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Efficacy Trial of a Brief Cognitive–Behavioral Depression Prevention Program for High-Risk Adolescents: Effects at 1- and 2-Year Follow-Up

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Objective: To evaluate the effects of a brief group cognitive–behavioral (CB) depression prevention program for high-risk adolescents with elevated depressive symptoms at 1- and 2-year follow-up. ***Method:*** In this indicated prevention trial, 341 at-risk youths were randomized to a group CB intervention, group supportive expressive intervention, CB bibliotherapy, or educational brochure control condition. ***Results:*** Significantly greater reductions in depressive symptoms were shown by group CB participants relative to brochure control participants by 1-year follow-up and bibliotherapy participants by 1- and 2-year follow-up but not relative to supportive expressive participants. Supportive expressive participants showed greater symptom reduction than CB bibliotherapy participants did at 2-year follow-up. Risk for onset of major or minor depression over the 2-year follow-up was significantly lower for group CB participants (14%; odds ratio = 2.2) and CB bibliotherapy participants (3%; odds ratio = 8.1) than for brochure controls (23%). ***Conclusions:*** Results indicate that this group CB intervention reduces initial symptoms and risk for future depressive episodes, although both supportive expressive therapy and CB bibliotherapy also produce intervention effects that persist long term. Indeed, CB bibliotherapy emerged as the least expensive method of reducing risk for future episodes of depression.

Keywords: depression, prevention, high-risk, adolescent, alternative interventions

Major depression is a common, recurrent, and impairing condition that increases risk for future suicide attempts, academic failure, interpersonal problems, unemployment, substance abuse, and delinquency (Klein, Torpey, & Bufferd, 2008). Because less than one third of depressed youths receive treatment (Newman et al., 1996), it is crucial to develop prevention programs for this psychiatric condition.

At present, cognitive–behavioral (CB) interventions with a primary focus on reducing negative cognitions have the most empirical support. CB interventions have produced significantly greater reductions in depressive symptoms than assessment-only control groups have in universal trials (Jaycox, Reivich, Gillham, & Seligman, 1994; Shochet et al., 2001; Spence, Sheffield, & Donovan, 2003), in selected trials with high-risk youths (Seligman, Schulman, & Tryon, 2007), and in indicated trials involving youths with elevated depressive symptoms (Clarke et al., 1995, 2001; Garber et al., 2009; Stice, Burton, Bearman, & Rohde, 2006). Although these interventions typically produce significantly greater reductions in depressive symptoms than observed in assessment-only control groups, effects rarely persist through 1- and 2-year follow-up. A meta-analytic review found that only four out of 17 trials of CB depression prevention programs produced effects that remained significant at 1-year follow-up, with an average effect size (r) of only .08 across the 17 trials (Stice, Shaw, Bohon, Marti, & Rohde, 2009). For instance, Clarke et al. (1995) found that greater reductions in depressive symptoms resulted by posttest after a 15-session group CB intervention than an assessment-only control condition for adolescents with depressive symptoms, though this effect was nonsignificant at 1-year follow-up. CB interventions have significantly reduced risk for future onset of major depression during follow-up in some trials (Clarke et al., 1995, 2001; Stice, Rohde, Seeley, & Gau, 2008) but not others (Gillham, Hamilton, Freres, Patton, & Gallop, 2006; Seligman, Schulman, DeRubeis, & Hollon, 1999; Seligman et al., 2007; Sheffield et al., 2006). Garber et al. (2009) found that risk for onset of depressive episodes was significantly reduced by their group CB intervention relative to assessment-only control over a 6-month period during which booster sessions were administered monthly.

Although several CB prevention programs have produced promising findings, the long duration of these interventions makes them challenging to implement. We believe, in addition, that adolescents are more likely to benefit from prevention programs that have only

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a few simple concepts to remember. In line with this thesis, a meta-analytic review of obesity prevention programs found that programs that focus on fewer concepts produced effects significantly larger than those produced by studies that focus on numerous concepts (Stice, Shaw, & Marti, 2006). It is possible that a similar process occurs for depression prevention programs. Thus, we developed a brief, six-session group CB prevention program that focused exclusively on reducing negative cognitions and increasing pleasant activities among individuals with elevated depressive symptoms. An earlier report from this indicated depression prevention trial found that participants assigned to this program showed significantly greater reductions in initial depressive symptoms and psychosocial impairment and reduced risk for onset of future major depression than educational brochure controls did through 6-month follow-up (Stice, Rohde, et al., 2008). The present report describes the effects for this group CB program through 1- and 2-year follow-up.

Another gap in the literature is that few trials have compared CB prevention programs to placebo or alternative interventions. This comparison is necessary for determining whether effects result because of the specific therapeutic procedures theorized to produce intervention effects or because of nonspecific effects common to all group-based interventions (e.g., therapeutic alliance, group cohesion, installation of hope, participant expectancies). Indeed, one criterion for establishing that an intervention is efficacious is that it outperforms a placebo or alternative intervention (American Psychological Association, 1995).

Five trials have compared CB depression prevention programs to alternative interventions. Merry, McDowell, Wild, Bir, and Cunliffe (2004) found that a universal CB program produced greater reductions in depressive symptoms at posttest than an arts and crafts intervention did, though effects were nonsignificant by 18-month follow-up. Stice, Burton, et al. (2006) found that participants assigned to a CB program, supportive expressive therapy, CB bibliotherapy, expressive writing, or a journaling intervention showed greater reductions in symptoms than assessment-only controls did at posttest, but only bibliotherapy produced effects that persisted through 6-month follow-up. CB participants showed greater symptom reductions relative only to journaling participants and only at posttest. Bibliotherapy participants showed greater symptom reductions than expressive writing participants did at 6-month follow-up. Gillham et al. (2007) found that a CB depression prevention program did not produce greater symptom reductions than a nonspecific comparison intervention or an assessment-only control condition. Horowitz, Garber, Ciesla, Young, and Mufson (2007) found that relative to assessment-only control, both a CB and an interpersonal therapy intervention reduced symptoms through posttest but not 6-month follow-up; there were no significant differences between the two interventions. An earlier report from the present trial (Stice, Rohde, et al., 2008) found that group CB participants showed greater symptom reductions at posttest than supportive expressive and CB bibliotherapy participants did, though effects were nonsignificant by 6-month follow-up. Supportive expressive and bibliotherapy participants both showed greater symptom reductions than assessment-only controls did through 6-month follow-up, with supportive expressive participants showing greater reductions than bibliotherapy participants did at posttest. These findings imply that nonspecific factors contribute to CB intervention effects or that interventions with either general, group-nonspecific therapeutic factors or CB material produce effects.

Thus, trials provide limited evidence that group CB depression prevention programs significantly outperform alternative interventions. Further, most of these trials included brief follow-up periods. The present report compared the effects of the brief, group CB prevention program with those of a supportive expressive intervention that was intended to control for nonspecific therapeutic factors and a CB bibliotherapy that was intended to control for CB content at 1- and 2-year follow-up. In supportive expressive interventions, which have been used in prior depression treatment trials (Brent et al., 1997; Shaw, 1977), the goals are to establish and maintain rapport, provide support, and help the client identify and express emotions. Bibliotherapy refers to the prescription of books for the treatment of a disorder. We thought it vital to compare the apparent intervention of choice for the prevention of depression (i.e., group CB) with bibliotherapy because the latter is much less expensive and easier to disseminate. Our primary outcomes were reductions in depressive symptoms, risk for onset of major/minor depressive disorder, and improvements in social adjustment. We targeted adolescents with depressive symptoms because meta-analytic reviews found that selected and indicated programs targeting high-risk youths produce larger effects than universal programs offered to unselected adolescents do (Horowitz & Garber, 2006; Stice et al., 2009). In theory, youths struggling with subdiagnostic depression may be more likely to engage in the prevention program because they are more motivated to change. It may also be easier to acquire intervention skills when they can be applied to current symptoms. We focused on adolescents with depressive symptoms, because risk factor studies have found that elevated depressive symptoms are typically the most potent predictor of future onset of major depression (Lewinsohn et al., 1994; Seeley, Stice, & Rohde, 2009; Weissman, Fendrich, Warner, & Wickramaratne, 1992) and this population has responded to CB prevention programs (Clarke et al., 1995, 2001; Garber et al., 2009).

Method

Participants

Participants were 341 high school students (56% female) who ranged in age from 14 to 19 years ($M = 15.6$ years, $SD = 1.2$) at pretest. The sample was composed of 2% Asians, 9% African Americans, 46% Caucasians, 33% Hispanics, and 10% who specified other or mixed heritage. Our sample was somewhat more ethnically diverse than the greater Austin area (7% African American, 18% Hispanic, 65% Caucasian) because we systematically recruited at schools with high proportions of minority students to maximize the ethnic diversity of our sample. Educational attainment of parents, a proxy for socioeconomic status, was 26% high school graduate or less, 17% some college, 35% college graduate, and 18% advanced degree. These percentages was somewhat higher than those for the population from which we sampled (34% high school graduate or less, 25% some college, 26% college graduate, 15% advanced degree), potentially because of the proximity to a large state university. Twenty-eight percent of the sample had received treatment services for emotional/behavioral problems during the 1-year period preceding the study. Past treat-

ment services did not differ significantly by condition: $\chi^2(3, N = 338) = 1.36, p = .711$; group CB = 26%, supportive expressive = 24%, CB bibliotherapy = 28%, brochure control = 23%. Of those who received treatment, 41% received individual therapy, 9% received group or family therapy, 8% took medication, and 42% received a combination of treatment types. Past treatment type did not differ significantly by condition, $\chi^2(9, N = 91) = 12.37, p = .192$. Twenty-nine percent of participants received treatment services for psychiatric problems during the 2-year follow-up; rates did not differ significantly by condition: $\chi^2(3, N = 313) = 4.25, p = .236$; group CB = 21%, supportive expressive = 28%, CB bibliotherapy = 30%, brochure control = 22%. Of those receiving treatment during the study 41% received individual therapy, 14% received group or family therapy, 10% took medication, and 34% received a combination of treatment types. Treatment type during the follow-up did not differ significantly by condition, $\chi^2(9, N = 92) = 6.68, p = .670$.

Procedure

Participants were recruited with mass mailings, handbills distributed during the lunch hour, and posters that invited students experiencing sadness to participate in a trial of interventions designed to improve current and future mood. Interested students were given a depression screener (the Center for Epidemiologic Studies–Depression scale [CES-D]; Radloff, 1977) and a consent form. Those who returned a signed consent form and scored 20 or above on the CES-D were invited to complete a pretest assessment. We selected this cutoff because an epidemiologic study (Roberts, Lewinsohn, & Seeley, 1991) found that 31% of community-dwelling adolescents scored above 20 on the CES-D, and this cutoff appeared to maximize sensitivity for detecting youths at risk for major depression. Students who met diagnostic criteria for current major depression upon interview were excluded and given treatment referrals (there were no other exclusion criteria). All participants were provided with treatment referral information and encouraged to seek treatment if their depressive symptoms escalated during the trial. If a youth endorsed suicidal ideation during any interview, project staff contracted for safety with the student and called the student's parent to emphasize the importance of seeking treatment and provide additional referral information. This issue emerged during 14 interviews over the course of the study. Four participants endorsed suicidal ideation during eligibility interviews (prior to randomization) and were excluded because they met criteria for current major depression. Ten youths endorsed suicidal ideation during follow-up interviews (3 group CB participants, 1 supportive expressive participant, 3 bibliotherapy participants, and 3 control participants).

Participants were recruited at six schools (40–75 students per school) between 2004 and 2007. The project coordinator used computer-generated random numbers to randomly assign them, within blocks created by gender and school, to intervention condition: (a) group CB ($n = 89$); (b) group supportive expressive ($n = 88$); (c) CB bibliotherapy ($n = 80$); or (d) educational brochure control ($n = 84$). Group CB and supportive expressive interventions consisted of six weekly 1-hr sessions. Groups contained 3–10 same-gender participants; CB groups contained an average of 6.3 participants, and supportive expressive groups contained an average of 6.8 participants. Groups were facilitated by a clinical psychology graduate student and cofacilitated by an undergraduate psychology student. Facilitators were assigned to conduct groups on the basis of (a) academic or clinical training experiences that enhanced a facilitator's ability to lead either CB or supportive expressive groups; (b) preference for the therapeutic approach (CB or supportive expressive); (c) time availability to conduct a group on a weekly basis for 6 weeks; and (d) gender (the gender of at least one of the facilitators matched the gender of group participants). Facilitators ($n = 13$) conducted an average of four groups. Of the facilitators, five (38%) conducted only CB groups, three (23%) conducted only supportive expressive groups, and five (38%) conducted both CB and supportive expressive groups. If a youth missed a session, a brief (10–15 min) individual session was conducted with the youth to review missed material when possible. Detailed manuals for group interventions contained a theoretical rationale for the program, general facilitator guidelines, material needed for each session, and outlines for all six sessions (session topics, points to cover in each section, anticipated time requirements for each section, home practice assignments for the CB condition). The manuals were designed to provide consistency across facilitators and provide a comparable level of guidance for the two forms of group intervention, but they were not verbatim scripts. For information on facilitator training, supervision, and competence and fidelity ratings, see the report of the acute effects of this trial (Stice, Rohde, et al., 2008).

Participants completed a survey and diagnostic interview at pretest, posttest, and 6-month, 1-year, and 2-year follow-ups. They were paid $20 for completing each assessment. Participant flow through the study is shown in Figure 1. Assessors, who were blinded to condition, had at least a bachelor's degree in psychology and received 40 hr of training in the use of the semistructured interviews, which involved didactic presentations on diagnostic criteria and interview skills, practice ratings of prerecorded interviews, and interview role-plays. Assessors were required to show a minimum kappa agreement of 0.80 for diagnosis with expert raters before starting data collection and to maintain this throughout the study (assessed in a randomly selected 10% of taped interviews). Assessments and groups were conducted at schools after classes at the convenience of participants. The local institutional review board approved this study.

CB Depression Prevention Intervention

In the design of our brief CB program, we drew upon the Clarke et al. (1995) program, general CB concepts for the prevention and treatment of depression, and our experience with the design of eating disorder prevention programs. Didactic presentation was minimized because psychoeducational interventions are less effective than interventions that actively engage participants (Stice & Shaw, 2004). The six weekly 1-hr sessions focused on building group rapport, increasing participant involvement in pleasant activities (Sessions 1–6), learning and practicing cognitive restructuring techniques (Sessions 2–4), and developing response plans for future life stressors (Sessions 5–6). In-session exercises required youths to apply the skills taught in the intervention. Homework reinforced the skills taught in the sessions and helped par-

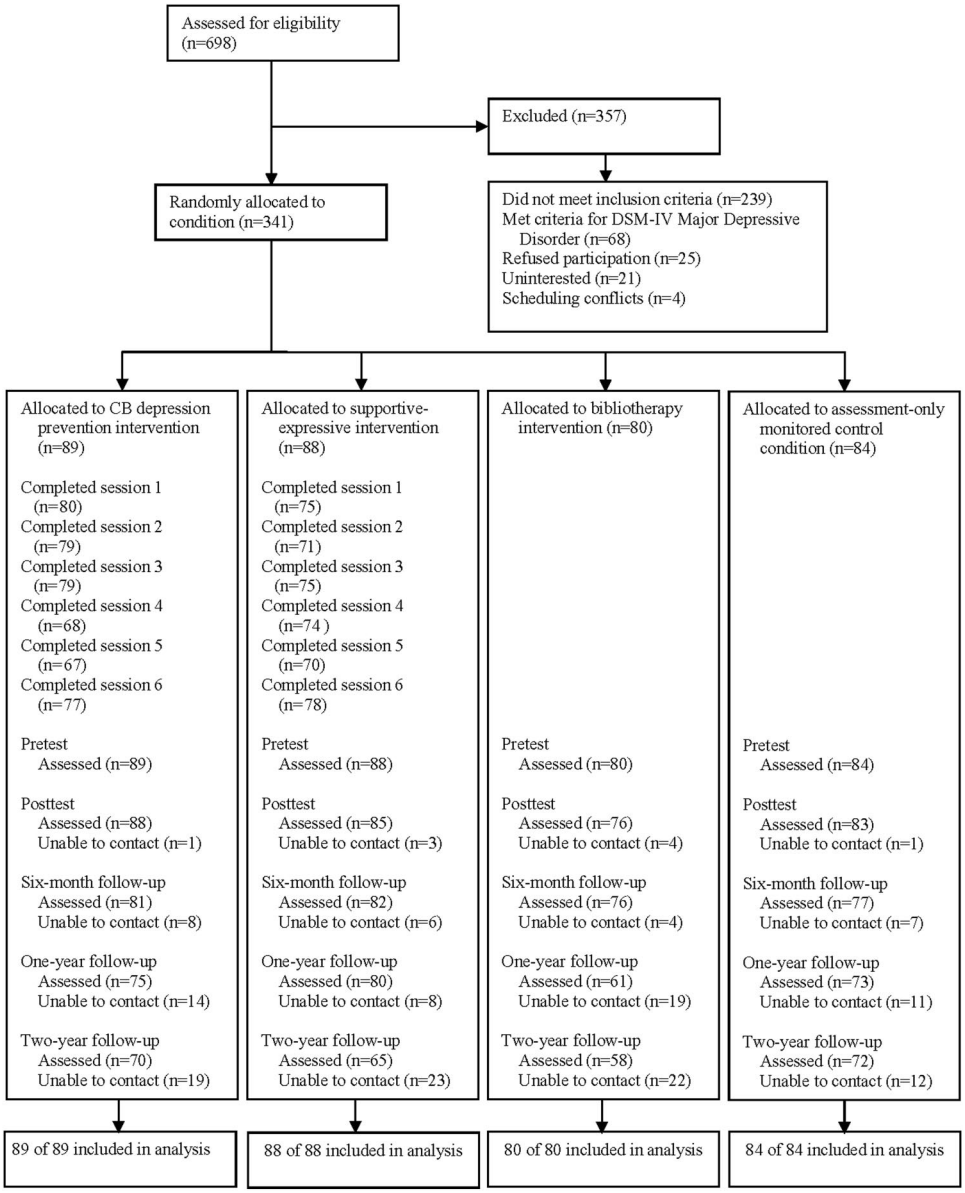

Figure 1. Flow of participants through each stage of the study. *DSM–IV = Diagnostic and Statistical Manual of Mental Disorders* (4th ed.); CB = cognitive–behavioral.

ticipants learn how to apply these skills to their daily life.[1] We also used motivational enhancement exercises to maximize willingness to use the new skills, strategic self-presentation to facilitate internalization of key principles, behavioral techniques to reinforce use of the new skills, and group activities to foster feelings of social support and group cohesion.

Supportive Expressive Group Intervention

Our goals in this intervention were to establish and maintain rapport, provide support, and help participants identify and express feelings; this group did not cover any specific skills learned in the other conditions. The six weekly 1-hr sessions provided a forum for discussing feelings in a safe environment, based on the rationale that (a) sharing our inner feelings with another person reduces stress and improves our mood, (b) listening to others helps us realize we are not alone, and (c) it is more helpful to listen than to tell others what to do. The sessions were devoted to open sharing, and they provided participants with a venue to discuss and process

[1] The proportion of assigned homework assignments completed by participants in the CB group, which was counted for each session they attended, correlated with change in depressive symptom scores from baseline to each of the postbaseline assessments. The correlation of the homework score with change in depressive symptoms from baseline to posttest ($r = .24$, $p = .026$) indicated that group CB participants who completed more homework assignments showed greater decreases in depressive symptom scores. Correlations with homework completion and change in depressive symptom scores at the 6-month, 1-year, and 2-year follow-up assessments were nonsignificant.

their emotional experiences since the previous meeting. Participants were encouraged to discuss changes in their experiences, as well as any emerging problems or worries. No direct advice was given. Participants and facilitators actively supported and responded to one another. All sessions concluded with a summary statement by the facilitators that focused on common themes that emerged in the session.

CB Bibliotherapy Intervention

Participants in the bibliotherapy condition were given copies of *Feeling Good* (Burns, 1980). Considered an effective self-help book for depression, it provides relevant and practical CB techniques for preventing and reducing negative moods. It is written at a high-school reading level. The book covers several topics (e.g., understanding feelings of sadness, building self-esteem), but the majority of text is focused on repeated examples of cognitive restructuring.

Educational Brochure Control Condition

At pretest, participants were given a National Institute of Mental Health brochure (*Let's Talk About Depression*; NIMH Publication No. 01-4162) that describes major depression, recommends treatment for depressed youths, and gives information about local treatment options. They completed the same assessments as those in the other conditions, which allowed us to monitor depression and suicidal ideation and to contact parents and provide treatment referrals as necessary (as was done in all conditions). Participants and their parents were asked to contact research staff if they believe that a participant's depression had worsened. We selected this control group because it represents an ecologically valid control condition of what is generally provided to youths in local schools.

Measures

Depressive symptoms and diagnosis. Sixteen items assessing major depression symptoms based on the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM–IV*; American Psychiatric Association, 1994) were adapted from the Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS; Kaufman, Birmaher, Brent, Rao, & Ryan, 1996), a semistructured diagnostic interview. Adolescents reported the peak severity of each symptom over their lifetime and over the past month at baseline or since the last interview at each follow-up assessment on a month-by-month basis. Items used an expanded response format (1 = *not at all* to 4 = *severe symptoms,* with ratings of 3 and 4 reflecting diagnostic levels). We averaged across the 16 severity items to form a continuous depressive symptom composite, which captured severity of symptoms over the past 6 months for the 1-year follow-up and over the past 12 months for the 2-year follow-up. Responses were also used to determine whether participants met diagnostic criteria for major or minor depression over their lifetime and since the last assessment. This adapted version of the K-SADS has shown test–retest reliability (*k*s = 0.63–1.00) and interrater reliability for depression diagnosis (*k*s = 0.73–1.00), internal consistency (αs = .68–.84), and predictive validity (Nolen-Hoeksema, Stice, Wade, & Bohon, 2007). To assess the interrater reliability in the present trial, a second assessor who was blind to the first diagnosis reinterviewed a randomly selected subset of participants (5% of all interviews) within a 3-day period; high interrater agreement for diagnoses (k = 0.83) and for the continuous symptom composite (r = .85) resulted. Another randomly selected subset of participants (5% of all interviews) completed a second diagnostic interview with the same assessor 1 week later, resulting in high test–retest reliability for diagnoses (k = 0.83) and for the continuous symptom composite (r = .93). In the present trial the depressive symptom severity score showed internal consistency (α = .75) and sensitivity to detecting intervention effects (Stice, Rohde, et al., 2008). At baseline, 28% of the participants reported a past history of major depression and 12% reported past minor depression (differences in rates between the four intervention conditions were nonsignificant).

We also included the 21-item Beck Depression Inventory (BDI; Beck, Steer, & Garbin, 1988) to allow more direct comparisons with results from previous depression prevention trials. For each item, participants select from among four responses reflecting the increasing levels of symptom severity (0 = *no symptom present* to 3 = *severe symptom present*) in the past 2 weeks. The BDI has acceptable internal consistency (αs = .73–.95), test–retest reliability (*r*s = .60–.90), and convergent validity with clinician ratings of depressive symptoms (mean r = .75; Beck et al., 1988). In the present study, the BDI had good internal consistency at baseline (α = .82). Although we report results for the BDI, our primary outcome measure is the interviewer-assessed depressive symptoms, because this measure covers a broader time period and incorporates the interviewer's synthesis and interpretation of the adolescent's report. The BDI correlated with the K-SADS depressive symptom composite at baseline (r = .58).

Social adjustment. We used 17 items adapted from the Social Adjustment Scale—Self Report for Youth (Weissman, Orvaschel, & Padian, 1980) to assess social impairment in school, peer, spare time, and family domains (response options 1 = *never* to 5 = *always*). The 17-item version has shown internal consistency (α = .77), 1-week test–retest reliability (r = .83), and sensitivity to detecting intervention effects (Stice, Marti, Spoor, Presnell, & Shaw, 2008). In the present study, the scale had marginal internal consistency at baseline (α = .71).

Results

Preliminary Analysis

Participants assigned to the four conditions did not differ on demographic characteristics, reported in Table 1, or baseline outcome measures, reported in Table 2, with the exception of baseline interview-assessed depressive symptoms, $F(3, 337) = 4.94$, p = .002, η^2 = .04. A Scheffe comparison showed that bibliotherapy participants had significantly lower baseline depressive symptoms than group CB and supportive expressive participants but not brochure controls. Thus, subsequent analysis controlled for baseline depressive symptoms.

Data were not provided by 3% of participants at posttest, 9% of participants at the 6-month follow-up, 15% of participants at the 1-year follow-up, and 22% of participants at the 2-year follow-up. On average, participants completed 4.4 assessments (SD = 0.9),

Table 1
Descriptive Statistics by Condition for Study Demographic Characteristics

Characteristic	Group CB (n = 89)		Supportive expressive (n = 88)		CB bibliotherapy (n = 80)		Brochure control (n = 84)	
	n	%	*n*	%	*n*	%	*n*	%
Female	51	57.3	48	54.5	43	53.8	50	59.5
Race								
African American	5	5.6	6	6.8	7	8.8	12	14.3
Hispanic	37	41.6	31	35.2	19	23.8	24	28.6
Caucasian	37	41.6	40	45.5	44	55.0	35	41.7
Other	10	11.2	11	12.5	10	12.5	13	15.5
Age								
14 years	20	22.5	15	17.0	14	17.5	20	23.8
15 years	29	32.6	25	28.4	30	37.5	29	34.5
16 years	17	19.1	23	26.1	24	30.0	16	19.0
17 years	17	19.1	22	25.0	11	13.8	13	15.5
18 years	6	6.7	3	3.4	1	1.3	6	7.1
Maximum parental education								
Grade school graduate	8	10.0	10	11.9	6	7.6	8	9.5
High school graduate	13	16.3	15	17.9	12	15.2	17	20.2
Some college	18	22.5	15	17.9	13	16.5	13	15.5
College graduate	29	36.3	31	36.9	30	38.0	30	35.7
Advanced degree	12	15.0	13	15.5	18	22.8	16	19.0

Note. No pairwise comparisons are statistically significant at $p < .05$ for any participant characteristics. CB = cognitive–behavioral.

and the number of completed assessments was not associated with intervention condition, $F(3, 337) = 1.13$, $p = .338$, or any baseline outcomes or demographic factors ($p < .05$). Attendance in the two group conditions was not associated with baseline demographic factors or outcomes at baseline or at follow-up assessments. We employed an intent-to-treat analysis by using maximum likelihood estimates to impute missing data with the NORM software program (Schafer, 1999), as it produces more accurate and efficient parameter estimates than listwise deletion or last observation carried forward (Schafer & Graham, 2002).

Intervention Effects for Primary Outcomes

Omnibus repeated measures analysis of covariance models (ANCOVA) tested whether there was differential change in the continuous outcomes across conditions over the 2-year follow-up (condition was a four-level, between-subjects factor; time was a five-level, within-subjects factor for depressive symptoms and BDI and a four-level, within-subjects factor for social functioning). Time × Condition interactions indicated there was significantly differential change across conditions for depressive symp-

Table 2
Descriptive Statistics by Intervention Condition for Study Outcome Measures

Outcome measure	Group CB (n = 89)		Supportive expressive (n = 88)		CB bibliotherapy (n = 80)		Brochure control (n = 84)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Depressive symptoms								
Pretest	1.88	0.35	1.83	0.37	1.68	0.31	1.81	0.30
Posttest	1.52	0.33	1.63	0.34	1.62	0.36	1.69	0.36
6-month follow-up	1.52	0.44	1.56	0.42	1.45	0.39	1.67	0.45
1-year follow-up	1.51	0.41	1.50	0.41	1.48	0.41	1.59	0.41
2-year follow-up	1.48	0.43	1.48	0.37	1.51	0.43	1.55	0.43
Beck Depression Inventory								
Pretest	20.12	10.38	20.27	9.83	18.21	7.53	19.60	9.23
Posttest	10.71	9.07	14.55	10.68	14.48	9.11	16.48	9.80
6-month follow-up	11.87	10.06	12.92	10.27	15.84	10.93	17.48	10.98
1-year follow-up	13.24	11.38	12.00	9.44	12.58	9.86	14.45	10.04
2-year follow-up	10.19	9.09	11.75	9.36	11.59	8.71	12.60	9.44
Social adjustment								
Pretest	2.80	0.49	2.74	0.49	2.74	0.52	2.73	0.52
6-month follow-up	2.51	0.51	2.64	0.58	2.66	0.48	2.67	0.52
1-year follow-up	2.43	0.50	2.44	0.52	2.57	0.39	2.50	0.48
2-year follow-up	2.27	0.54	2.36	0.50	2.36	0.48	2.34	0.49

Note. CB = cognitive–behavioral; *SD* = standard deviation.

toms, $F(12, 1348) = 3.07$, $p < .001$, $\eta^2 = .03$, and BDI scores, $F(12, 1348) = 3.80$, $p < .001$, $\eta^2 = .03$, but not for social adjustment, $F(9, 1011) = 1.63$, $p = .101$, $\eta^2 = .01$. For outcomes with significant omnibus Time × Condition interactions, separate follow-up repeated-measures ANCOVA models tested whether groups significantly differed from each other from pretest to 1-year follow-up and from pretest to 2-year follow-up. The Time × Condition interactions (see Table 3) test whether participants in one condition showed significantly greater changes in the outcome than did those in the other condition.

Effects relative to brochure controls. Group CB participants showed significantly greater reductions in depressive symptoms than brochure control participants did at the 1-year follow-up, but this effect was only marginal at 2-year follow-up. Although supportive expressive participants showed marginally greater symptom reductions than brochure controls did at 1-year follow-up, this effect was nonsignificant at 2-year follow-up. Bibliotherapy participants did not show significantly greater symptom reductions than brochure controls did at either follow-up.

Effects relative to other active interventions. Group CB participants showed significantly greater reductions in depressive symptoms than bibliotherapy participants did at both the 1- and 2-year follow-ups. However, group CB participants did not show significantly greater reductions in depressive symptoms than supportive expressive participants did at either follow-up. Supportive expressive participants showed marginally greater symptom reductions than bibliotherapy participants did at the 1-year follow-up and had significantly greater symptom reductions at 2-year follow-up.

Effects for the BDI. With regard to BDI scores, Group CB participants showed greater reductions in BDI scores than bibliotherapy participants did at the 2-year, but not the 1-year, follow-up assessment. Although the three other significant follow-up comparisons for interview-assessed depressive symptoms (shown in the top half of Table 3) were not detected for the BDI (shown in the bottom half of Table 3), the findings for the remaining contrasts replicated across the two measures.

As shown in Table 3, the effect sizes, as measured by Cohen's *d* statistic, for the significant and marginal effects ranged from 0.30 to 0.45, with an average of 0.38. These effect sizes were medium to large per Cohen's (1988) criteria.

Moderation

Gender and age were individually added to the models described above as a test for moderation of intervention effects for the depressive symptoms and BDI scores at 1- and 2-year follow-up. No evidence of gender as a moderator was found for depressive symptoms at 1-year follow-up, $F(9, 951) = 1.07$, $p = .380$, $\eta^2 = .01$, or 2-year follow-up, $F(12, 1268) = 1.59$, $p = .087$, $\eta^2 = .02$, or for age as a moderator at 1-year follow-up, $F(9, 951) = 0.69$, $p = .721$, $\eta^2 = .01$, or 2-year follow-up, $F(12, 1268) = 0.82$, $p = .631$, $\eta^2 = .01$. No evidence of gender as a moderator was found for BDI at 1-year follow-up, $F(9, 951) = 0.62$, $p = .782$, $\eta^2 = .01$, or 2-year follow-up, $F(12, 1268) = 0.61$, $p = .832$, $\eta^2 = .01$, or for age as a moderator at 1-year follow-up, $F(9, 951) = 0.44$, $p = .915$, $\eta^2 \leq .01$, or 2-year follow-up, $F(12, 1268) = 0.56$, $p = .873$, $\eta^2 = .01$.

Reliable Change

We used the reliable change index to test for clinically significant change in depressive symptoms and BDI scores over the 2-year follow-up (Jacobson & Truax, 1991). Omnibus tests indicated significantly different rates of reliability change in depres-

Table 3
Repeated Measures Analysis of Covariance Pairwise Contrasts

Condition and follow-up	Group CB					Supportive expressive					Bibliotherapy				
	Coeff	*SE*	95% CI	*p*	*d*	Coeff	*SE*	95% CI	*p*	*d*	Coeff	*SE*	95% CI	*p*	*d*
Depressive symptoms															
Supportive expressive															
1-year	0.01	0.02	[−0.03, 0.06]	.571	0.09										
2-year	0.02	0.03	[−0.04, 0.07]	.559	0.09										
Bibliotherapy															
1-year	0.06	0.02	[0.01, 0.11]	.015	0.38	0.05	0.02	[−0.01, 0.09]	.058	0.30					
2-year	0.08	0.03	[0.03, 0.13]	.004	0.45	0.06	0.02	[0.02, 0.11]	.011	0.40					
Brochure control															
1-year	0.05	0.02	[0.01, 0.10]	.023	0.30	0.04	0.02	[−0.01, 0.08]	.090	0.26	−0.01	0.02	[−0.05, 0.04]	.757	0.05
2-year	0.05	0.03	[−0.01, 0.10]	.056	0.29	0.03	0.02	[−0.01, 0.08]	.145	0.22	−0.03	0.02	[−0.08, 0.02]	.231	0.19
Beck Depression Inventory															
Supportive expressive															
1-year	−0.49	0.60	[−1.67, 0.69]	.413	0.12										
2-year	0.50	0.58	[−0.64, 1.64]	.390	0.13										
Bibliotherapy															
1-year	0.44	0.58	[−0.69, 1.57]	.442	0.12	0.93	0.53	[−0.10, 1.97]	.078	0.28					
2-year	1.17	0.54	[0.11, 2.23]	.030	0.34	0.67	0.54	[−0.40, 1.74]	.218	0.19					
Brochure control															
1-year	0.62	0.62	[−0.61, 1.84]	.322	0.15	1.11	0.58	[−0.04, 2.25]	.058	0.29	0.18	0.55	[−0.91, 1.26]	.751	0.05
2-year	1.03	0.60	[−0.15, 2.23]	.087	0.26	0.54	0.61	[−0.66, 1.74]	.377	0.14	−0.13	0.57	[−1.25, 0.99]	.818	0.04

Note. CB = cognitive–behavioral; Coeff = coefficient; CI = confidence interval; *SE* = standard error.

sive symptoms, $\chi^2(3, N = 341) = 12.49$, $p = .006$, and BDI scores, $\chi^2(3, N = 341) = 10.15$, $p = .017$. Follow-up contrasts indicated that reliable change rates for depressive symptoms were significantly greater in group CB participants (48.3%, $p = .013$), odds ratio [OR] = 2.21, 95% CI [1.18, 4.13], than brochure controls (29.8%). Follow-up contrasts for the BDI indicated that reliable change rates were significantly higher in group CB participants (31.5%, $p = .041$), OR = 2.11, 95% CI [1.03, 4.31], than brochure controls (17.9%) and in supportive expressive participants (25.0%, $p = .043$), OR = 2.33, 95% CI [1.03, 5.30], than bibliotherapy participants (12.5%).

Intervention Effects for Major/Minor Depression Onset

By the 2-year follow-up, 46 (14%) of the participants had shown onset of major depression (40 cases) or minor depression (6 cases): 19 (23%) of brochure control participants, 12 (14%) of group CB participants, 13 (15%) of group supportive expressive participants, and two (3%) of CB bibliotherapy participants. Figure 2 shows cumulative survival functions adjusted for baseline depressive symptoms for the percentage of participants in each condition that showed onset of major/minor depression from baseline to 2-year follow-up. Cox proportional hazard models using two-tailed tests showed that group CB participants, $B = 0.80$, $SE = 0.38$, $p = .033$, OR = 2.23, 95% CI [1.07, 4.67], and bibliotherapy participants, $B = 2.10$, $SE = 0.75$, $p = .004$, OR = 8.13, 95% CI [1.89, 34.96], showed significantly lower risk for onset of depressive episodes during the 2-year follow-up than brochure controls did. The incidence for major/minor depression onset did not differ significantly for the remaining contrasts: group CB versus supportive expressive, $B = 0.15$, $SE = 0.40$, $p = .709$, OR = 1.16, 95% CI [0.52, 2.56]; group CB versus bibliotherapy, $B = -1.29$, $SE = 0.77$, $p = .093$, OR = 0.28, 95% CI [0.07, 1.24]; supportive expressive versus brochure controls, $B = 0.65$, $SE = 0.37$, $p = .076$, OR = 1.92, 95% CI [0.94, 3.97]; and supportive expressive versus bibliotherapy, $B = -1.44$, $SE = 0.77$, $p = .060$, OR = 0.24, 95% CI [0.05, 1.06].

Discussion

Participants in the group CB depression prevention program showed significantly greater reductions in depressive symptoms than brochure control participants did by 1-year follow-up, though this effect was only marginal by 2-year follow-up. These results are encouraging, given that most group CB depression prevention programs do not produce effects that persist to either 1- or 2-year follow-up (Stice et al., 2009). The effect sizes for depressive symptoms ($d = 0.30$ at 1-year follow-up and 0.29 at 2-year follow-up) were medium in magnitude and compare favorably to the average effect sizes from follow-up from recent meta-analytic reviews of depression prevention programs ($d = 0.11$ in Horowitz & Garber, 2006, and $d = 0.20$ in Stice et al., 2009), particularly given that the intervention was only six sessions long (vs. an average of 11 sessions). Moreover, the pretest to 1-year follow-up effect size per hour of intervention ($d = 0.05$) compares favorably to the average parallel effect size for longer CB interventions evaluated in prevention trials ($d = 0.014$; Stice et al., 2009). There are several possible explanations for the fact that we observed stronger and more persistent effects for our brief CB depression prevention program than have been previously observed for longer CB depression prevention programs. First, our brief CB program included a focus on increasing pleasant activities, which has not been a core topic in longer CB prevention programs. Second, the longer CB depression prevention programs have typically included a focus on improving coping, problem-solving, and social skills. As noted, it is possible that adolescents are more likely to remember two core skills for combating depression that were covered in our brief CB program versus the wider range of concepts covered in the longer CB programs.

Supportive expressive participants showed marginally greater reductions in depressive symptoms by 1-year follow-up than brochure controls did, but this effect was nonsignificant at 2-year follow-up. Bibliotherapy participants did not show significantly greater reductions in depressive symptoms than brochure controls did at either follow-up assessment. It might be argued that bibliotherapy did not reduce depressive symptoms because participants

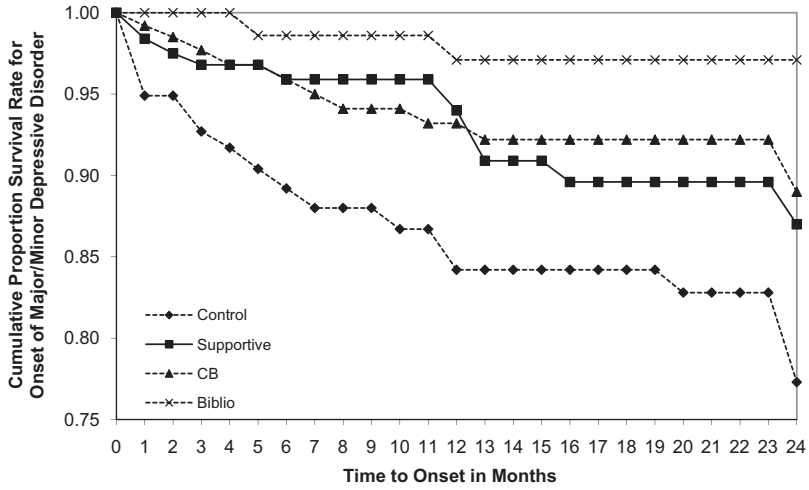

Figure 2. Covariate-adjusted survival curves for onset of major/minor depression by intervention condition. Supportive = supportive expressive; CB = cognitive–behavioral; Biblio = bibliotherapy.

in this condition received a small dose of this intervention, as they read only a portion of the book. Yet, data suggested that on average they read 150 pages from pre to post and another 50 pages during follow-up, which would take approximately 5.5 hr, assuming an average high school reading level (Carver, 1990). This is close to the average number of hours participants spent in the group CB intervention ($M = 5.1$ hr in session, plus time completing homework outside of session) and suggests that dosage was similar for the two CB interventions. However, the timing of the intervention across these two conditions probably differed, and this may have influenced the differential effects of these two interventions. It might also be argued that depressive symptoms reduction effects were more difficult to detect for bibliotherapy participants, because they had less of an opportunity to show regression to the mean during the follow-up due to their initially lower symptoms. However, bibliotherapy participants did not differ from brochure controls at baseline on either measure of depressive symptoms, yet bibliotherapy participants still did not show greater symptom reductions than controls on these two outcomes.

It is important that group CB participants showed significantly greater reductions in depressive symptoms than bibliotherapy participants, but not supportive expressive participants, did through 1- and 2-year follow-up. There was also evidence that supportive expressive participants showed significantly greater reductions in depressive symptoms than bibliotherapy participants did at 2-year follow-up, though this effect was only marginal at 1-year follow-up. We compared group CB to supportive expressive therapy and to CB bibliotherapy, as these alternate interventions can be conceptualized as dismantled aspects of group CB. The supportive expressive group provided nonspecific therapeutic factors without a CB-specific focus, and bibliotherapy delivered CB content without group-based nonspecific factors. Thus, the evidence that group CB did not significantly outperform the supportive expressive intervention in the present trial or one previous trial (Stice, Burton, et al., 2006) during follow-up suggests that nonspecific factors unrelated to the CB content may have contributed to the therapeutic effects of the group CB prevention program. In line with this interpretation, a report on mediators that account for the effects of these interventions found that relative to brochure control, group CB resulted in significant increases in emotional expression and reductions in loneliness (Stice, Rohde, Seeley, & Gau, 2010). However, it is also possible that CB content and emotional support are both effective methods of reducing depressive symptoms, even though group CB showed stronger effects relative to brochure control than supportive expressive therapy did in the present trial and a previous trial (Stice, Burton, et al., 2006). Either interpretation of these findings implies that it may be possible to improve intervention effects by devoting a greater focus to nonspecific group processes, such as building group rapport and expectations for positive intervention effects.

The evidence that group CB significantly outperformed a credible alternative intervention (bibliotherapy) is a novel contribution to the literature. Only two previous trials have provided evidence that group CB produces significantly greater reductions in depressive symptoms than alternative interventions do (Merry et al., 2004; Stice, Burton, et al., 2006), though these effects were observed only from pretest to posttest in these two prior trials. The present trial is the first to indicate that group CB significantly outperformed an alternative intervention through 1- and 2-year follow-up. Yet, it is important to acknowledge that relative to either supportive expressive or bibliotherapy, group CB did not significantly reduce the risk for future onset of major or minor depression, which is a key outcome for a depression prevention intervention.

Another important finding is that risk for onset of major or minor depression over the 2-year follow-up was significantly lower for group CB participants (14%) and bibliotherapy participants (3%) than for brochure controls (23%). It should be noted that baseline differences in depressive symptoms could not have contributed to these effects, because group CB and bibliotherapy participants did not differ from controls on either baseline measure of depressive symptoms and because we controlled for baseline differences in depression in the analyses. This is an important finding because group CB depression prevention programs have not reduced risk for future onset of depressive episodes during follow-up (Gillham et al., 2006; Seligman et al., 1999, 2007; Sheffield et al., 2006), with only two exceptions (Clarke et al., 1995, 2001). Indicated prevention interventions target individuals with signs of a problem to prevent future onset of a clinically significant disorder that would warrant treatment. Although most participants in the present study did not develop major or minor depression during follow-up and thus did not require early intervention for newly emerging depression, two of the three active interventions received support as indicated depression prevention interventions. Of note, whereas group CB, relative to the supportive expressive intervention and CB bibliotherapy, did not significantly reduce risk for onset of depressive episodes, data indicated that CB bibliotherapy produced marginally greater reductions in risk for future depressive episodes than both group CB and the supportive expressive intervention did. These effects should be interpreted with caution, given that they were marginal. Also, bibliotherapy participants entered the study at a slightly lower depression level, which may have impacted the incidence rates for depressive episodes in a manner that could not be statistically controlled.

The overall pattern of findings suggests that group CB produced significantly greater reductions in initial depressive symptoms than either the supportive expressive sessions or CB bibliotherapy did during and after the intervention but that relative to both group CB and the supportive expressive intervention, CB bibliotherapy produced marginally greater reductions in risk for onset of future depressive episodes. Indeed, the incidence of new depressive episodes was lowest in the bibliotherapy condition (3%). It is possible that the significantly lower level of depressive symptoms reported on the interview (but not the BDI) at baseline for bibliotherapy participants relative to group CB and supportive expressive participants might have contributed to the lower incidence of depressive disorder, but this seems unlikely because we statistically controlled for baseline depressive symptom. Another explanation for the low incidence of depression in the bibliotherapy condition is that participants did not come into contact with other youths with elevated depressive symptoms, as they did in the two group interventions. A third explanation for the low incidence of depression in the bibliotherapy condition is that participants were able to return to the book if they experienced a worsening of depressive symptoms during the 2-year follow-up. In line with this interpretation, data suggest that participants in this condition read approximately 50 additional pages during follow-up. Although the

present findings suggest that bibliotherapy has limited efficacy for reducing initial depressive symptoms in high-risk youths, results do suggest that this intervention prevents future onset of depressive episodes over a long period of time.

It was curious that CB bibliotherapy appeared to be effective at reducing risk for future onset of depressive episodes yet was ineffective at reducing initial depressive symptoms, particularly given that the reduction in depressive symptoms should have resulted in reduced risk for future onset of depressive episodes. This pattern of findings seems to suggest that nonspecific factors associated with group interventions, such as discussing feeling of depression and triggers for these emotions and the realization that other adolescents in the school are having similar experiences, are particularly effective in reducing initial depressive symptoms.

Although it is more common to conduct detailed costing analyses in effectiveness or dissemination trials rather than efficacy trials, we calculated the basic costs of delivering group CB versus CB bibliotherapy for participants in this trial. Facilitators were paid approximately $15 per hour and spent approximately 15 hr conducting each group (e.g., initial training, setup and actual intervention delivery, makeup sessions, group supervision). Costs for staff and supervision are estimated at $645 per group. This translates into $80 per student, as opposed to $8 per student for the cost of the self-help book used in bibliotherapy.

The incidence of depressive episodes in the present study was lower than that reported in some studies examining indicated depression prevention programs (e.g., Clarke et al., 1995, 2001; Garber et al., 2009; Gillham et al., 2006). It appears that this difference emerged because we recruited participants on the basis of a single risk factor, whereas some trials required that participants have two risk factors (e.g., elevated symptoms and a parental history of depression). Depression incidence for nonintervention control groups was higher in double than single risk factor studies (1-year depression onset rates of approximately 29% vs. 22%, respectively). The incidence in the present study for the control participants is comparable to that in other single risk factor studies. Thus, it appears that we had less power to detect differential risk of future depressive episode onset relative to indicated trials involving doubly at-risk youths.

It was also noteworthy that the BDI was less sensitive than interview assessments of depressive symptoms in detecting the effects of these prevention programs. Only one of the four effects that were significant for the interviewer-based depressive symptom measure emerged with the BDI. Results suggest that although they are more cumbersome and expensive, blinded diagnostic interviews provide a more sensitive measure of depressive symptoms in prevention trials, presumably because interviews assessed symptom severity during the entire period of time since the last assessment, as opposed to the past 2 weeks for the BDI. This interpretation suggests that it is critical to capture symptom fluctuation, including peak symptom severity, during the follow-up period in prevention trials. It is also possible that the BDI was less sensitive than the K-SADS interview because the former taps more self-perceived distress and the latter is a more objective indicator of depressive symptom severity. Researchers conducting efficacy and effectiveness trials in the area of depression prevention and treatment are encouraged to collect and report both interviewer-based and survey measures of adolescent depression. This will allow them to better understand the ability of both measures to detect change and to inform future large dissemination trials, in which it may be feasible to use only surveys when assessing depressive symptoms.

Although the group CB depression prevention program resulted in more social adjustment than the supportive expressive intervention, bibliotherapy, and educational brochure control did through 6-month follow-up (Stice, Rohde, et al., 2008), these effects did not persist through 1- and 2-year follow-up. It might be argued that this measure was not sufficiently sensitive to detect intervention effects on social functioning over such a long period, but we have observed intervention effects when using this measure through 3-year follow-up in another prevention trial (Stice, Marti, et al., 2008). The pattern of results in the present trial suggest that it might be useful to consider ways to refine the group CB prevention program so that it produces more lasting effects on psychosocial functioning (e.g., by having the home exercises focus on improving social functioning). To keep our CB intervention brief, we focused almost exclusively on cognitive restructuring and behavior activation and did not include additional CB skills for depression (e.g., social skills, communication, problem solving) that might lead to more persistent improvements in functioning at home, in school, and with peers. Other depression prevention programs, particularly those developed by Seligman, Gillham, and colleagues (Gillham et al., 2007; Seligman et al., 1999), have included a broader range of skills, including interpersonal skills and problem solving, but to our knowledge no depression prevention intervention has found long-term effects for social adjustment or psychosocial functioning.

Limitations of this trial should be noted. First, over 20% of the sample did not participate in the final follow-up assessment. Although there was no indication of differential attrition across intervention conditions or as a function of demographic variables, it was possible that incidence of depressive episodes might have been higher with a complete sample. Second, this report relies solely on adolescent-based data rather than multiple informants, although parent-report data can introduce additional complications to interpretation and adolescent reports of depression are considered the most reliable and valid single source of data in the area of depression (e.g., Cantwell, Lewinsohn, Rohde, & Seeley, 1997). Third, it would have been informative if we had collected objective measures of social adjustment, such as grades, school attendance, and parental report of functioning in the home. Fourth, data were not collected on other outcomes that might have been affected by these interventions (e.g., anxiety disorders) because of concerns regarding respondent burden. Last, group CB and supportive expressive participants were nested within groups, and this may have contributed to nonindependent data regarding change in the outcomes and increased risk for chance findings (Kenny & Judd, 1986).

In conclusion, results from this indicated prevention trial suggest that this brief CB depression prevention program produces clinically meaningful and long-lasting effects, including reductions in initial depressive symptoms in a high-risk population that persist for more than 1 year as well as reduced risk for future depressive episodes over a 2-year follow-up period. The reductions in depressive symptoms for group CB were superior to those for bibliotherapy but not for a nondirective alternative group intervention, suggesting that nonspecific factors associated with any psychosocial intervention may have significant depression prevention ef-

fects for at-risk adolescents. Although group CB was not significantly superior to the alternative group intervention, the supportive expressive control intervention, relative to the educational brochure control condition, did not reduce depressive symptoms or the incidence of depressive episodes. This implies that the group CB prevention program was more efficacious. Whereas the results in terms of reductions in depressive symptoms and risk for depressive episodes favored the group CB program, the fact that risk for future depressive episodes was significantly reduced by CB bibliotherapy relative to group CB, the supportive expressive intervention, and brochure control is noteworthy. If replicated, the preventive effects for bibliotherapy have important public health implications, given the ease of dissemination and low cost of this intervention. Future research should examine ways of increasing the effects of both CB prevention interventions, including more effective methods of identifying at-risk adolescents, motivating them to attend sessions or read bibliotherapy material, improving homework compliance, achieving greater generalization of CB material to important aspects of the lives, and finding methods for maintaining the gains that are achieved. One potentially significant improvement would be supplementing group CB with bibliotherapy. Finally, researchers in the area of indicated prevention for adolescent depression need to begin investigating and addressing the barriers to wide-scale dissemination of empirically supported depression prevention interventions. Clear gains are being made in the prevention of adolescent depression, and given a programmatic and scientifically rigorous body of research, we may yet realize the ultimate goal of reducing the prevalence of depression through prevention.

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