: depression, prevention, adolescents

Depression is a common disorder with increasing rates from childhood to adolescence. Adolescent depression has an estimated point prevalence between 3% and 8% (Fleming & Offord, 1990; Kovacs, 1996; Lewinsohn, Clarke, Seeley, & Rohde, 1994) and a chronic, recurrent, episodic course marked by considerable impairment, accounting for a substantial proportion of the health care costs incurred by this age group (Birmaher et al., 1996). Depression in adolescence is associated with such negative outcomes as substance abuse, academic problems, cigarette smoking, high-risk sexual behavior, physical health problems, impaired social relationships, and a 30-fold increased risk of suicide (Birmaher et al., 1996; Brent et al., 1993; Rohde, Lewinsohn, & Seeley, 1994).

Depressive symptoms, even at the subthreshold level, also are a substantial concern in youth, as they have been found to be associated with a range of problems, including drug and alcohol use, academic failure, school dropout, and teen pregnancy (Gillham, Shatté, & Freres, 2000). Moreover, moderate levels of depression have been found to persist for years in some children (Twenge & Nolen-Hoeksema, 2002), and subclinical levels of depressive symptoms constitute one of the most significant risk factors for the subsequent onset of depressive disorders (Clarke et al., 1995; Pine, Cohen, Cohen, & Brook, 1999). Thus, prevention of depressive symptoms, even at a subclinical level, is a worthwhile goal with important clinical implications. The primary pur-

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pose of the present study was to compare the efficacy of two different prevention programs to each other and to a no-intervention control condition.

The past decade has seen a growing emphasis on depression prevention. In general, depression prevention programs have produced small to moderate effects (Horowitz & Garber, 2006). An Institute of Medicine Report (Mrazek & Haggerty, 1994) classified prevention programs into three categories on the basis of the populations to whom the interventions are directed. *Universal* preventive interventions are administered to all members of a particular population. *Selective* prevention programs are provided to a subsample whose risk is deemed to be above average. *Indicated* preventive interventions are given to individuals who manifest subclinical signs or symptoms of a given disorder.

Each of these prevention approaches has both advantages and disadvantages. Programs for selective and indicated (targeted) samples have the benefit of reaching those youth most in need. In addition, when delivered in a group format, children selected for certain risk factors (e.g., parental depression) are likely to find peers with whom they can relate and draw support. Moreover, the program can be tailored to the particular risk factors shared by group members. A limitation of targeted programs, however, is that the screening procedures required to identify eligible participants add time and expense to the initial recruitment process.

In contrast, universal programs can reach large numbers of youth without a time-consuming selection process, particularly those children who may be at risk but who are not identified through screening. Universal programs also avoid the potential stigma of identifying children as being "at risk." For this reason, school administrators often prefer programs that can be delivered as part of a regular class curriculum. There are also data analytical advantages to using universal samples, which typically contain within them children who are at increased risk (e.g., have sub-threshold levels of symptoms). Separate analyses can be done examining the effects of the intervention for this important subgroup of participants (e.g., Spence, Sheffield, & Donovan, 2003). A drawback of universal prevention programs, however, is that they typically require large sample sizes to show an effect (Cuijpers, 2003) and therefore generally have produced nonsignificant results or smaller effect sizes than targeted programs (Horowitz & Garber, 2006; Merry, McDowell, Hetrick, Bir, & Muller, 2006). In addition, there has been little evidence of long-term preventive effects for universal interventions.

Most effective depression prevention programs implemented to date have been cognitive-behavioral (e.g., Clarke et al., 2001; Gillham, Reivich, Jaycox, & Seligman, 1995; Pössel, Horn, Hautzinger, & Groen, 2004; Spence et al., 2003). These programs teach cognitive strategies such as identifying and challenging automatic negative thoughts, as well as social problem-solving skills such as perspective taking, goal setting, and decision making. In addition, several interventions (e.g., Penn Prevention Program) teach coping skills for dealing with stress.

There also is some evidence that an interpersonal approach to depression prevention may be effective, particularly for girls. Forsyth (2000) found a large effect for an interpersonally oriented program in a sample of mostly female college students. Recently, Young, Mufson, and Davies (2006) reported that an interpersonal depression prevention program had a significant positive effect on depressive symptoms and overall functioning for a predominantly

female sample of middle school children. It is premature, however, to conclude that interpersonal prevention approaches are more effective for females than males or that females do better in interpersonal than cognitive programs, because no study has yet explicitly compared males and females in cognitive-behavioral versus interpersonal prevention programs.

Girls and boys may respond differently to prevention programs, although empirical evidence of such gender differences has been inconsistent (Merry et al., 2006). Clarke, Hawkins, Murphy, and Sheeber (1993) found that a cognitive-behavioral program resulted in short-term improvement in symptoms for boys, but not for girls. In addition, two school-based universal interventions (Ialongo et al., 1999; Kellam, Rebok, Mayer, Ialongo, & Kalodner, 1994) designed to prevent depression by improving achievement and mastery learning were found to be more effective for boys than girls. In contrast, the Penn State Adolescent Study (Petersen, Leffert, Graham, Alwin, & Ding, 1997), which used a cognitive-behavioral approach, reported improvement among girls and increased symptoms among boys at posttreatment. In a primary care setting, girls in the Penn Resiliency Program had reduced depressive symptom scores compared with girls in the usual care condition, whereas there was no such difference for boys (Gillham, Hamilton, Freres, Patton, & Gallop, 2006). Thus, no firm conclusions can be drawn regarding gender differences in response to different types of depression prevention programs. Therefore, another goal of this study was to examine the relative efficacy of a cognitive-behavioral versus an interpersonal prevention program for girls and boys.

Personality factors also may contribute to differential responses to interventions. *Sociotropy*, defined as the degree to which an individual's sense of self is dependent on his or her social relationships (Beck, Epstein, & Harrison, 1983), might be particularly relevant to interpersonal approaches. According to the specific vulnerability hypothesis (Beck, 1982), individuals vary in the extent to which they are affiliative and achievement oriented. Matching treatments with individual differences has sometimes led to better outcomes (e.g., Beutler, Engle, Mohr, & Daldrup, 1991). Thus, it is possible that highly affiliative individuals, regardless of gender, will benefit more from interpersonal approaches. In contrast, the cognitive-behavioral program used in this study was more didactic and structured, and it offered regular opportunities for successful completion of activities within and between group meetings. Moreover, the cognitive-behavioral program provided positive reinforcement for the development of skills and knowledge, and may have been better suited for more highly achievement-oriented students.

Finally, mediation analyses in prevention studies are important for several reasons. First, they serve as a manipulation check for the intended effects of the prevention programs, and such analyses can help identify aspects of programs that need to be strengthened. Second, effects on hypothesized mediators without significant effects on outcome variables may indicate either that the outcome effect will emerge later or that the hypothesized mediator was not an active ingredient for changing behavior. Third, if a study can identify the critical elements of a program, then future interventions can be more effective and less costly (MacKinnon & Dwyer, 1993).

Few studies of programs for preventing depression, however, have identified factors that mediate the effects of their programs.

Some have found changes in hypothesized mediators without showing an effect on depressive symptoms (e.g., Ialongo et al., 1999). Other studies have reported a significant effect on depression without identifying the processes by which the program was effective (e.g., Clarke et al., 2001). The current study measured several possible mediators. We hypothesized that, whereas cognitions and coping would mediate the relation between the cognitive-behavioral intervention and change in depressive symptoms, relationship quality would mediate the link between the interpersonal program and depression.

In summary, the present study tested the following hypotheses:

Hypothesis 1—Outcome: The cognitive-behavioral and interpersonal therapy prevention programs will be significantly better than the no-intervention control group in preventing depressive symptoms measured at postintervention and at a 6-month follow-up.

Hypothesis 2—Moderators

a. Initial levels of depressive symptoms will moderate the effect of the intervention, such that those with the highest levels of baseline depression will show the greatest benefit of the interventions.

b. Gender will moderate the effects of the interventions on outcome such that for girls, an interpersonal program will be better than the cognitive-behavioral program, whereas the reverse will be true for boys.

c. Personality characteristics will moderate the effect of the interventions on depressive symptoms. The effect of the interpersonal program on depressive symptoms is expected to be stronger for those high versus low in sociotropy, whereas the effect of the cognitive-behavioral program on depressive symptoms is expected to be stronger for those high versus low in achievement orientation.

Hypothesis 3—Mediators

a. The effect of the cognitive-behavioral intervention on change in depressive symptoms will be mediated by a decrease in negative cognitions and an increase in rational and active coping skills.

b. The effect of the interpersonal program intervention on change in depressive symptoms will be mediated by improvements in interpersonal relationships.

Method

Participants

Students in wellness classes in three suburban/rural high schools were recruited at school to participate in the study. Parental consent and student assent were obtained for 380 of a possible 600 students (63%). Most were freshmen (94%); the average age was 14.43 years ($SD = 0.70$); 54% of the sample was female. The sample was 79% Caucasian, 13% African American, 2% Latino, 1% Asian American, 1% Native American, 3% mixed heritage,

and 1% other. Participants and nonparticipants did not differ significantly with regard to age, gender, or race.

The first cohort was recruited in January 2004 and completed the 6-month follow-up in October 2004. The second cohort was recruited in August 2004 and completed the follow-up in April 2005. The schools served communities characterized as predominantly working (e.g., sales clerks, factory workers) to middle class (e.g., farmers, mechanics).

Procedure

A random number list was used by Jason L. Horowitz to assign participants to the cognitive-behavior program (CB; $n = 112$), the interpersonal psychotherapy-adolescent skills training (IPT-AST; $n = 99$), or the assessment-only control condition ($n = 169$). Figure 1 shows the participant flowchart. The control group had more participants because each CB and IPT-AST group was limited to no more than 15 students; in some class periods, the numbers of participants exceeded this constraint, in which case the excess (i.e., over the maximum of 15 students per intervention group) were assigned to the control condition. Within class periods, participants were randomly assigned to condition unless there were fewer than 15 students participating. This occurred for only two classes (25 of 380 participants); for these two classes, randomization was done at the class level rather than at the individual level.

Participants and group leaders were aware of group assignments, whereas those conducting the assessments did not know to which condition students had been assigned. A total of eight group leaders and eight coleaders conducted the groups. To avoid cross-contamination of methods, group leaders administered only one of the two interventions.

Participants completed questionnaires the week prior to beginning the intervention. Both intervention programs involved eight 90-min sessions delivered once a week during students' regular wellness class period. There were nine groups for each intervention delivered. To account for season and school calendar factors, half of all three conditions were run during the fall semester and half were run during the spring semester. Groups were of mixed gender and had between 8 and 15 students, with a median size of 11. Follow-up questionnaires were completed during school time by participants in all three conditions a week after the last group session and again 6 months postintervention. Participants who had changed schools were contacted by mail and telephone.

Participant safety was monitored throughout the course of the study by senior-level clinicians who supervised the therapists. In addition, school counselors were informed about the project and were available for consultation and referrals for any student in need of more immediate attention. No serious adverse events occurred during the study.

Measures

Depressive symptoms. Depressive symptoms were measured using the Children's Depression Inventory (CDI; Kovacs, 1985) and the Center for Epidemiological Studies Depression scale (CES-D; Radloff, 1977). The CDI is a 27-item, self-report measure that assesses a range of depressive symptoms; the item about

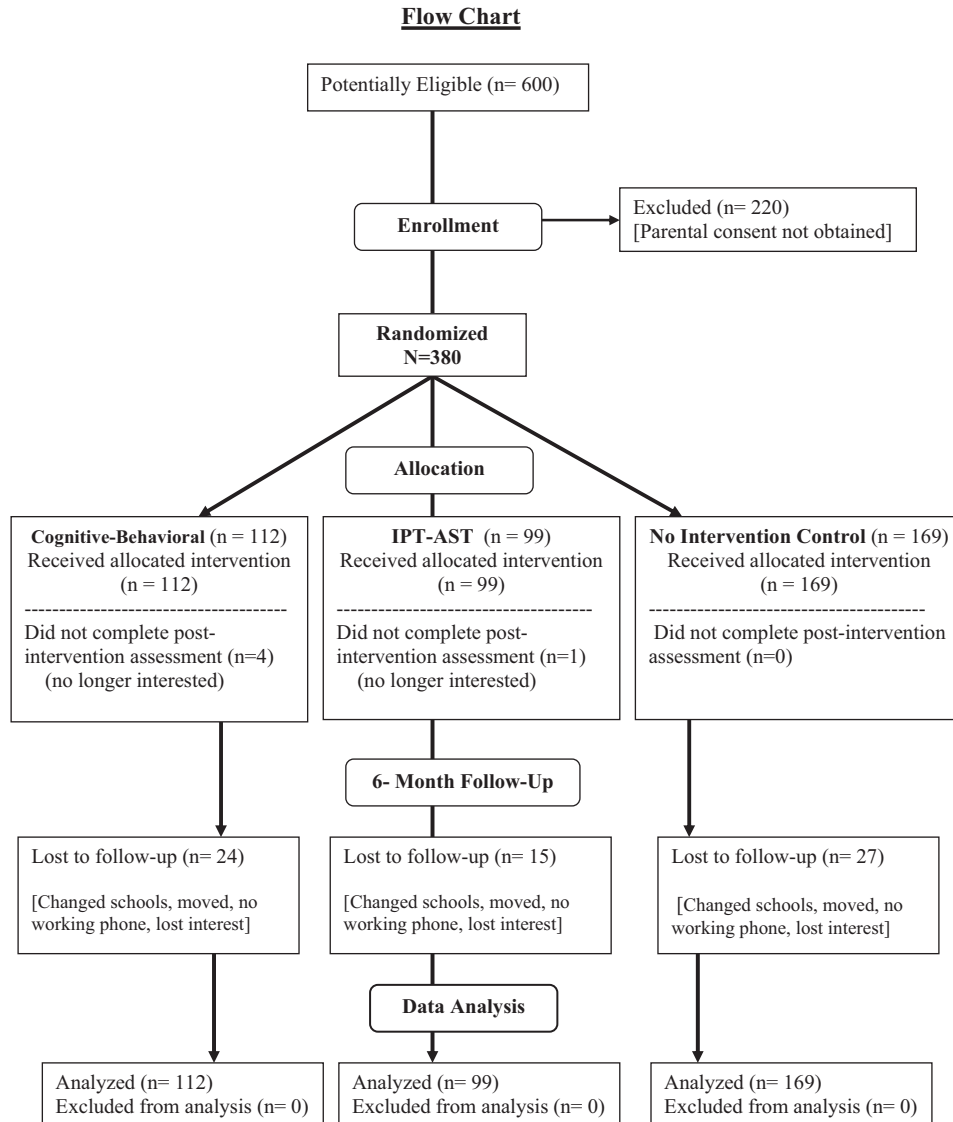


Figure 1. Participant flowchart. IPT-AST = interpersonal psychotherapy-adolescent skills training.

suicidal ideation was removed because of concerns of the participating schools, leaving 26 items with a range of possible scores from 0 to 52. The CDI is widely used and has been found to have good reliability and validity with children and adolescents (Kovacs, 2001). Internal consistency of the CDI at baseline in this sample was .89.

The CES-D is a 20-item, self-report measure of depressive symptoms rated on a 4-point frequency scale, yielding a total score between 0 and 60. The CES-D has been found to have good internal consistency, reliability, and validity in a sample of over 2,000 high school students (Roberts, Andrew, Lewinsohn, & Hops, 1991). Coefficient alpha in our sample was .86. In addition to examining these measures separately in all analyses, we created a composite measure of depressive symptoms by standardizing both the CDI and the CES-D and adding the z scores. These measures were significantly correlated ($r = .81, p < .001$), and the composite measure had a high level of reliability ($r_{YY} = .93$; Nunnally

& Bernstein, 1994). In addition to the separate depression measures, this composite index was used to analyze the main intervention effects.

Sociotropy and achievement orientation. Sociotropy and achievement orientation were measured using the Sociotropy-Achievement Scale for Children (SASC; Little & Garber, 2000), which contains 48 self-report items rated on a 5-point scale. The SASC yields scores on two factors: Sociotropy (Affiliativeness; e.g., "I care a lot about what other people think of me"), with scores ranging between 29 and 145, and Achievement Orientation (e.g., "I should be able to do well at anything if I try hard enough"), with scores ranging between 19 and 95. The SASC was validated on a sample of 486 young adolescents; the subscales had reliabilities between .58 and .79, and the SASC was found to have good test-retest reliability (Little & Garber, 2000). Coefficient alphas for the Sociotropy and Achievement Orientation scales in this sample were .90 and .86, respectively.

Cognitions. Attributional style was measured using the revised Children's Attributional Style Questionnaire (CASQ-R; Thompson, Kaslow, Weiss, & Nolen-Hoeksema, 1998). The CASQ-R assesses three attribution dimensions (locus, stability, globality). Lower total scores reflect a more negative attributional style. The total composite score ranges from 0 to 36. The CASQ-R has been evaluated in a sample of 1,086 children and has moderate internal consistency and test-retest reliability, as well as good criterion-related validity with depressive symptoms (Thompson et al., 1998). Coefficient alpha for the total composite score in this sample was .81.

Coping. The Coping Orientation to Problems Experienced Inventory (COPE; Carver, Scheier, & Weintraub, 1989) is a multidimensional assessment of coping style that asks respondents to choose how often they do each of 60 possible things when experiencing a stressful event. This measure was developed and tested with a sample of 978 undergraduates and was found to have good reliability and validity (Carver et al., 1989). Coefficient alphas in the current sample for the three major scales were .86 for the Rational Coping scale, .84 for the Emotional Coping scale, and .70 for the Avoidance Coping scale.

Quality of relationships. Adolescents' relationships with their parents were measured using the 20-item, true-false Conflict Behavior Questionnaire (CBQ; Prinz, Foster, Kent, & O'Leary, 1979), yielding scores ranging from 0 to 20. The CBQ was validated using parent-child dyads with children 11 to 15 years old and was found to discriminate well between distressed and nondistressed pairs (Prinz et al., 1979). In the current study, adolescents completed forms assessing perceptions of conflict with their mothers and fathers separately. Coefficient alpha for this sample was .87 about mothers and .88 about fathers.

Curriculum knowledge. Questionnaires were created on the basis of the program curriculum to assess participants' knowledge about the core information presented. There were seven multiple-choice questions relating to each course, with four choices each. Scores for CB knowledge ($\alpha = .29$) and IPT-AST knowledge ($\alpha = .62$) were computed separately on a scale from 0 to 7. All students completed the knowledge questionnaires at postintervention and at the 6-month follow-up.

Interventions

The CB was derived from the Coping With Stress Course (Clarke & Lewinsohn, 1995), which is a psychoeducational, cognitive-behavioral intervention for depression in adolescents. The course is based on the multifactorial model of depression (Lewinsohn, Hoberman, Teri, & Hautzinger, 1985) and Beck's (1967; Beck, Rush, Shaw, & Emery, 1979) cognitive model. The CB program educates about the nature and risk for depression and teaches how to (a) monitor daily moods; (b) identify activating events; (c) discover, challenge, realistically evaluate, and revise negative beliefs; (d) recognize the connections among activating events, beliefs, and consequences (e.g., affect and behaviors); and (e) problem solve and cope with stressful events. The expectation is that these skills will help teens deal with stress and thereby immunize them against future depression. The sessions consist of active guidance by group

leaders and structured activities for participants. A participant workbook, including exercises for practice outside of the group, was distributed to all students.

The IPT-AST (Young & Mufson, 2003) was created as an extension of interpersonal therapy, which has been found to be effective in the treatment of depression in adolescents (Mufson, Weissman, Moreau, & Garfinkle, 1999; Mufson et al., 2004). IPT-AST was designed originally for use with adolescents between the 7th and 10th grades who were experiencing sub-clinical symptoms of depression. IPT-AST seeks to prevent depression by teaching communication and social skills necessary to develop and maintain positive relationships. Three general problem areas are emphasized: (a) *Interpersonal role transitions* are targeted when an adolescent has difficulty adjusting to a life change that requires a new or different role, or when the family is having trouble adjusting to the adolescent's new developmental role in the family; (b) *interpersonal role disputes* occur when the adolescent and another person have non-reciprocal expectations for their relationship that lead to frequent conflicts; and (c) *interpersonal deficits* are identified when an adolescent lacks the social and communication skills needed to initiate and maintain relationships.

IPT-AST, as it was initially developed, includes two pregroup individual sessions and eight group sessions. The purpose of the pregroup sessions is for the leader to get to know the adolescent, assess depression symptoms, provide education about depression, explain the structure of the program, and conduct an interpersonal inventory. In the current study, however, it was not feasible to run individual pregroup sessions because of the large number of participants. Materials typically covered during these individual sessions were incorporated into the first group session.

The eight IPT-AST group sessions are divided into three phases. The initial phase (Sessions 1-3) teaches adolescents about the link between interpersonal relationships and their mood and introduces them to techniques that may be useful in improving their relationships. The middle phase (Sessions 4-6) focuses on applying the skills learned in the first phase to individual situations reported by group members. These sessions generally are less scripted, although role-playing is commonly used, and group members act as coaches for one another as they practice dealing with interpersonal issues. The last two sessions are the final phase, which centers on establishing the group members' sense of competence in dealing with interpersonal problems and preparing them for dealing with difficult situations on their own. Group leaders review the strategies that have been helpful to each group member, role-play hypothetical future situations, and discuss ways to generalize the skills they have learned.

Participants in the no-intervention control group attended their regularly scheduled health classes, where they were taught the standard wellness curriculum. Although no materials were provided to create an attention placebo control group, these classes were delivered in groups in a classroom setting similar to that used in the intervention groups. The size, environment, and format of the wellness classes were similar to the interventions, and the primary systematic difference was the content delivered.

Training and Supervision of Group Leaders

Group leaders were master's-level clinical psychology graduate students or recent clinical psychology PhDs, all of whom had received prior therapy training. Coleaders were clinical graduate students or undergraduate honors students. To ensure treatment integrity, (a) detailed treatment manuals were used for both CB and IPT-AST, (b) group leaders and coleaders participated in training workshops before beginning the study, and (c) throughout the intervention, weekly supervision meetings were held with clinical experts in the modality (i.e., CB or IPT-AST) leaders provided. During supervision, each session was carefully reviewed, and plans for the next session were outlined on the basis of the manuals. The schools did not permit taping of the group sessions.

Results

Data Analytic Plan

For analyses predicting depressive symptoms based on intervention group status or another categorical variable, we used analysis of covariance with preintervention depressive symptom scores as a covariate. Effect sizes were computed using Cohen's *d*. Power analyses indicated that this study would have adequate statistical power ($1 - \beta = 0.80$) to detect main effect sizes as small as 0.16. Maxwell (2000, p. 454, Table 5) used Monte Carlo simulation data to show that to achieve power at a level of 0.80 with 5 continuous predictors and an alpha level of .05 for moderator analyses a sample size of 419 would be required; thus, the current study likely had power slightly below 0.80 for detecting interactions. In addition, MacKinnon, Lockwood, Hoffman, West, and Sheets (2002, p. 94, Table 6) used Monte Carlo simulation data to show that with a sample of 200 and an alpha level of .05, power for detecting a small mediation effect would be 0.69, and power for detecting a medium effect would be 1.00. They reported data for continuous variables, but noted that simulations run with continuous and dichotomous variables showed no appreciable differences. Thus, this study also had sufficient power for detecting at least medium mediation effects. When predicting depressive symptoms using a continuous variable, we used linear regression with preintervention symptoms in the first step and the other predictors in subsequent steps.

Mediation analyses were done following the recommendations of Sobel (1982) and MacKinnon and colleagues (MacKinnon & Dwyer, 1993; MacKinnon et al., 2002; MacKinnon, Warsi, & Dwyer, 1995). In contrast to the four-step procedure for testing mediation recommended by Baron and Kenny (1986), the method suggested by MacKinnon et al. (1995, 2002) and Sobel (1982) involves a single statistical test of the indirect path. MacKinnon et al. (1995, 2002) demonstrated that the magnitude of the indirect effect of an independent variable through a mediator is mathematically equivalent to the decrease in association between the independent and dependent variables when the mediator is included in the model. This approach provides more power for testing mediation and renders the Baron and Kenny (1986) method essentially redundant with the test of the magnitude of the indirect path (MacKinnon et al., 1995, 2002).

Interactions between continuous and categorical variables were analyzed using linear regression, following Aiken and West (1991). In the case of the intervention group, for example, dummy variables were created to contrast each of the active intervention conditions with the control condition. Interaction terms were created using the product of each of the dummy-coded intervention condition variables with a centered version of the other independent variable in question. Both interaction terms then were entered in the final step of the regression. Therapist effects were examined, and none were found. Leverage statistics and Cook's distances (see Tabachnick & Fidell, 2001, pp. 67–71) were examined to screen for multivariate outliers in the analyses; no outliers were detected.

Demographics and Attrition

Students in the three conditions did not differ significantly in age, sex, or race/ethnicity, nor were there differences in depressive symptoms at postintervention or follow-up based on age, group leader, school, cohort, or race/ethnicity. Of the 380 participants assessed at preintervention, 375 (99%) completed the postintervention evaluation and 314 (84%; CB: 88 [79%]; IPT-AST: 84 [85%]; control: 142 [84%]) completed the 6-month follow-up.

To test for possible differential attrition based on levels of depressive symptoms, we conducted Intervention Group \times Completion Status analyses of variance at pre- and postintervention. Preintervention depression scores were not significantly associated with intervention group, completion status, or their interaction (all $ps > .60$). At postintervention, however, the Intervention \times Completion Status interaction, $F(2, 352) = 4.42, p < .01$, significantly predicted higher CDI scores. That is, within the control group, those participants who did not complete the 6-month follow-up had higher postintervention CDI scores ($M = 17.6, SD = 11.8$) than individuals who were retained at follow-up ($M = 10.9, SD = 9.0$), $F(1, 352) = 12.09, p < .001$. This was not the case, however, for the two intervention groups.

Efficacy of the Interventions

Depression scores were analyzed using the two depression measures separately and a composite depression score. Combining multiple measures of the same construct creates a score that is more reliable than either alone (Nunnally & Bernstein, 1994), whereas separating the scores allows for results to be more readily interpreted and compared with other studies. At preintervention, the three groups were not significantly different in level of depressive symptoms as measured by the composite index, the CDI, or the CES-D (all $ps > .20$). Controlling for preintervention composite depressive symptom scores, there was a significant main effect for intervention group at postintervention on composite depressive symptoms, $F(2, 357) = 4.00, p = .02, \eta^2 = .02$ (see Table 1). Both the CB group (Cohen's $d = 0.37$) and the IPT-AST group ($d = 0.26$) had significantly lower composite depression scores than the control group at postintervention; the CB and IPT-AST groups did not differ significantly from each other.

Controlling for preintervention CDI scores, there was a significant intervention effect on postintervention CDI symptoms, $F(2, 350) = 5.28, p < .01, R^2 = .01, \eta^2 = .03$. The CB group

Table 1
Means and Standard Deviations of Depressive Symptoms and Potential Mediator Variables at Preintervention (Pre), Postintervention (Post), and 6-Month Follow-up (F/U)

Scale	Control						CB						IPT-AST					
	Pre		Post		F/U		Pre		Post		F/U		Pre		Post		F/U	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
CDI	10.50	8.18	11.78	9.69	10.08	8.55	8.68	6.65	8.19	6.86	8.23	7.68	9.18	7.37	9.47	7.30	9.67	8.10
CES-D	17.87	11.74	20.34	12.57	17.47	11.64	15.91	9.69	16.68	10.81	17.82	12.31	17.80	10.40	16.96	9.19	17.42	11.55
Depression composite	0.12	1.05	0.20	1.07	0.06	0.95	-0.11	0.79	-0.18	0.81	-0.05	0.92	-0.03	0.89	-0.09	0.77	0.03	0.96
COPE-RA	42.49	8.83	40.13	8.76	40.36	9.06	44.71	8.34	41.36	9.37	41.68	9.45	43.41	8.06	41.19	8.60	38.32	9.85
COPE-Em	18.88	4.42	17.55	3.98	18.16	4.72	19.29	5.27	17.72	4.96	18.15	5.12	19.27	5.09	17.49	4.93	17.43	4.85
COPE-Av	20.41	4.86	19.60	5.17	18.74	5.04	19.12	4.54	17.95	4.60	18.67	5.23	20.87	4.47	20.21	5.22	18.66	5.06
CASQ	-1.91	4.91	-2.49	5.21	-1.88	5.15	-0.62	4.32	-0.90	4.59	-1.60	4.81	-1.75	4.73	-2.26	5.18	-2.17	5.00
CBQ-Mo	8.64	3.97	6.85	5.17	8.92	4.74	9.07	3.28	6.51	5.47	8.11	4.98	7.69	4.21	6.88	5.71	7.19	5.07
CBQ-Fa	8.75	4.07	8.03	6.01	8.58	4.52	7.80	3.38	5.92	5.46	7.65	5.48	7.60	4.21	7.17	5.49	7.58	4.81
CB quiz			1.45	1.07	1.57	1.21			2.68	1.44	2.06	1.47			1.52	1.16	1.52	1.10
IPT-AST quiz			2.59	1.81	2.71	1.73			3.02	1.86	3.08	2.15			3.52	2.03	3.30	1.21

Note. CDI = Children's Depression Inventory; CES-D = Center for Epidemiological Studies Depression scale; COPE-RA = Coping Orientation to Problems Experienced Inventory, Rational-Active scale; COPE-Em = COPE Emotion scale; COPE-Av = COPE Avoidance scale; CASQ = Children's Attributional Style Questionnaire; CBQ-Mo = Conflict Behavior Questionnaire, Mother; CBQ-Fa = Conflict Behavior Questionnaire, Father; CB = cognitive-behavioral program; IPT-AST = interpersonal psychotherapy-adolescent skills training program.

($d = 0.40$) had significantly lower CDI scores at posttreatment than the control group. The IPT-AST group ($d = 0.24$) did not differ significantly from either the control group or the CB group. Controlling for preintervention CES-D scores, there was no group effect on postintervention CES-D scores, $F(2, 330) = 1.96, p = .14, R^2 = .01, \eta^2 = .01$.¹ At the 6-month follow-up, there were no significant group differences on the CDI, $F(2, 304) = 1.16, p = .32, R^2 = .01, \eta^2 = .01$; or the CES-D, $F(2, 287) = 0.13, p = .88, R^2 = .00, \eta^2 = .00$ (see Table 1).

Several different methods have been recommended for examining the outcome given missing data (Kendall & Flannery-

Schroeder, 1998). First, the most conservative approach uses participants' baseline score for missing observations. Second, the last observation carried forward method (Shao & Zhong, 2003) uses depression scores from the postintervention assessment for those who did not complete the follow-up evaluation. Third, the least conservative approach is to analyze the follow-up data eliminating all participants with missing data. None of these analyses yielded significant differences at follow-up on any index of depressive symptoms (all $ps > .13$).

Moderators

Initial level of depressive symptoms. To examine whether the CB and IPT-AST groups had a larger effect for individuals who were more symptomatic at baseline, we used regression models to test for interactions between initial symptom levels and intervention condition. Baseline CDI scores significantly moderated the effect of both the CB, $\beta = -0.12, t(348) = -1.95, p = .05, \Delta R^2 = .01$; and the IPT-AST groups, $\beta = -0.13, t(348) = 2.05, p = .04, \Delta R^2 = .01$. This interaction indicated that the difference between intervention groups was largest for individuals with initially high levels of depressive symptoms on the CDI (see Figure 2). Simple slope analyses demonstrated that, at 1 standard deviation above the mean on pretreatment CDI scores, the CB intervention showed a

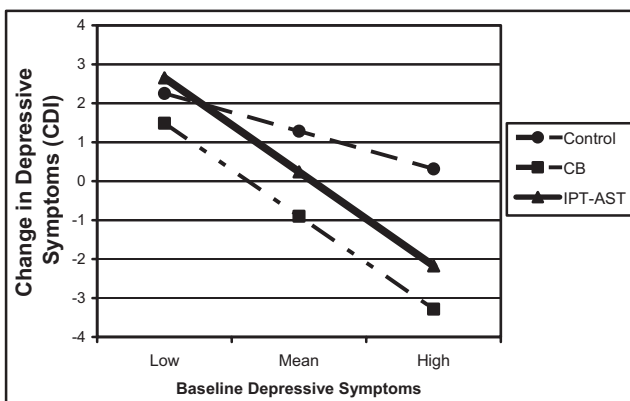


Figure 2. The interaction of baseline depressive symptoms on the Children's Depression Inventory (CDI) and intervention condition predicting change in depressive symptom scores (CDI) from pre- to postintervention. CB = cognitive-behavioral program; IPT-AST = interpersonal psychotherapy-adolescent skills training.

¹ Following the suggestions of Baldwin, Murray, and Shadish (2005), we also conducted analyses adjusting the observed group differences to account for the nonindependence of observations within each intervention group. These results were very similar to the unadjusted effects: A significant effect for group was found on the CDI, $F(2, 23) = 4.98, p < .05$; but not the CES-D, $F(2, 23) = 1.91, p = .17$.

significant difference from the control group ($\beta = -0.11, p = .01$); the effect of the IPT-AST intervention was nonsignificant ($\beta = -0.04, p = .32$). At 1 standard deviation below the mean, there was no significant effect for either the CB ($\beta = 0.06, p = .56$) or the IPT-AST ($\beta = 0.11, p = .27$) intervention. No interaction was found for the CES-D ($\Delta R^2 = .00, p = .56$) or at the 6-month follow-up ($ps > .24$).

Gender. Controlling for preintervention depressive symptoms, no main effect for gender or gender by treatment condition interactions were detected for either the CES-D or CDI at either posttreatment or the 6-month follow-up ($ps > .09$).

Sociotropy and achievement orientation. Multiple regression analyses with two dummy-coded variables (i.e., CB vs. control, IPT-AST vs. control) for treatment group and corresponding interaction terms with the moderator variables were used to explore whether sociotropy or achievement orientation moderated the effect of each treatment. A significant sociotropy by condition interaction was detected when predicting CES-D scores at posttreatment, $\beta = -0.77, t(324) = -2.98, p < .01, \Delta R^2 = .02$ (see Figure 3). Simple slope analyses revealed that higher levels of sociotropy were related to lower levels of depression in the IPT-AST group ($\beta = -0.17, p = .05$), higher depression in the control group ($\beta = 0.15, p < .05$), and were unrelated to depression in the CB group ($\beta = 0.10, p = .22$). A nonsignificant trend for this interaction was observed with the CDI, $\beta = -0.37, t(345) = -1.79, p = .08, \Delta R^2 = .01$. No such interaction was detected in predicting depression at the 6-month follow-up ($ps > .18$).

A significant achievement orientation by condition interaction was detected when predicting CDI scores at posttreatment, $\beta = 0.65, t(345) = 2.93, p < .01, \Delta R^2 = .01$ (see Figure 4). Simple slope analyses revealed that high levels of achievement orientation were related to lower CDI scores in the control ($\beta = -0.18, p < .01$) and IPT-AST ($\beta = -0.20, p < .01$) conditions, but were unrelated in the CB condition ($\beta = 0.09, p = .24$). This interaction was not found for the CES-D ($ps > .55$) or at the 6-month follow-up for either outcome measure ($ps > .27$).

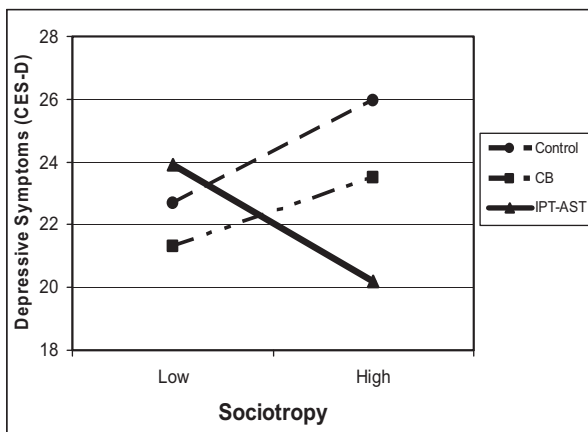


Figure 3. The interaction of sociotropy and intervention condition predicting depressive symptom scores on the Center for Epidemiological Studies Depression scale (CES-D) at postintervention, controlling for preintervention scores. CB = cognitive-behavioral program; IPT-AST = interpersonal psychotherapy-adolescent skills training.

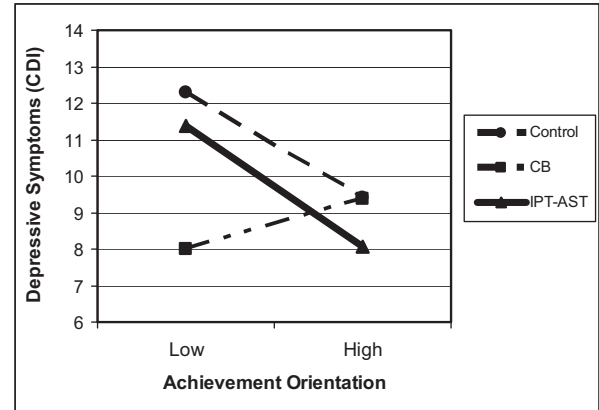


Figure 4. The interaction of achievement orientation and intervention condition predicting depressive symptom scores on the Children's Depression Inventory (CDI) at postintervention, controlling for preintervention scores. CB = cognitive-behavioral program; IPT-AST = interpersonal psychotherapy-adolescent skills training.

Mediators

Attributional style. Examination of the relation between intervention condition and attributional style revealed a nonsignificant trend in which, at postintervention, the CB group had a less negative attributional style than the control group, $d = 0.31, \beta = 0.08, t(344) = 1.72, p = .09$. In addition, when both intervention condition and attributional style were used to predict postintervention depressive symptoms, attributional style was significantly associated with CDI scores, $\beta = -0.28, t(344) = -6.85, p < .001$; the effect of the CB group was significant, but reduced from its former magnitude, $\beta = -0.11, t(344) = -2.78, p < .01$. The Sobel (1982) method revealed a nonsignificant trend for attributional style to partially mediate the relation between the intervention and depressive symptoms for CB (CDI: $z = -1.67, p = .09$; CES-D: $z = -1.69, p = .09$) but not for IPT-AST (CDI: $z = 0.03, p = .97$; CES-D: $z = 0.03, p = .97$).

Coping. There was no effect for group at postintervention on coping, as measured by the COPE subscales for rational and active coping, $F(2, 341) = 0.39, p = .68$; emotion-based coping, $F(2, 343) = 0.20, p = .82$; or avoidance coping, $F(2, 340) = 2.25, p = .11$. There was, however, a nonsignificant trend at the 6-month follow-up for rational and active coping, $F(2, 286) = 2.49, p = .08$. Controlling for preintervention coping scores, participants in the CB group had higher levels of rational and active coping at follow-up than did participants in IPT-AST or the control group.

Conflict. Controlling for Time 1 measures, there was no effect for intervention group on perceived conflict (CBQ) with mothers, $F(2, 335) = 0.11, p = .90$; or fathers at postintervention, $F(2, 319) = 2.17, p = .12$; or with mothers, $F(2, 282) = 0.42, p = .68$; or fathers at the 6-month follow-up, $F(2, 271) = 0.18, p = .83$.

Knowledge checks. At postintervention, the mean score across groups on the CB quiz was 1.84 ($SD = 1.34$), and the mean score on the IPT-AST quiz was 2.93 ($SD = 1.89$). There was a significant effect for treatment group on the CB quiz at postintervention, $F(2, 362) = 36.79, p < .001$; and at follow-up, $F(2, 312) = 5.53, p < .01$. Participants in the CB group answered significantly more questions correctly on the CB quiz than did participants in either

the IPT-AST, $\beta = -0.39$, $t(364) = -6.91$, $p < .001$; or the control, $\beta = -0.45$, $t(364) = -7.97$, $p < .001$, conditions at postintervention. After controlling for prior levels of depression, postintervention CB quiz scores did not significantly predict post-treatment depression on either the CES-D, $\beta = 0.07$, $t(330) = 1.49$, $p = .14$; or the CDI, $\beta = 0.03$, $t(353) = 0.86$, $p = .39$. Using the Sobel test, scores on the CB quiz did not significantly mediate the effect of CB treatment on depressive symptoms on either the CES-D ($z = 1.47$, $p = .14$) or the CDI ($z = 0.85$, $p = .40$).

There was a significant effect for intervention condition on the IPT-AST quiz at postintervention, $F(2, 362) = 5.96$, $p < .01$, such that students in the IPT-AST group answered significantly more questions correctly on the IPT quiz than did those in the control, $\beta = -0.21$, $t(364) = -3.40$, $p < .001$; but not the CB condition, $\beta = -0.09$, $t(364) = -1.44$, $p = .15$. After controlling for preintervention depressive symptom levels, IPT-AST quiz scores were significantly associated with depressive symptoms at postintervention: CES-D, $\beta = -0.12$, $t(330) = -2.59$, $p < .01$; CDI, $\beta = -0.10$, $t(353) = -2.80$, $p < .01$. The Sobel (1982) test showed that scores on the IPT-AST quiz significantly mediated the relation between the IPT-AST intervention and postintervention depressive symptoms on the CES-D ($z = 2.06$, $p < .05$) and the CDI ($z = 2.16$, $p < .05$).

High-Risk Subgroup

Given that initial levels of depressive symptoms moderated the effects of treatment, we ran a set of main effect analyses on participants who scored in the top 25th percentile of the composite depression measure ($n = 96$). Controlling for preintervention symptoms, there was a significant main effect for intervention group on composite depressive symptom scores at postintervention, $F(2, 87) = 7.51$, $p = .001$, $\eta^2 = .10$. Both the CB group ($d = 0.89$) and the IPT-AST group ($d = 0.84$) had lower levels of depressive symptoms than the control group at postintervention. The CB and IPT-AST groups did not differ from one another. At follow-up, no significant group differences were found, $F(2, 72) = 0.62$, $p = .54$.

Because initial scores on the CDI, but not the CES-D, moderated the effect of treatment, we ran an additional set of exploratory analyses on participants who scored in the top 25th percentile on the CDI. Controlling for preintervention CDI scores, there was a significant main effect for intervention group on CDI scores at postintervention, $F(2, 93) = 3.51$, $p < .05$, $R^2 = .04$, $\eta^2 = .07$. The CB group had significantly lower CDI scores at posttreatment ($\beta = -0.21$, $p < .05$, $d = 0.85$), and the IPT-AST group had marginally lower scores ($\beta = -0.15$, $p = .08$, $d = 0.40$), controlling for pretreatment depression (see Figure 5). The intervention groups did not differ from each other ($\beta = 0.05$, $p = .59$). At follow-up, there was no significant group effect on the CDI, $F(2, 77) = 1.42$, $p = .25$, $R^2 = .03$, $\eta^2 = .04$. Gender did not moderate the effect of treatment, $F(2, 90) = 0.30$, $p = .74$, $R^2 = .00$.

There was a significant effect for group on postintervention attributional style, $F(2, 89) = 5.09$, $p = .01$, such that participants in the CB group had a less negative attributional style than participants in the IPT-AST ($\beta = 0.72$, $p < .01$, $d = 0.95$) and the control ($\beta = 0.33$, $p < .01$, $d = 0.68$) groups. The IPT-AST and control groups did not differ ($\beta = -0.02$, $p = .84$, $d = 0.04$). Postintervention attributional style and depressive symptoms were

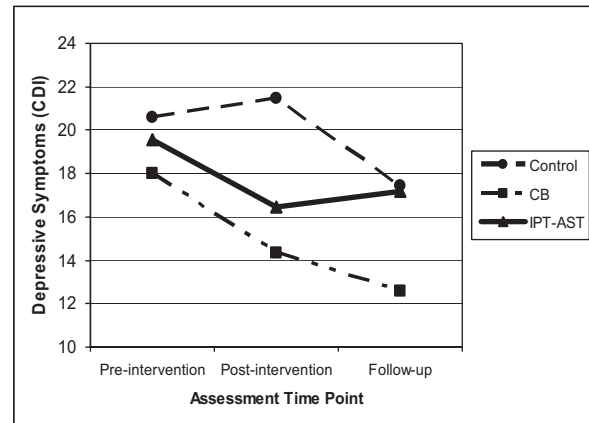


Figure 5. Depressive symptom scores on the Children's Depression Inventory (CDI) for high-risk adolescents at preintervention, postintervention, and 6-month follow-up as a function of intervention condition. CB = cognitive-behavioral program; IPT-AST = interpersonal psychotherapy-adolescent skills training.

significantly associated, controlling for both prior levels of depressive symptoms and intervention group ($\beta = -0.19$, $p < .05$). The Sobel (1982) test showed a nonsignificant trend for attributional style to mediate the effect of the CB intervention on depressive symptoms (CDI: $z = -1.75$, $p = .08$).

Among high-risk students, there were no effects on the COPE composite scales at postintervention. There were significant group differences at follow-up, however, for rational and active coping, $F(2, 68) = 4.81$, $p < .05$; a nonsignificant trend for emotion-based coping, $F(2, 70) = 2.82$, $p = .07$; but not for avoidance coping, $F(2, 68) = 1.73$, $p = .18$. High-risk participants in the IPT-AST group reported engaging in less rational and active ($\beta = -0.31$, $p < .001$) and emotion-based ($\beta = -0.27$, $p < .05$) coping than did participants in either the CB or control group.

Controlling for Time 1 measures, there was no effect for group on perceived conflict (CBQ) with mothers, $F(2, 87) = 0.27$, $p = .77$; or fathers at postintervention, $F(2, 76) = 1.32$, $p = .27$; or with mothers, $F(2, 69) = 0.65$, $p = .53$; or fathers at follow-up, $F(2, 63) = 1.67$, $p = .20$.

There were significant group differences in the CB quiz scores at postintervention, $F(2, 88) = 1.95$, $p < .01$; but not at follow-up, $F(2, 73) = 0.49$, $p = .58$. High-risk participants in the CB group answered significantly more questions correctly on the CB quiz than participants in either the IPT-AST ($\beta = -0.36$, $p < .01$) or the control condition ($\beta = -0.37$, $p < .01$). There were no significant group differences on the IPT-AST quiz at postintervention, $F(2, 88) = 1.76$, $p = .18$; or at follow-up, $F(2, 76) = 1.70$, $p = .19$.

Low-Risk Group

Finally, we examined the effect of the intervention programs for low-risk adolescents (i.e., scoring in the bottom 75th percentile on the CDI). Controlling for initial depressive symptoms, a nonsignificant trend for intervention condition was observed at postintervention, $F(2, 253) = 2.39$, $p = .09$. In contrast to the control group, the low-risk CB group showed lower CDI scores at post-

treatment ($\beta = -1.79, p < .05$). No significant treatment effect of the IPT-AST group was found ($\beta = -0.56, p = .51$). The CB and IPT-AST groups were not significantly different at posttreatment ($\beta = 0.09, p = .18$). No treatment effect was observed at the 6-month follow-up, $F(2, 211) = 0.72, p = .49$. Gender did not moderate the relation between intervention and depression.

Discussion

The current study compared the efficacy of a CB and an IPT-AST program for preventing depressive symptoms in adolescents versus a no-intervention control condition. A significant but small short-term effect was found for both CB ($d = 0.37$) and IPT-AST ($d = 0.26$) compared with controls for the entire sample at postintervention. Differences between the active intervention groups and controls were largest for individuals with initially high levels of depressive symptoms. Moreover, among those adolescents with elevated levels of baseline depressive symptoms (i.e., high risk), both CB ($d = 0.89$) and IPT-AST ($d = 0.84$) had particularly strong effects. The overall group effects were not maintained at follow-up; the two active intervention conditions were not significantly different from each other at either postintervention or follow-up.

Analyses of the entire sample showed positive intervention effects, although this likely was due largely to the effect for the high-risk adolescents. That is, those adolescents with the greatest need on the basis of their initial levels of depressive symptoms showed the greatest benefit. This result is consistent with the finding that, in general, indicated and selective depression prevention programs produce greater effect sizes than universal programs (Horowitz & Garber, 2006; Merry et al., 2006). It is not clear from the present study, however, whether the high-risk teens would have done as well, better, or worse had they been in groups with only other at-risk teens (i.e., indicated prevention). On one hand, low-risk adolescents may have served as role models from whom high-risk youth could learn new cognitive, coping, and communication strategies. On the other hand, groups comprising only high-risk adolescents may be more beneficial because these youth might feel more comfortable discussing problems that others in the group also may have experienced. Nevertheless, the present study found that both the CB and IPT-AST interventions delivered as universal programs had short-term benefits for high-risk adolescents in particular.

Whereas the results for the full sample showed a pattern generally consistent with a prevention effect, the pattern for the high-risk group is more accurately considered a treatment effect. That is, analysis of the whole sample showed that there was little change in depression scores for those in both intervention groups and a significant increase in depressive symptoms for those in the control group (i.e., prevention). In contrast, for the high-risk group, the interventions resulted in a decline in the level of depressive symptoms relative to controls (i.e., treatment; Gillham et al., 2000). This is consistent with findings of a meta-analysis of depression prevention programs with adolescents (Horowitz & Garber, 2006), which showed that many depression "prevention" programs produce effects better characterized as treatment of sub-clinical depressive symptoms. Indeed, although one selective study (Quayle, Dzuirawiec, Roberts, Kane, & Ebsworthy, 2001) and three indicated studies (Gillham, Reivich, et al., 2006; Jaycox,

Reivich, Gillham, & Seligman, 1994; Reivich, 1996) have found evidence of prevention, universal studies rarely show a true prevention effect.

To date, most depression prevention programs have focused on cognitive-behavioral approaches. An important strength of the current study was that it directly compared two active interventions, an established cognitive-behavioral program and an interpersonally oriented prevention program. The fact that both programs produced significant effects compared with no intervention is encouraging and suggests that multiple approaches may be able to prevent depressive symptoms in adolescents. On the other hand, it is possible that any intervention is better than nothing, regardless of the content (Merry, McDowell, Wild, Bir, & Cunliffe, 2004; Merry et al., 2006; Stice, Burton, Bearman, & Rohde, 2006). Merry et al. (2004, 2006) asserted that an attentional control group is needed to address concerns about nonspecific factors, such as time to talk about problems with a caring adult. Stice et al. (2006) similarly stated that "It is vital to compare prevention programs to placebo or alternative intervention control groups because without such control conditions it is not possible to know whether improvements resulted because of the specific therapeutic procedures theorized to produce intervention effects, general nonspecific effects common to all psychosocial interventions (e.g., attention, therapist competence), or design artifacts (e.g., participant expectancies, demand characteristics)" (p. 864).

Whereas the present study did contrast two active interventions, it did not include an attention control group. Therefore, we cannot rule out the possibility that the benefits obtained by members of each active intervention condition were the result of nonspecific factors. Although the no-intervention control condition was similar in format, size, length, and setting to the two active interventions, the fact that these wellness classes were provided by teachers rather than outside adults may have limited the extent to which students felt comfortable discussing personal issues. Future prevention studies should compare active preventive intervention programs, such as the ones tested in the current study, with an attention placebo condition as well. Moreover, a program that combines the active ingredients of both CB and IPT-AST into a single intervention should be developed and tested. Future prevention research also needs to identify indicators of who is most likely to benefit from which type of program, predictors of response, and mechanisms of change.

In the present study, both sociotropy and achievement orientation moderated the effects of the prevention programs on depression at postintervention. Consistent with expectations, higher levels of baseline sociotropy predicted lower levels of depressive symptoms in the IPT-AST group; this relation was not evident in either the CB or control groups. Adolescents who placed a high value on interpersonal relationships appeared to particularly benefit from a prevention program that focused on social functioning. Future studies using the IPT-AST program should examine what aspects of sociotropy (i.e., connectedness, neediness), in particular, contribute to positive responses to this intervention approach.

The relation between baseline achievement orientation and postintervention depression was significant for the IPT-AST and the no-intervention control groups, such that higher levels of achievement orientation predicted lower levels of depressive symptoms. It is possible that adolescents who have a high drive to achieve may have more success and mastery experiences (i.e.,

good grades, athletic achievements), which then fosters positive self-esteem and lower levels of depressive symptoms, regardless of intervention. It is interesting that the relation between achievement orientation and posttreatment depressive symptoms was not significant for those in the CB group. That is, the effectiveness of the CB prevention program was not related to participants' level of achievement orientation. It is possible that the measure of achievement orientation used here did not tap a personality characteristic of most relevance to a CB program. Rather, the tendency to have a negative cognitive style might be a more appropriate individual difference variable on which to select participants for the CB intervention program.

Contrary to expectation, the efficacy of the two active prevention programs was not different for girls and boys. Evidence of sex differences in response to cognitive-behavioral depression prevention programs has been mixed (e.g., Clarke et al., 1993; Petersen et al., 1997; Reivich, 1996; Seligman, Schulman, DeRubeis, & Hollon, 1999). Interpersonal prevention approaches have been found to be effective with females (e.g., Forsyth, 2000; Young, Mufson, & Davies, 2006), but gender differences were not tested in these other studies. Important questions about gender differences remain regarding both the structure and content of interventions for preventing depression. For example, are the effects of prevention programs delivered in same versus mixed gender groups different for girls versus boys? Chaplin et al. (2006) showed that girl-only groups were better than coed groups in reducing girls' hopelessness, but were similar to coed groups in reducing depressive symptoms. Moreover, although females are at greater risk for depression than males (Hankin et al., 1998), and several explanations for this heightened risk have been proposed (e.g., Nolen-Hoeksema, 2002), depression prevention programs have not yet been designed to specifically target these hypothesized risk factors. The translation of basic knowledge about the processes that account for gender differences in rates of depression to the actual content of prevention programs remains an important future research direction.

The current study also examined possible mediators of the relation between the prevention programs and depression, including attributional style, coping, and perceived quality of the parent-child relationship. Attributional style partially mediated the positive effect of CB, but not IPT-AST, at postintervention. This is in keeping with the content of the CB program, which includes identifying negative thought patterns, looking for alternative explanations for negative events, and challenging the accuracy of negative beliefs. This result is consistent with other studies that have found that changes in attributional style partially mediated the effect of cognitive interventions on depression (Hollon, Evans, & DeRubeis, 1990; Seligman et al., 1999). Given that the ideal method for testing mediation involves at least three time points (see Cole & Maxwell, 2003), however, the current findings are only suggestive at best and require replication.

Significant effects were not found, however, for the other hypothesized mediators. It is possible that the measures used here were not sensitive to the changes the programs produced. For example, the conflict measure asks broad questions about the parent-child relationship, such as whether the adolescent enjoys spending time with his or her parent. For teens with problematic parental relationships, IPT-AST may have taught them ways of dealing with such problems, but it may not have produced a change

in their relationship in a way that was captured by the CBQ. In addition, it is likely that a short-term intervention that does not directly involve parents will not be powerful enough to create a measurable change in parent-child relationships. It also is possible that the programs worked through processes different from those hypothesized and measured here. Nonmeasured, nonspecific factors such as attention and a supportive group leader may have helped adolescents in the intervention programs feel less depressed, although not necessarily by improving their coping behaviors or reducing their level of conflict with parents.

Finally, knowledge related to the IPT-AST program was found to partially mediate the effect of that program on depressive symptoms at postintervention. That is, students in IPT-AST appeared to have learned something from the intervention, which may be related to preventing an increase in depressive symptoms, although a true test of mediation was not possible with only two time points. Moreover, assessing whether participants actually learn the content of an intervention is an important manipulation check that can guide future modifications of the programs.

There are some limitations to the current study. The decrease in depression scores for participants in the two intervention groups in the present study might simply have been a reflection of a demand characteristic rather than a real "treatment" effect. That is, having gone through the intervention, students may have thought that they "should" report fewer symptoms. The fact that participants in the control group showed an increase in symptoms, however, is less likely explained by such expectancy effects.

Another issue regarding the pattern of results concerns the apparent increase in depressive symptoms in the control group at the postintervention assessment and then the drop in symptoms at the 6-month follow-up evaluation. An analysis of the attrition data provided a partial explanation for this somewhat puzzling finding. The significant intervention by attrition interaction indicated that within the no-intervention control condition, those participants who did not complete the 6-month follow-up had higher depression scores at the postintervention assessment than did those who were retained at follow-up. That is, within the control group, but not the intervention groups, adolescents with higher levels of depressive symptoms at postintervention were significantly less likely to complete the follow-up assessment. Thus, we might have lost the very people who would have been the most likely to show continued elevations in depression scores. Although the analyses using the last observation carried forward method (Shao & Zhong, 2003) did not yield significant differences for the follow-up comparison, it is still possible that the depression scores of these "lost" participants would have continued to increase over time rather than stay at their postintervention levels. If so, then their posttest scores might have been an underestimate of their worsening depression scores. In addition, those members of the control group experiencing high levels of depressive symptoms may have received treatment between the postintervention and follow-up assessments. A limitation of this study is that we did not obtain information regarding treatment between assessments.

Another limitation of this study was that, because of the large number of participants, it was not possible to conduct diagnostic interviews. Nevertheless, symptoms alone make up a meaningful outcome, as subclinical depressive symptoms in youth predict an increased risk for subsequent depressive disorders (Clarke et al., 1995; Pine et al., 1999) as well as other problems such as sub-

stance use, academic problems, and teen pregnancy (Gillham et al., 2000). Although depressive symptoms and diagnoses are often correlated (e.g., Clarke et al., 2001), one cannot assume that a preventive effect on symptoms would necessarily affect diagnoses. Indeed, some studies have shown significant effects for symptoms but not disorders (e.g., Seligman et al., 1999). Future prevention studies should measure both depressive symptoms and diagnoses.

Another constraint of the relatively large sample was that it was not possible to conduct the individual pregroup sessions in the IPT-AST condition. This might have diluted the focus on teens' individual interpersonal issues and their ability to target their specific problems in the group, thereby affecting the proposed mechanisms of change for IPT-AST. Thus, more powerful effects might have been found for IPT-AST had these individual pregroup sessions been conducted.

On the other hand, the sample size was relatively small for a universal intervention study. Universal prevention programs typically require very large samples sizes to show an effect (Cuijpers, 2003). Nevertheless, we had sufficient power to detect small effects (0.16) for the primary outcome analyses, and we were slightly underpowered for the moderator analyses (Maxwell, 2000).

In addition, results of the current study might not generalize to the full population of high school students because of the modest (63%) participation rate. Moreover, the results might not generalize to a more ethnically diverse sample. More research is needed to evaluate the efficacy of these and other depression prevention programs in samples that are more culturally and ethnically representative (e.g., see Cardemil, Reivich, Beevers, Seligman, & James, 2007; Cardemil, Reivich, & Seligman, 2002).

Another limitation was that independent observations of therapists were not completed, so absolute fidelity to intervention protocols cannot be assured. Although the sessions were monitored by experienced clinicians during the weekly supervision meetings, it is possible that group leaders did not fully describe everything that went on in the groups. When possible, researchers should audio- or videotape the intervention sessions so that they can be reviewed for fidelity.

Finally, results varied somewhat for the different measures of depressive symptoms. Although these measures were highly correlated, in general, the effects appeared to be stronger for the CDI compared with the CES-D. Other studies (e.g., Merry et al., 2004; Sheffield et al., 2006) that have used multiple measures of depressive symptoms also have found different results by measure. For example, Sheffield et al. (2006) similarly used both the CDI and CES-D and reported significant effects for intervention group on the linear time trajectories for CDI, but not for the CES-D. In a prevention study using the Reynolds Adolescent Depression Scale (Reynolds & Mazza, 1998) and the Beck Depression Inventory (Beck, Steer, & Brown, 1996, Merry et al. (2004) suggested that differences in the statistically significant effects were possibly due to the Beck Depression Inventory having greater variability than the Reynolds Adolescent Depression Scale, which was not related to the intervention. In addition, whereas the CDI appears to measure the severity of the depressive symptoms, the CES-D seems to be a measure of how frequently the person experienced the symptoms in the past week. Future prevention studies should continue to use multiple measures of depressive symptoms to try to deter-

mine what each instrument is actually assessing, and whether the differences are methodological, substantive, or both.

Future studies also should examine other potential predictors and moderators of outcomes, such as parental psychopathology and child comorbidity. For example, parental psychopathology has been found to predict a worse outcome in treatment studies of depressed youth (Birmaher et al., 2000) and may affect the results of prevention studies as well. The extent to which other child and family characteristics influence the outcome of depression prevention programs should be explored so that such programs can be modified to address these additional factors.

Another very important issue for future research is how to design prevention programs that have more enduring effects. Although some studies (Gillham et al., 1995; Merry et al., 2004) have found longer lasting effects, the present study and others (e.g., Clarke et al., 1995; Spence, Sheffield, & Donovan, 2005) have successfully produced positive short-term outcomes but not sustained effects over time. One approach may be to provide periodic booster sessions to help preserve the short-term benefits provided by the interventions. Indeed, some treatment studies have found that infrequent but long-term cognitive-behavioral therapy sessions reduce the likelihood of relapse of depression (e.g., Kroll, Harrington, Jayson, & Fraser, 1996). Kroll et al. (1996) reported that the cumulative risk for adolescent depressed patients who continued in CBT for 6 months after the acute phase was significantly lower (0.2) than that in the comparison group that had not received the continuation therapy (0.5). The addition of booster sessions or supplemental information and reminders delivered periodically by telephone, mail, or e-mail should be evaluated in long-term follow-up studies in the future. Training teachers to continue implementing components of these programs throughout the school year also may be a way to sustain their short-term benefits.

In summary, the present study compared the efficacy of a CB program, an IPT-AST program, and a no-intervention control group for preventing depressive symptoms in adolescents. Small positive, short-term effects were found for the two active interventions compared with controls for the whole sample at postintervention. Large positive effects were found at postintervention for both programs compared with controls for adolescents with high initial levels of depressive symptoms (high risk). Sociotropy and achievement orientation moderated the effects of the interventions. A nonsignificant trend was found for changes in attributional style to partially mediate the effect of the CB program on depressive symptoms; evidence for other hypothesized mediators was not found, however. Positive effects were not maintained at follow-up. Future studies should assess both symptoms and diagnoses and focus on methods to help maintain the positive short-term effects of preventive interventions over more extended periods of time.

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