

Indicated Cognitive Behavioral Group Depression Prevention Compared to Bibliotherapy and Brochure Control: Acute Effects of an Effectiveness Trial With Adolescents

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Objective: We tested whether a brief cognitive behavioral (CB) group and bibliotherapy prevention reduce major depressive disorder (MDD) onset, depressive symptoms, and secondary outcomes relative to brochure controls in adolescents with self-reported depressive symptoms when school personnel recruit participants and deliver the intervention. **Method:** Three hundred seventy-eight adolescents (M age = 15.5 years, SD = 1.2; 68% female, 72% White) with elevated self-assessed depressive symptoms were randomized to a 6-session CB group, minimal contact CB bibliotherapy, or educational brochure control. Participants were assessed at pretest, posttest, and 6-month follow-up. **Results:** CB group participants showed a significantly lower risk for major depressive disorder onset (0.8%), compared to both CB bibliotherapy (6.3%) and brochure control (6.5%; hazard ratio = 8.1 and 8.3, respectively). Planned contrasts indicated that CB group resulted in lower depressive symptom severity than brochure control at posttest (p = .03, d = 0.29) but not 6-month follow-up; differences between CB group and bibliotherapy were nonsignificant at posttest and 6-month follow-up. Condition effects were nonsignificant for social adjustment and substance use. **Conclusions:** The finding that a brief CB group intervention delivered by real-world providers significantly reduced MDD onset relative to both brochure control and bibliotherapy is very encouraging, although effects on continuous outcome measures were small or nonsignificant and approximately half the magnitude of those found in efficacy research, potentially because the present sample reported lower initial depression.

Keywords: depression, prevention, cognitive behavioral, adolescents, bibliotherapy

Major depressive disorder (MDD) is a common, recurrent, and impairing condition that predicts future suicide attempts, academic failure, interpersonal problems, unemployment, substance abuse, and delinquency (e.g., Klein, Torpey, & Bufferd, 2008). However, less than 40% of adolescents with MDD receive treatment (Cummins & Druss, 2011), and community-delivered treatment is often not optimally effective (Weersing, Iyengar, Kolko, Birmaher, & Brent, 2006). In addition, many depressed adolescents are opposed to evidence-based treatments (Jaycox et al., 2006). Thus, it is crucial to develop prevention programs for this major public health problem.

Numerous adolescent depression prevention interventions have been developed, with cognitive behavioral (CB) prevention interventions having the largest evidence base (e.g., Christensen, Pal-

lister, Smale, Hickie, & Calear, 2010; Stice, Shaw, Bohon, Marti, & Rohde, 2009). CB prevention programs have produced significantly greater reductions in depressive symptoms than assessment-only control groups in universal trials that have targeted entire adolescent populations (e.g., Spence, Sheffield, & Donovan, 2003), selective trials that have targeted youth at elevated risk for depression (e.g., Cardemil, Reivich, & Seligman, 2002; Seligman, Schulman, & Tryon, 2007), and indicated trials that have targeted youth with elevated depressive symptoms (e.g., Clarke et al., 2001; Stice, Rohde, Seeley, & Gau, 2008). CB interventions have significantly reduced risk for future onset of MDD in some trials (Clarke et al., 2001; Garber et al., 2009; Stice et al., 2008) but not others (Gillham, Hamilton, Freres, Patton, & Gallop, 2006; Seligman et al., 2007; Sheffield et al., 2006). Overall, meta-analytic reviews indicate that the average effects from depression prevention trials are typically small in magnitude, and effects for universal programs are significantly smaller than those for selective/indicated programs (e.g., average pre to post effect for selective or indicated versus universal programs d = 0.30, .23, and .12, respectively; Horowitz & Garber, 2006).

Although several selective or indicated CB prevention programs have produced promising findings, the length of these interventions makes them challenging to implement. Thus, Stice, Burton, Bearman, and Rohde (2007) developed an indicated four-session CB group prevention program that focused on reducing negative cognitions and increasing pleasant activities, evaluating it among

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high-risk adolescents with depressive symptoms. Elevated depressive symptoms is one of the most potent risk factors for predicting future onset of MDD in prospective studies (e.g., Gotlib, Lewinsohn, & Seeley, 1998; Lewinsohn et al., 1994; Stice, Hayward, Cameron, Killen, & Taylor, 2000). The CB group intervention was superior to the control condition (waitlist) at posttest and 1-month follow-up, but effects became nonsignificant by 6-month follow-up. In addition, the program was not clearly superior to four alternate or placebo interventions (i.e., supportive-expressive group, bibliotherapy, expressive writing, journaling). The findings prompted us to expand the program into a six-session intervention.

Stice et al. (2008) then initiated a large randomized efficacy trial that compared this prevention program to a supportive-expressive group comparison, CB bibliotherapy, and a brochure control condition with 341 adolescents with elevated depressive symptoms. Relative to participants in a brochure control condition (13.1%), participants in all three active interventions showed a significantly lower MDD onset over the 6-month follow-up (6.8% in CB group; 6.7% in supportive-expressive; 2.5% in CB bibliotherapy; differences *ns*). CB group participants also showed significantly greater reductions in depressive symptoms than supportive-expressive group, CB bibliotherapy, and brochure control participants at posttest, though only the latter effect was significant at 6-month follow-up. In addition, CB group participants showed significantly greater improvements in social adjustment and lower rates of substance use through 6-month follow-up than participants in all three other conditions. In a subsequent article examining long-term effects, onset of depressive disorder (major/minor) over the 2-year follow-up was significantly higher for brochure controls (23%) versus both CB group participants (14%; odds ratio [OR] = 2.2) and CB bibliotherapy participants (3%; OR = 8.1), which did not significantly differ (the 15% depressive disorder onset in the supportive-expressive condition did not significantly differ from controls). CB group participants showed significantly lower depressive symptoms than brochure control participants by 1-year follow-up and compared to CB bibliotherapy participants by 1- and 2-year follow-up, but not relative to supportive-expressive group participants (Stice, Rohde, Gau, & Wade, 2010). Thus, this CB group intervention reduced initial symptoms and risk for future depressive episodes, although both supportive-expressive group therapy and CB bibliotherapy produced some intervention effects that persisted.

Bibliotherapy has several advantages over face-to-face interventions, including ease of use, low cost, low staffing demands, and greater privacy. CB bibliotherapy has outperformed assessment-only control conditions for the treatment of depression for both adolescents and adults (Gregory, Schwer-Canning, Lee, & Wise, 2004). Ackerson, Scogin, McKendree-Smith, and Lyman (1998) found that CB bibliotherapy (*Feeling Good*, by David Burns, 1980, which was used in the present study) was superior to an assessment-only control condition for adolescents with moderate depressive symptoms through 1-month follow-up. Although numerous self-help books exist, *Feeling Good* is the only depression self-help book that meets the criterion for a "probably efficacious treatment" (Malouff & Rooke, 2007).

Based on the encouraging findings from the efficacy trial, we initiated a large randomized indicated prevention effectiveness trial, contrasting the brief CB group prevention program to both a minimal contact CB bibliotherapy condition and brochure control.

Testing whether interventions found to be efficacious in tightly controlled efficacy trials produce effects in the real world with effectiveness trials is an essential step to wide-scale dissemination, and schools have been recognized as important venues for mental health promotion efforts (Weist et al., 2003). The first aim of the present study was to test whether intervention participants showed lower MDD onset when school counselors or nurses recruited adolescents with self-reported depressive symptoms and delivered the interventions under ecologically valid conditions. Though low disorder base rates can make detection of intervention effects difficult, a reduced incidence of future pathology onset is the *sine qua non* for prevention interventions. Based on 6-month outcomes from the previous efficacy trial, we hypothesized that CB group would produce significantly lower incidence rates of MDD onset by 6-month follow-up relative to brochure control and would not differ from CB bibliotherapy. The second aim was to test whether CB group participants showed lower depressive symptoms both at intervention termination and at 6-month follow-up. Based on the previous efficacy trial, we hypothesized that CB group would produce greater and more rapid reductions in depressive symptoms compared to both brochure control and CB bibliotherapy. The third aim was to test whether intervention participants show significant improvements in other ecologically meaningful outcomes, namely, social adjustment and reduced substance use. We found in the efficacy trial that the CB group intervention improved social adjustment compared to both CB bibliotherapy and the brochure control condition and also reduced the escalation of substance use that normally occurs during this developmental period; we sought to replicate these secondary effects.

To our knowledge, only one previous selective/indicated depression prevention effectiveness trial in schools has been conducted (Arnarson & Craighead, 2009, 2011). In that trial, CB prevention resulted in significantly lower rates of first incidence MDD or dysthymia relative to assessment-only controls at 12-month follow-up (3.9% vs. 21.0%) in adolescents who had been recruited based on either elevated depressive symptoms or negative attributional style. Three additional selective/indicated depression prevention trials involved endogenous providers delivering the intervention, although research staff conducted recruitment and screening: Teacher-delivered CB resulted in lower rates of depressive symptoms compared to assessment control at posttest among middle-school students, most of whom had elevated self-reported depressive symptoms at baseline (Gillham et al., 2012) and out to 6-month follow-up among Chinese youth with depressive symptoms or family conflict (Yu & Seligman, 2002), whereas CB provided to preadolescents with elevated depressive symptoms by therapists from a large health maintenance organization failed to reduce depressive symptoms, relative to assessment-only control, at posttest or through 24-month follow-up (Gillham et al., 2006). Although data from effectiveness trials are limited, research suggests that CB prevention interventions can be successfully delivered by well-trained and supervised endogenous providers. The present trial, in which school personnel were responsible for recruitment and intervention delivery, is the first large-scale indicated prevention effectiveness trial of a CB intervention and CB bibliotherapy relative to brochure controls with adolescents reporting elevated depressive symptoms. It is also the first effectiveness trial in which a much briefer prevention intervention (six sessions

versus 12–14 sessions in previous studies with successful depression prevention effects) is evaluated.

Method

Participants

Participants were 378 high school students (68% female) between 13 and 19 years of age ($M = 15.5$; $SD = 1.2$) at pretest. The sample was composed of 6% Hispanic, 2% Asian American, 1% African American, 72% Caucasian, 1% Native American, and 18% who specified other or mixed heritage. Educational attainment of parents, a proxy for socioeconomic status, was 39% high school graduate or less; 26% some college; 22% college graduate; 13% graduate degree. The sample was fairly representative of the county from which we sampled in terms of race/ethnicity (7% Hispanic, 2% Asian American, 1% African American, 84% Caucasian, 1% Native American, 4% two or more races) and parental education (adult education level 36% high school graduate or less; 28% some college; 17% college graduate; 11% graduate degree). Consistent with an effectiveness trial design, participants were not excluded on the basis of prior or concomitant treatment, and 37% had received treatment for mental health problems in the year before the study.

Procedures

Participants were recruited from five high schools (mean enrollment = 1,412 students; range = 1,013–1,588) from three school districts that represent the majority (71%) of area high schools (two additional high schools were approached but declined to participate due to lack of staff interest or availability). We streamlined the recruitment process and had school staff recruit participants because this is less complicated and time-consuming than using school-wide surveys or diagnostic interviews for enrollment. Participants were recruited through direct mailings to all students in each school (total number of letters mailed was approximately 8,020). The recruitment letter contained text provided by the researchers and invited students to participate in a research study evaluating two interventions aimed at helping adolescents reduce sadness and promote emotional well-being; it also contained a one-page self-administered screening measure assessing depressive symptoms based on the Center for Epidemiologic Studies—Depression Scale (Radloff, 1977). The measure was simplified from four to two response options (i.e., rarely/a little vs. occasionally/most of the time) and responses were all worded in the same direction. Students who endorsed two or more symptoms were encouraged to participate. As the screening was completed prior to informed consent, neither the school nor the research team collected those data. In addition to the mailings, recruitment posters (provided by the research staff) containing pictures of ethnically diverse adolescents were hung at schools.

The recruitment letter invited eligible students who were interested in participating in this study to secure parental consent (if under 18 years of age) and call the research office to schedule an eligibility interview to be privately conducted at their school. Potential participants ($N = 421$; see Figure 1) completed a pretest assessment with research staff to obtain baseline data and ensure that they did not have a current diagnosis of MDD or acute suicidal

ideation. If a student met either exclusion criteria ($n = 43$), project staff spoke with the student and called the parents to contract for safety, reiterate the importance of seeking treatment, and provide referral information. No other exclusionary criteria were used to maximize ecological validity. Participants were recruited (31–145 students per school) between 2009 and 2011. Eligible participants were randomly assigned, within blocks created by gender and school, by the project coordinator using computer-generated random numbers to one of three conditions: (a) CB group ($n = 126$), (b) CB bibliotherapy ($n = 128$), or (c) brochure control ($n = 124$).

Participants completed a survey and diagnostic interview at pretest, posttest, and 6-month follow-up. To reduce attrition, we collected detailed contact information for three people who would always know how to contact the adolescent/family, updated contact information (address, phone, e-mail) every 6 months, and paid participants \$25 for completing each assessment. Assessors, who were blind to condition, had at least a bachelor's degree in psychology and received approximately 40 hr of training in the use of the semistructured interviews. Assessors were required to show a minimum kappa agreement of .80 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 the schools. The Oregon Research Institute Institutional Review Board approved this study.

CB Group Depression Prevention Intervention

The CB group program content was the same as the intervention evaluated in the previous efficacy research (Stice et al., 2008) but the intervention manual was expanded to provide group facilitators with more scripted text for each session. The six weekly 1-hr sessions began with a review of concepts and (after Session 1) review of past home practice assignments; all sessions concluded with home practice assignments. Each session had a portion devoted to thought identification/recording and cognitive restructuring (called "Changing Thinking," e.g., triangle of feelings, thoughts, actions; Trigger + Negative Thought = Feeling model; generating positive counterthoughts using "What's the Alternative?" "Where's the Evidence?" and "What if it's True?" anticipating daily hassles and major life events) and a portion devoted to increased involvement in pleasant activities (called "Changing Doing," e.g., generating a personal list of fun activities [especially physical and social behaviors] and rewards for completing assignments; getting out of negative coping ruts; planning future fun; developing behavioral backup plans for coping with bad feelings). We used motivational enhancement exercises to maximize willingness to use the new skills, behavioral techniques to reinforce use of the new skills, and group activities to foster feelings of group cohesion. Single-gender groups of five to nine participants ($M = 6.0$) were conducted at the school, usually after normal classes. Sessions were usually facilitated by two school personnel (e.g., school counselors or nurses; $n = 13$, 12 women); three of the 21 groups were led by solo facilitators due to staff availability and prior experience. If a participant missed a session, a brief (10–15 min) individual session was conducted with the youth to review missed material when possible. To encourage attendance, small snacks were provided during each session, and participants who attended all six sessions (or completed make-up session) were

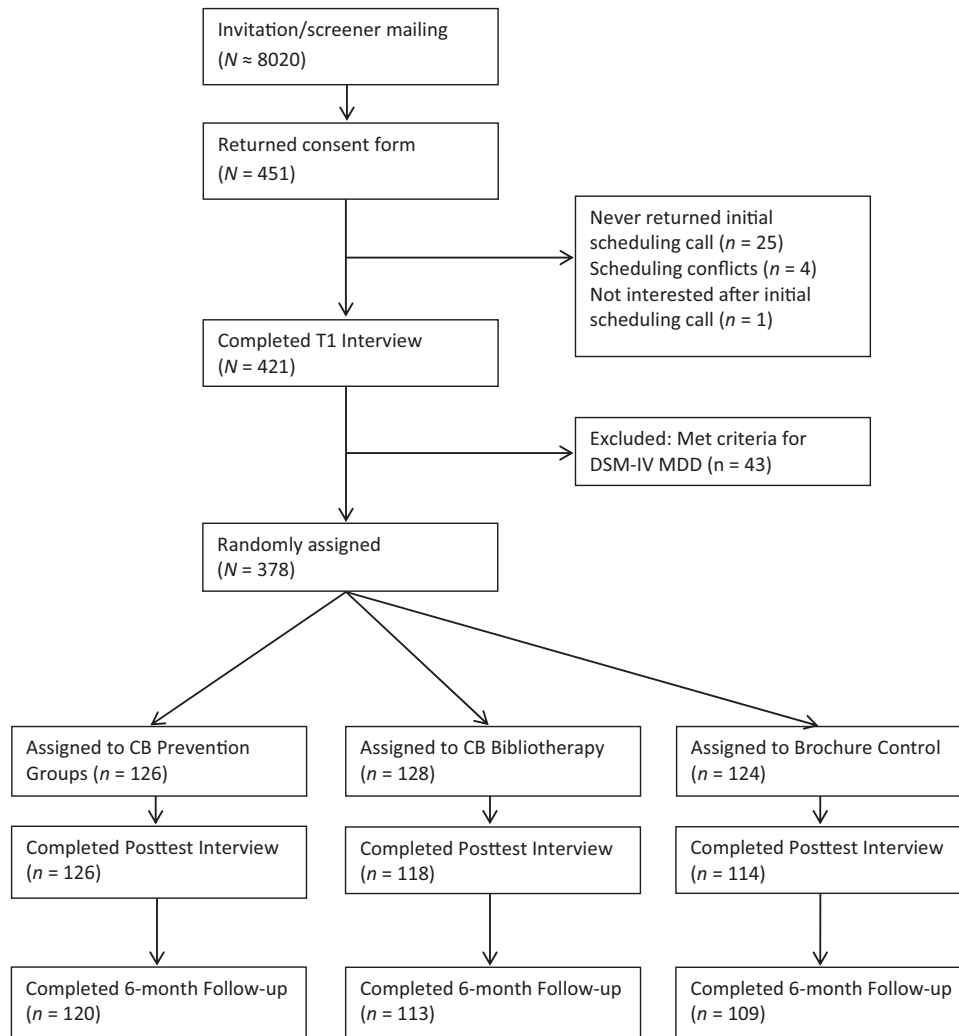


Figure 1. Participant flowchart. *DSM-IV* = *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; American Psychiatric Association, 1994); MDD = major depressive disorder; CB = cognitive behavioral.

eligible for a drawing at the last session (e.g., \$5–\$10 gift card; snacks and gift cards were provided by the research project).

Facilitator Training and Supervision

All counseling and/or nursing personnel at a high school were invited to deliver the interventions, and we trained all who expressed interest (i.e., there were no staff selection or exclusion criteria); one to four staff per school were recruited and trained. Facilitators (11 women and two men) were given articles describing results from the efficacy trials to introduce them to the major concepts involved in the CB group depression prevention program and asked to read the detailed intervention script. Next, they attended a 4-hr standardized training workshop conducted by the first and second author in which they reviewed the components of each session and role-played the challenging aspects of the programs. A crisis response plan was also reviewed.

Sessions were audiotaped and half were randomly selected for review by the first and third author for treatment adherence and

competence, based on scales developed previously. Protocol adherence was measured using session-specific checklists for the concepts, skills, and exercises that are outlined in the session script. Each item was rated on 10-point scales that cover presentation of key concepts and supporting material for each session component (a score of 7 was “good” and indicated that no key concept of that section had been missed). Facilitator competence was rated using 12 items rated on 10-point scales (6 = “good/average”) that assess various general indices of a competent group therapist with behavioral anchors for each item (e.g., leader expresses ideas clearly and at an appropriate pace; 10 = “Superior. Leaders are unusually articulate and express ideas in what that all group members understand. Perfect pace”; 6 = “Good/average. Ideas are expressed in a clear manner and at a pace which is easy to follow”; 4 = “Fair/Below average. Ideas are expressed in clear manner *or* pace is appropriate but not both”). These scales can be rated reliably (M intraclass correlation [ICC] = .72) and CB group facilitators have been found to adhere closely to a treatment

manual (Stice et al., 2008). Thirty-five percent of all sessions were doubly rated and reviewed for consensus ratings; ICC for competency = .65; ICC for adherence = .85. Facilitators received e-mail feedback from the supervisors based on tape review of 50% of their sessions. School personnel who led groups for more than one academic year received an annual booster training session to ensure intervention fidelity.

CB Bibliotherapy Intervention

Participants in the CB bibliotherapy condition were given the book *Feeling Good* (Burns, 1980), which provides relevant and practical CB techniques for preventing and reducing negative moods. It is written at a high-school reading level. Topics covered include understanding feelings of sadness, building self-esteem, overcoming guilt and helplessness, and coping with stress. Participants were told, "This book has been shown to be helpful to some individuals who are feeling sad or depressed. This copy is yours to keep, so feel free to write or highlight in it as you read. We encourage you to use this as a self-help resource." The school personnel were asked to make two brief scripted reminder phone calls to CB bibliotherapy participants encouraging them to continue or start reading the book and to complete as many exercises in the book as possible.

Brochure-Only Control Condition

Participants were given a National Institute of Mental Health brochure that describes MDD and recommends treatment for depressed youth (National Institute of Mental Health, 2001), as well as information about local treatment options. They completed the same assessments as those in the other conditions, allowing us to monitor depression and suicidal ideation, and 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 believed that the adolescent's depressive symptoms had worsened. We selected this control group because it represented an ecologically valid condition of what is generally provided to youth in local schools.

Measures

Depressive symptoms and diagnosis. Sixteen questions assessing *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Association, 1994) MDD symptoms were adapted from the Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS; Puig-Antich & Chambers, 1983), a semistructured diagnostic interview. Participants reported the peak severity of each symptom over the past 12 months (at pretest) or since the last interview using a 4-point response format (1 = *not at all* to 4 = *severe symptoms* [ratings of 3 and 4 reflecting diagnostic levels]). Responses were used to determine whether youth met diagnostic criteria for MDD (primary outcome) since the last assessment. Severity ratings for each symptom were also averaged to form a continuous depressive symptom composite. This version of the K-SADS has shown test-retest reliability ($\kappa = .63$ – 1.00) and interrater reliability for depression diagnosis ($\kappa = .73$ – 1.00), internal consistency ($\alpha = .68$ – $.84$), and predictive validity for the symptom composite (Stice

et al., 2010). The present study showed good test-retest reliability ($\kappa = .99$), interrater reliability at the item level ($\kappa = .98$) and depression diagnosis ($\kappa = 1.00$), and interitem correlation for the continuous depressive symptom composite (ICC = .99).

Substance use was measured with 10 items from Stice, Barrera, and Chassin (1998). Adolescents reported the frequency of intake during the past 6 months of beer/wine/wine coolers and hard liquor; frequency of heavy drinking (five or more drinks in a row); frequency of times drunk; and frequency of marijuana, stimulants, downers, inhalants, and hallucinogen use. Items used 6-point response scales ranging from *never* to *3–7 times a week*. Items were averaged to form an overall substance use measure, which was normalized with an inverse transformation. This scale has shown 1-year test-retest reliability ($r = .72$) and predictive validity for substance abuse symptoms (Stice et al., 1998; $\alpha = .79$ at pretest).

Social adjustment in school, work, peer, spare time, and family domains was assessed using 17 items adapted from Social Adjustment Scale—Self-Report for Youth (Weissman, Orvaschel, & Padian, 1980; response options: 1 = *never* to 5 = *always*). The 17-item version has shown internal consistency ($\alpha = .77$), 1-week test-retest reliability ($r = .83$), and sensitivity to detecting intervention effects in multiple prevention trials (Stice et al., 2008; Stice, Shaw, Burton, & Wade, 2006). Reliability in the current study was adequate ($\alpha = .74$).

Expectancies, process, and contamination measures. After receiving a brief description of the three conditions, participants at pretest completed four items assessing credibility, expected improvement from each condition, satisfaction (5-point scales), and intervention preference. CB bibliotherapy participants completed three items at both posttest and 6-month follow-up to track how much of the book they had read and when. For CB group participants, after each group session, facilitators recorded attendance (absent, partial, full) and homework completion (none, some, all) for each participant using previously developed measures of in-session behavior (Rohde, Clarke, Mace, Jorgensen, & Seeley, 2004). Last, all participants were asked questions at posttest to assess potential cross-condition contamination.

Data Analysis

Preliminary analyses examined the comparability of participants across conditions and descriptive features of this sample. Attrition for diagnostic interview data was 5% at posttest and 13% at 6-month follow-up. Attrition did not differ between the three conditions at posttest, $\chi^2(2, N = 378) = 1.40, p = .50$ or 6-month follow-up, $\chi^2(2, N = 378) = 0.97, p = .62$. Missingness was not significantly related to any of the study variables at pretest. To maximize statistical power and reduce potential missing data biases, we used multiple imputation to replace missing values (Graham, 2009). We imputed 20 data sets using the "fully conditional specification" in SPSS 19.0. The imputation model included all study variables, including interaction terms, as well as relevant auxiliary variables. Analyses were conducted on all 20 data sets and pooled using Rubin's (1987) rules. Aim 1 (MDD incidence) was examined using Cox proportional hazard regression models using data from pretest to the 6-month follow-up assessment. As in our past trials, we used one-tailed inferential tests for the hazard models that investigated MDD onset, because of the reduced sensitivity of this analytic procedure due to the dichotomous

outcome and low incidence. Missing data were taken into account directly with right-censoring in Cox proportional hazard model estimation; multiple imputation was not used for Aim 1. Aims 2 (changes in depressive symptom severity) and 3 (changes in social adjustment and substance use) were evaluated using repeated measures analysis of covariance with pretest value of the outcome as covariate. Given our specific interest in comparing the present findings to previous efficacy research evaluating the CB group and to provide more detailed information for future meta-analyses, we first conducted planned comparisons of CB group versus CB bibliotherapy and brochure control at both posttest and 6-month follow-up. Planned comparisons are more powered and preferred over exploratory omnibus tests when hypothesized comparisons are driven by theory and previous findings (Tabachnick & Fidell, 2001). To explore unplanned differences between groups, we used omnibus *F* tests to investigate the main effect of Condition and the interaction of Condition \times Time as a first step and performed post hoc comparisons when significant omnibus effects emerged. Analyses were conducted using SPSS MIXED (and proc MIXED and proc MIANALYZE in SAS 9.2 to obtain omnibus *F* tests specifically).

Results

Preliminary Analyses

Participants in the three conditions did not differ on demographic variables or outcome measures at pretest. The three conditions differed significantly on perceived credibility, $F(2, 354) = 86.01, p < .001$, expected benefit, $F(2, 354) = 133.69, p < .001$, and satisfaction with assignment to that condition, $F(2, 354) = 20.65, p < .001$, with all contrasts being significant (CB group $>$ CB bibliotherapy $>$ brochure control). Regarding intervention preference, 33% of participants preferred CB group, 19% preferred CB bibliotherapy, 20% preferred CB group or bibliotherapy but not control, and 11% preferred brochure (17% reported no opinion). Table 1 presents the continuous outcome measures for the

Table 1
Mean and Standard Deviation of Primary and Secondary Study Outcomes at Pretest (T1), Posttest (T2), and Follow-Up (T3)

Outcomes measures	CB group (<i>n</i> = 126)		CB bibliotherapy (<i>n</i> = 128)		Brochure control (<i>n</i> = 124)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Depressive symptoms						
T1	1.37	0.35	1.46	0.41	1.38	0.36
T2	1.40	0.32	1.50	0.42	1.50	0.41
T3	1.24	0.31	1.24	0.32	1.26	0.34
Social adjustment						
T1	2.67	0.45	2.71	0.45	2.73	0.41
T2	2.51	0.43	2.64	0.54	2.60	0.50
T3	2.50	0.47	2.52	0.51	2.63	0.54
Substance use						
T1	0.26	0.52	0.30	0.51	0.37	0.65
T2	0.24	0.45	0.23	0.43	0.24	0.44
T3	0.40	0.63	0.38	0.56	0.35	0.61

Note. Means and standard deviations are averaged over 20 imputed data sets. CB = cognitive behavioral.

three conditions from pretest to 6-month follow-up. Thirty percent of the sample reported receiving some form of treatment for emotional/behavioral problems issues during the study. Participants in the three conditions did not differ in rates of adjunctive mental health treatment either 1 year prior to enrollment or during the study.

Regarding treatment adherence and facilitator competence, mean adherence was 7.0 ($SD = 0.7$) and mean competence was 7.1 ($SD = 0.7$) on the 1–10 point scales, which suggest that on average all key concepts of the various session sections were presented with good or very good therapist competence. Only 1.4% of items were rated as “minimal adherence” (score of 4; “minimal adherence”; the majority of key concepts were presented but poorly”) and 1.9% as “minimal competence” (score of 4; fair/below average).

Participants in the CB group condition attended an average of 5.3 sessions ($SD = 0.9$); 48% attended all six sessions and none attended less than three sessions; 94% received an individual make-up session if they missed a session. The average number of make-up sessions in CB group participants was 0.7 ($SD = 0.9$). The amount of CB group attendance was unrelated to change in depressive symptoms pre to post ($r = .01; p = .92$) or pre to 6-month follow-up ($r = .10, p = .32$). Eighty percent of homework assignments were recorded by the group leader as completed for participants assigned to CB group.

Among CB bibliotherapy participants, 15% indicated they read at least half the book, 54% read less than a quarter, and 32% did not read any. The amount of the book read by CB bibliotherapy participants was not significantly correlated with change in depressive symptoms from pre to post ($r = -.24; p = .08$) or from pre to 6-month follow-up ($r = -.16, p = .26$). Of those who read at least part of the book 16% indicated they read the book when depressed, 46% when bored, and 38% immediately after receiving the book.

With regard to the cross-condition contamination questions completed at posttest, 96% had not talked with anyone from the other conditions. Of those who talked with a participant in another condition, most did not specify any condition ($n = 7$); others referred to “the book” ($n = 2$) or “meeting after school” ($n = 1$). Two participants (0.5%; both in CB group) stated that hearing about the other groups had changed their behavior but provided no specific information regarding the content of their conversation.

Intervention Effects for Major Depressive Disorder Onset

By 6-month follow-up, 17 (4.5%) of participants had shown MDD onset: eight brochure control participants (6.5%), eight CB bibliotherapy participants (6.3%), and one CB group participant (0.8%). Figure 2 shows cumulative survival functions for the percentage of participants in each condition that showed MDD onset from pretest to 6-month follow-up. Cox proportional hazard regression indicated that the MDD incidence over follow-up was 8.3 (confidence interval [CI] = 1.04 – 66.7; $p = .023$) greater in brochure control compared to CB group and 8.1 (CI = 1.01 – 64.7; $p = .024$) greater in CB bibliotherapy compared to CB group, which reflect large magnitude effects (hazard ratios [HRs] of 1.39, 2.28, and 3.74, approximate small, medium, and large effects, respectively; Lipsey & Wilson, 2001). CB bibliotherapy and brochure control did not differ in risk of MDD onset over follow-up.

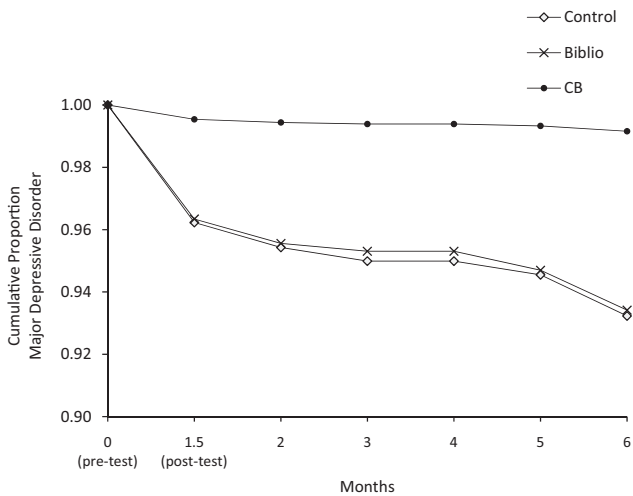


Figure 2. Survival curves for the onset of major depression over the follow-up period by intervention condition. Biblio = bibliotherapy; CB = cognitive behavioral.

There was no effect of school and adding this factor to the model did not modify the two significant associations. Similarly, adjusting for adjunctive treatment at baseline or during the study did not eliminate the significant HR effects. Regarding expectancies toward the three interventions (none of which predicted MDD onset), adjusting for perceived credibility, expected benefit, or satisfaction regarding the specific condition to which the participant was assigned did not change the significance of the HR coefficients.

Intervention Effects for Change in Depressive Symptoms

Planned contrasts indicated that CB group resulted in lower depressive symptom severity than brochure control at posttest ($B = -.10, p = .03, d = 0.29$) but not 6-month follow-up ($B = -.04, p = .35, d = 0.12$); depressive symptom differences between CB group and CB bibliotherapy were nonsignificant at posttest ($B = -.09, p = .06, d = 0.27$) and 6-month follow-up ($B = -.01, p = .87, d = 0.05$). Controlling for receipt of adjunctive treatment or intervention credibility, expected benefit, satisfaction with assignment did not eliminate the significant planned comparison of CB group versus brochure control at posttest. Exploratory omnibus F tests indicated no overall main effect of Condition on depression symptom severity, $F(2, 10821) = 1.28, p = .17$ and no Condition \times Time interaction, $F(2, 13226) = 1.28, p = .28$. Therefore, we did not perform any additional post hoc comparisons between groups. Hierarchical modeling did not indicate the existence of any significant variation in symptom severity between the different CB groups ($\sigma^2 = .008, p = .19; ICC = 0.04$).

Intervention Effects for Secondary Outcomes

Planned comparisons indicated that CB group did not result in better social adjustment than brochure control at posttest ($B = -.07, p = .29, d = 0.18$) and 6-month follow-up ($B = -.10, p =$

$.17, d = 0.23$), nor than CB bibliotherapy at either posttest ($B = -.10, p = .11, d = 0.25$) or 6-month follow-up ($B = -.03, p = .70, d = 0.08$). Exploratory omnibus F tests indicated no main effect of Condition on social adjustment, $F(2, 1096) = 1.60, p = .20$ and no Condition \times Time interaction, $F(2, 587) = 0.76, p = .47$, and we therefore did not conduct any additional post hoc comparison between groups.

Contrary to previous findings in the efficacy trial, planned comparisons indicated no secondary benefit of CB group in terms of lower substance use compared to brochure control at either posttest ($B = .003, p = .96, d = 0.10$) or 6-month follow-up ($B = -.002, p = .98, d = 0.08$), and no effect relative to CB bibliotherapy at either posttest ($B = -.003, p = .58, d = 0.11$) or 6-month follow-up ($B = -.003, p = .63, d = 0.09$). Exploratory omnibus F tests indicated no main effect of Condition on substance use, $F(2, 115) = 0.31, p = .73$ and no interaction between Condition \times Time, $F(1, 1610) = 0.001, p = .99$. We conducted no further post hoc comparison between groups.

Discussion

The primary aim of this effectiveness trial was to extend findings from a prior efficacy trial to evaluate whether brief CB interventions reduced the incidence of MDD onset relative to brochure control when high school personnel recruited participants and delivered interventions. By 6-month follow-up, CB group participants showed significantly lower risk for MDD onset (0.8%) compared to both a minimal contact CB bibliotherapy condition (6.3%) and brochure control (6.5%). These differences reflect large magnitude effects for CB group compared to both CB bibliotherapy and brochure control, differing from the previous efficacy trial results. In the efficacy trial, MDD onset by 6-month follow-up was significantly higher for brochure controls (13.1%) compared to both CB group participants (6.8%; $OR = 2.5$) and CB bibliotherapy participants (2.5%; $OR = 4.5$), which did not differ. The overall incidence of MDD onset was higher in the efficacy trial, but the magnitude of the effect for MDD incidence in CB group compared to brochure control was actually larger in the present study. The fact that the CB group intervention resulted in lower MDD onset compared to brochure control in both efficacy and effectiveness trials, and relative to CB bibliotherapy in the effectiveness trial is highly encouraging and provides support for continued refinement, evaluation, and potential dissemination of this group prevention program.

Comparing the present CB group effects for MDD onset to other selective/indicated trials that have found a significant prevention effect, the magnitude of the present study HR of 8.3 for CB group versus brochure control is comparable or greater to 6-month onset results reported by others ($HR = 1.6$ in Garber et al., 2009; $OR = 8.3$ in Arnarson & Craighead, 2009) and 12-month onset rate results ($HR = 5.6$ in Clarke et al., 2001). As noted, the 6 session duration of the present CB group intervention was substantially shorter than other successful programs (14 sessions in Arnarson & Craighead, 2009; 14 sessions in Garber et al., 2009; 15 sessions in Clarke et al., 2001). In sum, MDD onset appears to be approximately two to eight times higher given no intervention or usual care compared to CB prevention programs, and we find no evidence to suggest that MDD prevention effects are significantly

diminished by extending the program to real-world settings and providers or by providing interventions that are briefer in duration.

With regard to the second aim, the CB group resulted in lower depressive symptoms than brochure control at posttest but not at 6-month follow-up. These findings represented small effects ($d = 0.29$ and 0.12 , respectively) that were approximately half as large as the previous efficacy results ($d = 0.46$ and 0.42 , respectively), although they are more consistent with posttest and follow-up results from meta-analytic reviews of depression prevention programs ($d = 0.18$ and 0.25 , respectively; Horowitz & Garber, 2006) and ($d = 0.28$ and $.20$, respectively; Stice et al., 2009). The CB group intervention in the present study failed to achieve a significant reduction in depressive symptoms compared to CB bibliotherapy (posttest $d = 0.27$, 6-month follow-up $d = 0.05$, both *ns*), whereas CB group participants in the previous efficacy trial (Stice et al., 2008) had showed significantly lower depressive symptoms compared to CB bibliotherapy at posttest ($d = 0.52$), though not at 6-month follow-up ($d = 0.18$).

With regard to the third aim, the CB group intervention had no detectable effects relative to either brochure control or CB bibliotherapy on either social adjustment (mean $d = 0.20$ and 0.16 compared to brochure control and CB bibliotherapy, respectively) or substance use (mean $d = 0.09$ and 0.10 compared to brochure control and CB bibliotherapy, respectively). The previous efficacy trial found that CB group participants showed improved social adjustment (mean $d = 0.35$ compared brochure control; *ns* results compared to CB bibliotherapy) and decreased substance use over 6-month follow-up relative to increases that were observed for both CB bibliotherapy (mean $d = 0.24$) and brochure control (mean $d = 0.37$). These previous results for substance use were small to medium in magnitude but were significant at both posttest and 6-month follow-up and were also found to persist through 2-year follow-up (Rohde, Stice, Gau, & Seeley, 2012). One possible explanation for the different pattern of findings is that participants in the present trial had somewhat lower substance use compared to efficacy participants ($M = 0.31$ vs. 0.48 , average $SD = 0.59$). The lack of a significant effect for improvements in social adjustment could not be attributed to better initial adjustment in the present study compared to the efficacy trial ($M = 2.70$ vs. 2.75 , respectively, average $SD = 0.48$).

In sum, compared to findings from the efficacy trial, the current effectiveness results are encouraging in terms of MDD prevention for this brief CB group program. However, outcomes on all three examined continuous outcomes, which reflect the overall impact of interventions on all participants assigned to that condition, were about half the magnitude of effects in the efficacy trial. Three potential factors could account for these differences.

First, although it might be argued that the real-world therapists had lower treatment fidelity than research-based interventionists, adherence and competence data were similar across trials and data in this trial suggested that all or almost all key concepts were presented across sessions and that sessions were generally delivered competently. Moreover, given the larger number of group leaders in the present study, we also looked for the presence of differential rates of symptom improvement across CB groups but found no evidence of such group effects. Second, there was no evidence that CB group participants in this effectiveness trial got a lower “dose” of prevention (e.g., 47% attended all six sessions in this trial compared to 44% in the efficacy trial) and homework

completion rates were high, although it appears very likely that the previous research-based therapists had a higher threshold for rating homework completion compared to the high school personnel in this effectiveness trial. Future studies should examine the quality of the homework that is completed as an additional indication of intervention receipt in effectiveness trials.

The third explanation for attenuated effects on the continuous measures is that current participants were less depressed than in the efficacy trial. Participants in this study began with an average depressive symptom level one *SD* lower than adolescents in the efficacy trial ($M = 1.34$ vs. 1.70 , respectively, average $SD = 0.35$). The lower initial level of depressive symptoms likely diminished our ability to detect group effects on continuous measures. The simplified recruitment procedure applied in this effectiveness trial allowed students to self-select into the program rather than research staff verifying that participants met a minimum level of depressive symptoms. This procedure resulted in a sample with lower initial depression severity levels compared to the efficacy trial, which could have accounted for the weaker effects for continuous outcomes. It suggests that efficacy and effectiveness trials should use parallel recruitment procedures and that the screener data be collected and analyzed. However, it is also possible that the less closely controlled recruitment process may have resulted in a self-selected sample of adolescents who truly needed the structured support provided by the CB group intervention to stave off the onset of MDD. This would suggest that factors other than elevated depressive symptoms may have contributed to study enrollment and the apparent MDD risk reduction effects for CB group prevention. More research is needed to better understand the factors that lead young people to decide to engage in prevention programs.

Bibliotherapy performed more poorly in the present trial than in the previous efficacy trial, where it resulted in significantly lower incidence of MDD onset and lower depressive symptoms at 6-month follow-up, compared to brochure control. As noted, the weaker effects may have been due to participants reading less of the book, thus receiving a lower dose of the intervention in this trial (14% indicated reading at least half the book and 33% reported not reading any of it in the present study, compared with 28% and 28%, respectively, in the efficacy trial). One facet of effectiveness research is whether the intervention can be successfully delivered in a real world setting; usage data in the present study suggest that bibliotherapy with minimal support is not sufficiently engaging. As noted previously (Stice et al., 2008), the selected bibliotherapy text is very long (over 600 pages), although the change model is presented in the first 50 pages. Thus, even a partial “dose” of this intervention could be sufficient for an effect. Although it is possible that CB bibliotherapy may emerge as an effective prevention intervention over longer follow-up (depressive disorder onset over 2-year follow-up was 3% given CB bibliotherapy vs. 14% given CB group vs. 23% given brochure controls; Stice et al., 2010), the present results found no contrasts in which minimal contact CB bibliotherapy was superior to brochure control. More contact from the research or school staff might have yielded better effects for this intervention, as depression reduction effects of bibliotherapy with adults are stronger for therapist-guided than “pure” bibliotherapy (Gellatly et al., 2007). However, introducing therapist contact to bibliotherapy would significantly increase the cost of delivery and could actually result

in much greater therapist contact time for CB bibliotherapy compared to CB group (average amount of contact for therapist-guided bibliotherapy in the Gellatly et al., 2007, review was 2.8 sessions, which would translate in 22.4 sessions to intervene with 8 students compared to 8 hr of contact to deliver the CB group). Last, the self-help book was designed to be read without therapist contact for support and direction.

It is important to note the study limitations. First, all of the outcomes relied on youth self-report. Greater confidence could be placed on the findings if multiple informants had been used. However, we decided against collecting data from parents for several reasons (e.g., increased assessment burden, scheduling complexities, difficulties obtaining parental participation) but mainly due to the fact that adolescents appear to provide the most valid data regarding their depression levels (e.g., Cantwell, Lewinsohn, Rohde, & Seeley, 1997). Second, to minimize respondent burden, we did not include measures of additional factors that are of interest (e.g., lifetime history of all psychiatric disorders), including current parental depression, which has been found to negatively impact of the efficacy of CB prevention interventions for high-risk adolescents (Garber et al., 2009). Third, to help students self-administer the screener, the CES-D response format was modified and appears to have selected a less depressed sample. A related limitation is that this self-selection procedure recruited less than 6% of the student population, whereas previous research suggests that more than 25% of a high school population would have elevated CES-D scores (Roberts, Lewinsohn, & Seeley, 1991); ideally, recruitment procedures would be developed so that high school personnel could successfully and easily engage a broader proportion of students with subthreshold depressive symptoms. Fifth, the racial/ethnic composition of the sample reflected the local area but resulted in insufficient numbers of ethnic minority groups to test whether the program works similarly across each ethnic group. Fortunately, previous research suggests that program effects do not significantly differ across racial/ethnic groups (Marchand, Ng, Rohde, & Stice, 2010). Last, attrition rates on diagnostic interviews were 5% at posttest and 13% at 6-month follow-up, though attrition rates did not differ across the three conditions at any assessment point, and multiple imputation was used to preserve statistical power and reduce potential attrition bias.

Effectiveness trials such as this are essential prior to dissemination efforts. Although there are definite advantages to providing mental health services in school settings (e.g., access to clients, nonstigmatizing environment, convenience for parents), there are also challenges, consisting primarily of limited time and resources for mental health care provision and lack of support from administrators (Beidas et al., 2012). We implemented a fairly simple recruitment process in which students self-determined their eligibility for the program that was feasible for schools to conduct, but it appeared to recruit a lower risk sample than previous efficacy research. However, the self-selected nature of recruitment may also have resulted in a sample likely to benefit from a CB group prevention intervention to avoid the onset of MDD. The present results reflect relatively short-term outcomes but suggest that a CB group-based prevention program may be more effective than CB bibliotherapy in preventing MDD incidence with high school adolescents in a real-world setting. Future research with this sample will examine longer-term outcomes, as well as moderating and

mediating factors, to further inform the important public health issue of preventing depression in young people.

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