Published in final edited form as:

J Clin Child Adolesc Psychol. 2019 ; 48(SUP1): S180–S193. doi:10.1080/15374416.2017.1280800.

Components Analyses of a School-Based Cognitive Behavioral Treatment for Youth Depression

Prerna G. Arora^{1,2}, Courtney N. Baker³, Lauren Krumholz Marchette⁴, and Kevin D. Stark⁵

¹Department of Psychology, Pace University, 41 Park Row 13th Floor, New York, NY 10038

²Division of Child and Adolescent Psychiatry, University of Maryland School of Medicine, 737 W Lombard St 4th Floor, Baltimore, MD 21201

³Department of Psychology, Tulane University, 6400 Freret St, Percival Stern Hall, New Orleans, LA 70118

⁴Cambridge Health Alliance, Harvard Medical School, Cambridge, MA

⁵Department of Educational Psychology, University of Texas Austin, 1600 W 38th St, Austin, TX 78731

Abstract

Objective: The current study sought to build upon research on CBT as the first-line treatment for depressed youth by investigating the effects of the various components of a CBT treatment on changes in depressive symptoms in young females.

Method: Females aged 9 to 14 years ($n = 40$; M age = 10.58 years) with a diagnosis of a depressive disorder from the CBT-only treatment condition of a larger randomized clinical trial were included in the current study. Participants engaged in a 20-session, 11-week, school-based CBT group intervention (ACTION Treatment; Stark et al., 2006). Depressive symptoms were assessed pre- and post-treatment and intervention components were coded based on review of audio recordings of treatment sessions. Data were examined using two-level mixed effects models using hierarchical linear modeling with full maximum likelihood estimation.

Results: Results indicated that higher quality behavioral intervention components were associated with greater improvement in post-treatment depression scores, higher quality cognitive intervention components were marginally associated with worsening post-treatment depression scores, and relational intervention components were not associated with depression outcome. Age significantly moderated the relationships between intervention components and depression outcome, with younger females benefiting most from higher quality behavioral and relational intervention components.

Conclusion: These findings provide preliminary evidence about the differential impact of CBT components on depression treatment outcome for young females, with consideration of age as a moderator. This study highlights the importance of continuing to dismantle CBT treatment

components for youth depression, as such findings can be used to design more potent, developmentally-tailored interventions.

Keywords

depression; intervention research; treatment components; schools

Depression is widespread with approximately 20% of youth experiencing an episode by age 18 (Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993). Depression negatively impacts academic achievement; impairs family, peer, and early romantic relationships; and increases the risk of suicide attempt and completion (Gould et al., 1998; Puig-Antich et al., 1993; Rohde, Lewinsohn, & Seeley, 1991). Development of depression during childhood is believed to have lasting negative consequences into adulthood, including lower academic attainment, substance use, and recurrent episodes of depressive disorders (Rohde et al., 1991; Weissman et al., 1999). Starting in adolescence, females, compared to males, suffer from depression at a rate of 2 to 1 (Galambos, Leadbeater, & Barker, 2004); this disparity persists, and even increases, during adulthood (Hankin & Abramson, 2001).

Cognitive behavioral therapy (CBT) is an effective treatment for depression in both children and adolescents (David-Ferdon & Kaslow, 2008). CBT has been shown to be more effective than no-treatment for reducing symptoms in depressed youth, particularly when it is combined with psychopharmaceuticals (Brent et al., 2008; TADS Team, 2007). Accordingly, and due to the public health impact of youth depression, CBT was promoted as best practice for treatment of depressive disorders (National Health and Medical Research Council, 1997), primed for dissemination into practice, including in schools (Stark, Arora, & Funk, 2011).

However, limited information exists regarding which components of CBT interventions are necessary to yield a positive outcome in youth. Though CBT for depression typically includes cognitive (e.g., eliciting automatic thoughts, recognizing cognitive errors, searching for alternative explanations) and behavioral components (e.g., teaching patients how to engage in pleasurable and enjoyable activities, improve problem-solving skills, increase self-control, and cope with their emotions) (Friedberg & McClure, 2002), there exists a paucity of research concerning specific components contributing to the successful treatment of depressed youth (Kennard et al., 2009). Specifically, it is unknown whether all components contribute in varying degrees to positive outcomes or whether particular components serve the purpose of priming the patient for effective engagement in the others (Shirk, Jungbluth, & Karver, 2012). Accordingly, research identifying efficacious treatment components in order to inform the development of more effective, efficient, and transportable treatments has been indicated (Fixsen, Naoom, Blase, Friedman, & Wallace, 2005; McCarty & Weisz, 2007) and research in which components are isolated, or in which components utilized in a specific therapy are assessed over the course of treatment, is required (Bell, Marcus, & Goodlad, 2013; Shirk et al., 2012). Few studies have, however, assessed individual components of CBT protocols, particularly with regards to depression in child and adolescent samples. Related studies are briefly discussed here.

Components Analysis Studies of CBT

Cognitive and behavioral components of treatment.

In studies examining the cognitive components of treatment programs for youth, results have been mixed, with some providing support for the inclusion of cognitive interventions (Kendall & Braswell, 1982) and others finding little support for inclusion of these interventions (Butler, Mieztis, Friendman, & Cole, 1980). Several studies have provided persuasive evidence of the use of behavioral interventions in the treatment of depression, though this research has been conducted primarily with adults (Coffman, Martell, Dimidjian, Gallop, & Hollon, 2007; Dobson et al., 2008; Dimidjian et al., 2006; Gortner, Gollan, Dobson, & Jacobson, 1998; Jacobson et al., 1996). With children and adolescents, initial uncontrolled trials have provided promising support for behavioral interventions in the treatment of depression (Chu, Colognori, Weissman, & Bannot, 2009; McCauley, Schloedt, Gudmundsen, & Martell, 2011; Ritschel, Ramirez, Jones, & Craighead, 2011).

In a meta-analysis of mediators of change, CBT for depression in youth was associated with a small but significant effect in cognitive but not behavioral processes (Chu & Harrison, 2009); though not looking exclusively at cognitive interventions, results of this meta-analysis provide support for the use of cognitive interventions in the treatment of youth depression. When queried directly, youth have endorsed behavioral interventions as more helpful than cognitive interventions in addressing their depressive symptoms (Asarnow, Scott, & Mintz, 2002). In another study, youth endorsed problem solving interventions as the most beneficial, though it is important to note that only half of the sample attended the cognitive restructuring sessions which occurred later in treatment (Feehan & Vostanis, 1996). In a secondary analysis of the TORDIA study (Brent et al., 2008), neither general therapy processes, behavioral activation, emotional regulation or coping skills, nor family-orientated components were related to outcome, while delivery of problem solving and social skills training were positively associated with improvements in depressive symptoms (Kennard et al., 2009). It is important to note that, despite its potential impact on outcome, the quality of the intervention components was not considered in the analyses (Kennard et al., 2009). While these studies provide some initial findings regarding those components of CBT that contribute to treatment outcome in youth, additional examinations with depressed youth are needed.

Relational components of treatment.

Beyond the application of certain components of the selected therapy, therapeutic change is also believed to be contingent on nonspecific elements of treatments, such as the therapeutic relationship and group cohesion (Burlingame, Fuhrman, & Johnson, 2001; Shirk & Karver, 2003). In the context of CBT, the therapeutic relationship has been underscored as an essential aspect of successful treatment of youth, purporting to enhance the effectiveness of various CBT interventions (Kendall, 2011). The results of several meta-analyses have indicated that the therapeutic relationship is moderately to strongly related to outcomes in youth (Karver, Handelsman, Fields, & Bickman, 2006; Shirk & Karver, 2003). However, the literature on this area remains mixed, with some reviews concluding that nonspecific factors are responsible for therapeutic change (Ahn & Wampold, 2001), and others suggesting that

specific ingredients of therapy contribute to treatment outcomes (Bell et al., 2013). Additional clarification regarding the role of nonspecific elements, including the therapeutic relationship and group cohesion, on treatment outcome, particularly in combination with specific ingredients of treatment, is needed.

Age as a moderator.

Developmental literature has posited that cognitive interventions are more effective with older youth while behavioral interventions benefit younger children to a greater degree (Ollendick, Grills, & King, 2001). Despite the importance placed on the role of developmental level and age as treatment moderators due to the developmental sophistication believed to be needed to engage in certain aspects of CBT, these variables remain understudied (Grave & Blissett, 2004). In the few studies examining this, findings have provided mixed results. For instance, an early meta-analysis of treatment studies concluded that CBT was not as effective for younger relative to older youth (Durlak, Furhman, & Lapman, 1991). In the TADS study, however, age was found to be a significant moderator, with younger adolescents being more likely to benefit during the acute phase of all depression treatments (i.e., CBT, combined CBT and medication) than older adolescents (Curry et al., 2006). Additional research is needed to clarify the impact of age on treatment outcome.

Current Study

The current study evaluated the relative effects of cognitive, behavioral, and relational components of a CBT treatment for an ethnically diverse sample of pre- and early adolescent females. The following research questions and hypotheses were evaluated: (a) Are higher quality behavioral interventions associated with more improvement in depression symptoms post-treatment? (b) Are higher quality cognitive interventions associated with more improvement in depression symptoms post-treatment? (c) Are higher quality relational interventions, composed of the therapeutic relationship and group cohesion, associated with more improvement in depression symptoms post-treatment? (d) When all components are considered simultaneously, which contribute to improvement in depressive symptoms? (e) Within this sample of 9 to 14 year-old girls, does age moderate the effect of behavioral, cognitive, and relational interventions on improvement in depression scores?

We hypothesized that higher quality behavioral and relational, but not cognitive, intervention components would be associated with more improvement in severity of depressive symptoms. In addition, in line with the developmental literature (Ollendick et al., 2011), we hypothesized that behavioral interventions would be associated with greater improvements in severity of depressive symptoms for younger youth, cognitive interventions would be associated with greater improvements in severity of depressive symptoms for older youth, and relational interventions associated with greater improvements in severity of depressive symptoms equally for both age groups.

Method

Participants

The sample included 40 females enrolled in grades 4 to 7 at two suburban school districts in the Southern US from the CBT-only treatment condition of a larger clinical trial. These participants' ranged in age from 9 to 14 years ($M = 10.57$; $SD = 1.28$). The majority of participants received a primary diagnosis of Major Depressive Disorder (MDD) ($n = 33$; 82.5%), with a significant proportion ($n = 17$; 42.5%) suffering from at least one additional comorbid disorders. Self-reported race/ethnicity of participants were White/Hispanic ($n = 16$; 40%), White/nonHispanic ($n = 16$; 40%) and African American ($n = 7$; 17.5%). Participants attended an average of 19.18 out of 20 sessions and were in treatment groups ranging from two to four individuals (with a total of 14 groups). See Table 1.

Measures

Intervention Components.—A slightly modified version of the of the CBT Coding Scale for Bulimia Nervosa (CCS-BN; Spangler, 1998) was employed as a measure of the quality of the CBT therapist's delivery of cognitive, behavioral, and relational interventions. The scale consists of a coding manual, which provides detailed guidelines regarding the coding of each item, with explicitly defined anchors and examples for each (Spangler, 1998). Specifically, therapist/child interactions reflective of each score (on a Likert scale) is provided for each item. The wording of items was modified so that items related to treatment generally as opposed to the treatment of bulimia nervosa in particular. It is important to note that, while the measure is, for the most part an assessment of *quality* of the intervention components, at times, the frequency of the intervention is assessed.

The Behavioral Interventions subscale of the CCS-BN, which consisted of six items, was modified to more accurately capture the complete range of behavioral interventions delivered as part of the treatment for depression. Areas assessed included training in mood monitoring and coping skills, therapist identification and exploration of adaptive and maladaptive behaviors, completion and review of assigned homework, and engagement in problem solving strategies. The final measure consisted of 20 items on a 7-point Likert scale, with higher scores indicating increased quality of delivery of the identified techniques. Scores range from 0 to 120 for each session. Calculated internal consistency of the modified subscale for this sample was excellent ($\alpha = .92$). See Table 2 for the modified list of items.

The Cognitive Interventions subscale of the CCS-BN was used as a measure of the quality of cognitive interventions. The subscale, incorporating items from both the Cognitive Therapy Rating Scale (CTRS; Young & Beck, 1980) and the Collaborative Study Psychotherapy Rating Scale-Cognitive Behavioral Section (CSPRS; Hollon et al., 1988), consists of 19 items rated on a 7-point Likert scale, with higher scores indicating higher quality of delivery of the identified techniques. One item, however, scores the frequency with which the therapist attempts to elicit the participants' specific cognitions. Scores ranged from 0 to 114 for each session. The subscale has demonstrated adequate inter-rater reliability (.69) and high internal consistency ($\alpha = .87$) (Spangler, Beckstead, Hatch, Radpour-Wiley, & Agras,

2001). Calculated internal consistency of the modified subscale for this sample was excellent ($\alpha = .93$). See Table 3 for the modified list of items.

The Empathy Interventions subscale of the CCS-BN (Spangler, 1998) was employed as a measure of the quality of therapist relational behaviors. The subscale consists of seven items assessing empathy, understanding, warmth, rapport, collaboration, involvement, and interpersonal effectiveness rated on a 7-point Likert scale, with higher scores indicating greater quality of therapist relational interventions directed toward the participant. One item, however, scores the frequency with which the therapist displays warmth when communicating with participants. The Empathy subscale possesses adequate inter-rater reliability (.71) and high internal consistency (.87) (Spangler et al., 2001). Scores range from 0 to 42 for each session. Calculated internal consistency of the subscale for this sample was good ($\alpha = .89$).

The Harvard Community Health Plan Group Cohesiveness Scale, Version II (HCHP-GCS-II; Soldz et al., 1987) was also employed in the assessment of the quality of group cohesion. The HCHP-GCS-II consists of 5 items rated on an 8-point Likert scale. The measure has adequate psychometric properties, (Budman, Soldz, Demby, & Davis, 1993). Calculated internal consistency of the modified subscale for this sample was excellent ($\alpha = .92$). This measure was combined with the Empathy Intervention subscale of the CCS-BN (Spangler, 1998) to create a composite score for quality of relational interventions. Scores ranged from 5 to 40. The calculated internal consistency of the composite scale for this sample was excellent ($\alpha = .91$). Total scores for the relational intervention score ranged from 5 to 82 for each session.

For the intervention component measures, participants received a score for each item on each measure for each session coded. If a participant was absent, which happened infrequently (see Table 1), the session was coded 0 as the participant did not receive any of that intervention component during the session and did not obtain a make-up session. For instance, participants received a score for each of the 19 items on the Cognitive Interventions subscale for each session, with scores for each session ranging from 0–114. These scores were summed across all ten coded sessions, and an average per session score was created by dividing this sum by the number of coded sessions (i.e., ten). Thus, in the example above, the participant's scores on the Cognitive Interventions subscale across the sessions coded were summed, with a total ranging from 0 to 1,140. This sum was then divided by ten to create an average Cognitive Intervention score for each participant. These raw scores were then standardized (i.e., transformed into *z*-scores) in order to improve interpretability.

Depressive Symptoms.—The Schedule for Affective Disorders and Schizophrenia for School Age Children (K-SADS-P IVR; Ambrosini & Dixon, 2000) is a semi-structured diagnostic interview for use in youth, aged 6 to 18. For each symptom present, a severity rating is assigned based on information obtained from the child and parent interviews, with the diagnosing clinician generating a summary rating based on all information. Ratings range from 0 to 4 or 0 to 6, with higher scores indicating increased severity. Symptoms are deemed clinically significant if a rating of at least 3 is endorsed on the 0 to 4 scale or at least

4 on the 0 to 6 scale. Ratings are then used to determine diagnoses in relation to DSM-IV criteria.

Depression scores can be calculated for two points in time: when the depressive episode was at its most severe during the current episode and over the last week. Only Last Week scores were used in this investigation. The scores are calculated by summing the ratings for each of the 17 symptoms. Scores range from 17 to 97 with higher scores indicating greater severity. Adequate internal consistency (Ambrosini, Metz, Bianchi, Rabinovich, & Undie, 1991; Chambers et al., 1985) and test-retest reliability (Chambers et al., 1985) have been reported. Change scores were calculated by subtracting posttest score from pretest score, so that the change score outcome can be interpreted as “improvement.” This change score was then standardized (i.e., transformed into a z-score) to improve the interpretability of the results. Change scores were conditioned on pretest depression scores, which were also standardized.

Demographics.—Participant demographic data, including participant age (collapsed into four categories: ages, 9, 10, 11, and 12–14), grade in school, and ethnicity, was queried via the use of a demographic questionnaire.

Procedure

This study is part of a larger investigation examining the efficacy of a school-based CBT treatment for depression in 8 to 13 year old girls; see Stark, Streusand, Arora, and Patel (2012) as well as Morey, Arora, and Stark (2015) for a detailed description of the full study.

The treatment protocol, ACTION, is a manualized group CBT treatment for depressed early adolescent females (Stark et al., 2006). Treatment entails 20 group and two individual sessions, approximately 60 minutes in length, and occurs over an 11-week period, with each group consisting of two to four participants. The treatment protocol consists of two main ingredients designed to address depressive symptoms. Behavioral interventions (e.g., behavioral activation, problem solving) are introduced and primarily practiced during sessions 2 through 9 though were practiced throughout the remainder of the sessions; cognitive interventions were, for the most part, introduced during session 10 and practiced during sessions 10 through 19. Treatment in the larger clinical trial was implemented by female doctoral level psychology students, with supervision provided by the treatment developer. Depression measures were collected at pre- and post-intervention. Therapy sessions from the trial were audio recorded in an effort to evaluate treatment integrity. Degree of integrity was established by independent raters using a coding system developed for the study. Subsequent analyses indicated that 89% of the objectives were adequately or completely addressed over the course of treatment.

Coding.—Audiotapes of the therapy sessions were coded using the modified Behavioral and Cognitive Interventions subscales of the CCS-BN (Spangler, 1998), the Empathy Interventions subscale of the CCS-BN (Spangler, 1998) and the HCHP-GCS-II (Soldz et al., 1987). Coders included doctoral level graduate students who had extensive training in and experience delivering the treatment protocol. Training of the coders began with a review of the intervention coding manuals and procedures (CCS-BN; Spangler, 1998; HCHP-GCS-II; Soldz et al., 1987); four tapes from the treatment of the minimal contact control condition

that was completed after post-testing were coded and discussed as a group in order to better acquaint the raters with items on the coding scales and underscore the coding process. Eight tapes were then coded for purposes of calculating inter-rater reliability. Inter-rater reliability was established between the Principal Investigator of the present study and each separate rater for each subscale. An inter-rater reliability statistic was calculated, with each coder approved for independent coding after achieving a minimum intraclass correlation coefficient (ICC) of .70 or greater on each item. The initial training period lasted approximately 50 hours. A selection providing a representative sample of the interventions of the total 20 meetings were then chosen for coding. Specifically, audiotapes from half of the sessions (including sessions 2, 4, 6, 8, 9, 12, 14, 16, 18, and 19) for each group were coded. A selection of the meetings (rather than all meetings) were coded as these were believed to be representative of the overall treatment and due to the time intensive nature of the coding. After removing sessions 1 and 20, which were unique in their content with a focus on treatment initiation and termination, respectively, the sessions were chosen randomly. Each participants' ten therapy sessions were together randomly assigned to coders, with a coder coding all participants within the same group. At the conclusion of the coding, 10% of the total sample was utilized in order to calculate inter-rater reliability for the coding system used. The final inter-rater reliability statistics represent the actual differences between coders; discrepancies were not resolved. The ICCs for the coding measures used in the current study were as follows: CCS-BN Cognitive Interventions subscale = .61, CCS-BN Behavior Interventions subscale = .77, and, for relational coding interventions, CCS-BN Empathy subscale = .81 and HCHP-GCS = .84.

Analytic Approach

Because participants were nested within therapy groups, we examined two-level random-intercept mixed effects models utilizing hierarchical linear modeling (HLM) with full maximum likelihood estimation (Raudenbush & Bryk, 2002). Using HLM to fit models allows change in individuals' depression scores to be predicted by interventions that occur at the level of the group. In order to determine if HLM was necessary, given the small number of participants and groups, we calculated the intraclass correlation (ICC) for the null model. The ICC indicated that the use of HLM was appropriate, $ICC=.24$. Specifically, the magnitude of this ICC indicates that 24% of the variability in participants' depression symptom change was due to group-level effects, while the remainder was due to individual differences between participants.

All predictors and covariates were entered at level 1. Continuous variables were grand-mean centered with the exception of standardized variables, which are already centered, and interaction terms. We selected grand-mean (rather than group-mean) centering because we were primarily interested in how group therapy intervention components influenced individual participant depression scores relative to the average youth, rather than relative to the group-specific average. Given the small number of units, the variances of covariates were fixed. Final models estimated variance components only when terms were associated with significant variability (Raudenbush & Bryk, 2002). There were no missing data.

To test our first hypothesis, we modeled the associations between behavioral, cognitive, and relational intervention components and depression symptom improvement in three separate models, controlling for therapy group attendance, number of diagnoses, and pretest depression symptoms. Next, we modeled the multivariate associations between the same variables in one model. Modeling with single predictors clarifies how the treatment components are independently related to symptom improvement, while the multivariate model provides information on whether symptom improvement is better explained by a subset of the treatment components. In order to test our second hypothesis, we added the age by treatment component interactions to the level 1 equation, controlling for therapy group attendance, number of diagnoses, and pretest depression scores. Estimations of fixed effects without robust standard errors are interpreted due to the small number of level 2 units. Because the change scores and the treatment components have been standardized, main effects can be interpreted as follows: every one standard deviation increase in the average quality of the treatment component delivered each session is associated with *beta* standard deviation unit improvement in depression scores over the course of treatment for youth with average attendance, number of pretest diagnoses, pretest depression symptoms, and, if included in the model, age and quality of other treatment components. Due to the small number of level 1 and 2 units and in light of the fact that this study is one of the first to evaluate the effect of individual treatment components within CBT for pre- and early adolescent females, marginally significant effects were also interpreted.

Results

Descriptive Statistics

Means and standard deviations of the study variables, and inter-correlations between these variables, are presented in Table 4. Several significant correlations emerged between the study variables. First, behavioral intervention components were associated with cognitive intervention components ($r=.63, p < .001$) and with relational intervention components ($r=.54, p < .001$) and cognitive intervention components were associated with relational components ($r=.47, p < .01$). Age was related to behavioral ($r=.34, p < .05$) and relational ($r=.40, p < .05$) intervention components as well as to depressive symptom improvement ($r=.38, p < .05$). These correlations are all considered medium or large effects (Cohen, 1992). It should be noted that the majority of participants who completed the CBT intervention improved (i.e., positive depression change score), and that both behavioral ($r=.19$) and relational ($r=.19$) components had small-medium sized relationships with depressive symptom improvement.

Behavioral, Cognitive, and Relational Intervention Components and Depression Symptom Improvement

We modeled the hypothesized associations between behavioral, cognitive, and relational intervention components separately, controlling for therapy group attendance, number of diagnoses at pretest, and pretest depression symptoms. Consistent with hypotheses, higher quality behavioral intervention components were associated with greater improvement in depression scores, $G40 = .18, se = .09, p = .048$ (see Table 5, Model 1). Specifically, every standard deviation increase in quality of behavioral intervention components delivered per

session was associated with a .18 standard deviation unit improvement in depression scores over the course of treatment, for youth with average attendance, number of pretest diagnoses, and pretest depression symptoms. In line with hypotheses, higher quality cognitive intervention components were not associated with change in depression scores, $G40 = .06$, $se = .15$, $p = .38$ (see Table 5, Model 2). Contrary to hypotheses, higher quality relational intervention components were also not associated with change in depression symptoms, $G40 = .15$, $se = .10$, $p = .15$ (see Table 5, Model 3). When we tested these relationships in the multivariate model, the effects were unchanged for the behavioral component, $G40 = .28$, $se = .11$, $p = .02$, and the relational component, $G60 = .13$, $se = .12$, $p = .28$. However, the cognitive component became marginally significantly associated with worsening symptoms, $G50 = -.24$, $se = .12$, $p = .06$ (see Table 5, Model 4).

Age as a Moderator between Components and Depression Symptom Improvement

In order to evaluate the role of age in the relationship between therapy components and treatment outcome, we added age to the model as a moderator of the relationship between intervention component and depression improvement. Age was significantly associated with improvement on depression scores, such that older females improved more from the intervention than younger females, $G70 = .25$, $se = .08$, $p = .004$ (see Table 5, Model 5). As hypothesized, age significantly moderated the relationships between intervention components and depression outcome. Specifically, and as hypothesized, younger females appeared to benefit the most from groups with higher quality behavioral intervention components, $G80 = -.22$, $se = .09$, $p = .03$ (see Figure 1). Analyses of simple slopes revealed that the relationship between quality of behavioral intervention components and depression symptom improvement was significantly moderated by age at both low, $b = .41$, $se = .12$, $p < .001$, and average, $b = .21$, $se = .07$, $p = .004$, but not high, $b = .01$, $se = .07$, $p = .95$, levels of behavioral intervention components (see Figure 1). Contrary to hypotheses, the interaction between age and cognitive components was not significant; thus, there was no evidence that older youth benefited more from therapy sessions with more cognitive components, $G90 = .10$, $se = .09$, $p = .27$. Also, contrary to hypotheses, the effect of relational intervention components on symptom improvement was also moderated by age. Relational intervention components followed a similar pattern as behavioral components, with younger females appearing to benefit more from them than older females, although the relationship was only marginally significant, $G100 = -.16$, $se = .07$, $p = .054$ (see Figure 2). Specifically, the relationship between quality of relational components and depression symptom improvement was significantly moderated by age at both low, $b = .44$, $se = .13$, $p < .001$, and average, $b = .22$, $se = .07$, $p = .003$, but not high, $b = .001$, $se = .07$, $p = .99$, levels of behavioral intervention components (see Figure 2).

Secondary analyses.

First, we tested our study aims using log-transformed variables, which are an alternative to using simple difference scores. These analyses demonstrated an identical pattern of findings, and we present the findings from models with the untransformed variables for ease of interpretation. Second, given our relatively small sample size, we conducted sensitivity analyses to evaluate whether the interaction findings were statistical artifacts. We found no support that this was the case; in contrast, we found identical patterns of findings across all

tests. Third, as previous studies have examined behavioral components separately (e.g., problem solving, social skills training, behavioral activation, emotion regulation; Kennard et al., 2009) with differing outcomes, we attempted to also examine the behavioral components in this study separately to the degree that was feasible considering our coding procedures used. Thus, we examined problem solving components and other behavioral components (which in this study included mood monitoring and coping skills training, as well as therapist identification and exploration of adaptive and maladaptive behaviors and completion and review of assigned homework) separately. Sensitivity analyses evaluated the behavioral and problem solving aspects of the behavioral code separately for all hypotheses; the pattern of findings was unchanged.

Discussion

The current study sought to build upon current research on CBT as the first-line treatment for depressed youth by investigating the effects of the various components of a CBT treatment on changes in depressive symptoms in young females. Specifically, the current study explored the effects of cognitive, behavioral, and relational components of a CBT treatment for depressed youth on changes in depression scores in a group of ethnically diverse, pre- and early adolescent females, as well as examined whether age moderated the effect of intervention components on improvement in depression scores. This study contributes to the limited research on treatment components studies, particularly in the area of youth depression, and informs the development and tailoring of interventions to support the increased implementation of cognitive behavioral interventions for depressed youth.

In line with our hypothesis, higher quality behavioral intervention components were associated with greater improvement in depression scores. This finding is consistent with previous literature which has supported the use of behavioral interventions in the treatment of depression, though this research has been primarily conducted with adult samples and with interventions used in isolation (e.g., Coffman, Martell, Dimidjian, Gallop, & Hollon, 2007; Dimidjian et al., 2006; Dobson et al., 2008). In the sole study of its kind located with youth samples, this finding was somewhat consistent with previous results though components compared differed (Kennard et al., 2009). This study extends previous literature by supporting this finding in youth, and differs from previous research in that it assesses the impact of behavioral interventions in a group, rather than individual, therapy format.

Contrary to our hypothesis, higher quality cognitive intervention components were marginally associated with worsening depression scores, though only when examined in the context of the multivariate model. Though only marginally associated, this finding is discussed here due, as indicated previously, to the small sample size and in light of the fact that this study is one of the first studies to evaluate the effect of individual treatment components within CBT for pre- and early adolescent females. This finding is inconsistent with previous findings which indicated that cognitive interventions were at least as effective as behavioral interventions in the treatment of youth (Butler et al., 1980; Kendall & Braswell, 1982); findings from this study are also inconsistent with findings from adults studies that cognitive interventions were either not found to be related to symptom reduction (Hayes, Castonguay, & Golfried, 1996) or found to be the most significant treatment

component in reducing symptoms (Christensen, Griffiths, MacKinnon, & Brittliffe, 2006). The findings from the current study failed to clarify existing inconsistencies regarding the role of cognitive interventions in the treatment of depressed youth. Additional research exploring the role of cognitive interventions in the treatment of depressed youth is thus needed. This is especially salient considering previous findings regarding the role of cognitive interventions as protective factors in preventing recurrence of depressive symptoms following treatment (Dobson et al., 2008); additional assessments of outcome over time may help clarify the role of cognitive interventions in treating youth depression.

Our hypothesis that higher quality relational interventions would be associated with more improvement in depression symptoms was not supported. This finding is consistent with some literature which has underscored the role of specific ingredients of therapy (Bell et al., 2013) though inconsistent with findings that have highlighted the role of relational factors (Ahn & Wampold, 2001; Karver et al., 2006; Shirk & Karver, 2003). Methodological limitations, such as use of objective observer ratings versus youths' perceptions of empathy and group cohesiveness, may have prevented an accurate assessment of these relational interventions. Further research via additional component analyses studies using diverse methods of measurement (i.e., participants' perceptions) are needed to confirm this study's finding.

In line with our hypothesis, younger females appeared to benefit the most from higher quality behavioral intervention components. Contrary to our hypothesis, the interaction between age and cognitive components was not significant. Also contrary to our hypothesis, the effect of relational intervention components was also moderated by age, with younger participants appearing to benefit more from them than older participants, although the relationship was only marginally significant. While the finding regarding behavioral interventions is consistent with previous literature indicating that higher cognitive development is needed to properly engage in certain aspects of CBT (Ollendick et al., 2001), the finding regarding cognitive interventions is not consistent with this literature. These findings clarify previous inconsistent findings regarding the role of age on the effectiveness of CBT (Curry et al., 2006; Durlak et al., 1991) by parsing components to determine the differential impact of each depending on age of youth. With regards to the relational piece, this finding appears consistent with previous theory indicating that the therapeutic relationship is increasingly salient for child populations due to the added challenge related to engagement in therapy (Kendall, 2011). However, this research, to our knowledge, is the first to provide empirical support for such a finding.

Several limitations should be taken into account when considering the results of the current study. First, a significant limitation of this study was its small sample size and small number of clusters. This limitation may have impacted the power to detect statistical significance in the analyses conducted. Nonetheless, the study provides initial findings regarding an important area well primed for examination. Future research should seek to repeat such analyses with larger samples. Moreover, considering some of the unique aspects of our findings (e.g., intervention component relationships to symptom improvement), general replication of our study would be beneficial to confirm our results.

Concerns regarding the measurement of interventions represent another limitation of this study. First, the quality of intervention delivered, rather than the frequency of intervention component delivery, or the level of skill in the intervention attained or applied by the participant, was assessed. The addition of measures of therapist frequency of delivery or of participant understanding and application of skills learned might provide an improved and more accurate way of assessing the CBT interventions. Additionally, the coding method used may have been insufficient in assessing the nuances associated with assessing the delivery of the treatment. Specifically, it remains unclear whether the codings themselves were directly assessing the particular interventions, some combination of interventions, or, rather, a common underlying factor in CBT for depression. While we attempted to address this by engaging in the secondary analyses of the intervention components, future research should seek to employ additional methodologies (e.g., dismantling studies) or different intervention quality or adherence measures (see McLeod & Weisz, 2010; Southam-Gerow et al., 2015) to attempt to replicate findings of this research. Additionally, as our behavioral intervention component included a diverse range of elements which have been found to predict outcomes differentially in a past study (Kennard et al., 2009), future research should also seek to examine behavioral components separately.

Additionally, the study only included outcome measures collected at pre- and post-treatment. Future studies should consider including outcome measures throughout the treatment. Further, in order to further explore the role of cognitive interventions in promoting longer-term change in depressive symptoms, assessment beyond post-treatment would be beneficial. Thus, future studies should seek to include this potential third level, namely additional follow-up data, as an area of examination.

Regarding the analyses, it is important to note that the order in which components were delivered was not considered. While the current study still provides useful information regarding the value of isolated components, future research should seek to examine whether some components prime the patient for other components by examining the importance of the order of components delivered.

Finally, while a strength of the study is its inclusion of a sample of individuals less often studied in the context of depression, the results may be limited as they do not account for potential differences due to gender or developmental age. Nonetheless, given the prevalence of depression in pre- and early adolescent females and the associated consequences of youth-onset depression, findings specifically applicable for this group of individuals are useful.

Despite these limitations, this study provides a noteworthy contribution by exploring the differential impact of components of a CBT treatment on changes in depressive symptoms in young females. Findings from this study have implications for future research supporting the implementation of CBT treatments for depressed youth. Specifically, consideration of age along with which “active ingredients” are critical to incorporate into depression treatment for youth are of utmost importance in order to design potent, time-limited, developmentally-tailored, school-based CBT treatment for depression. Results from this study, while preliminary, suggest the importance of including high quality behavioral intervention

components for youth, particularly younger depressed females. Additional research examining intervention components with larger, diverse samples of youth of varying ages is needed to better understand the impact of each of these components on treatment outcome. Findings from this study along with future research in this area facilitate efforts to bridge the research to practice gap and support transportability of interventions to community settings. Specifically, findings can inform the development of best practice guidelines for the treatment of youth depression in schools, as well as in other clinical care contexts.

Acknowledgments

FUNDING

Funding for this work was provided by a National Institute of Mental Health RO1 MH63998 – 01A1 and from the Society for the Study of School Psychology. The contents of this paper are the sole responsibility of the authors and do not represent the official position of the National Institutes of Health.

References

- Ahn H, & Wampold B (2001). Where oh where are the specific ingredients? A meta-analysis of component studies in counseling and psychotherapy. *Journal of Counseling Psychology*, 48(3), 251–257.
- Ambrosini PJ (2000). Historical development and present status of the Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS). *Journal of the American Academy of Child & Adolescent Psychiatry*, 39(1), 49–58. [PubMed: 10638067]
- Ambrosini PJ & Dixon JF (2000). Schedule for affective disorders & schizophrenia for school age children (6–18 years) – Kiddie-SADS (KSADS) (present state and lifetime version) K-SADS-IVR (Revision of K-SADS-IIIR) Unpublished manuscript, Eastern Pennsylvania Psychiatric Institute, Philadelphia, PA.
- Ambrosini PJ, Metz C, Bianchi MD, Rabinovich H, & Undie A (1991). Concurrent validity and psychometric properties of the Beck Depression Inventory in outpatient adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry*, 30(1), 51–57. [PubMed: 2005064]
- Asarnow JR, Scott CV, & Mintz J (2002). A combined cognitive– behavioral family education intervention for depression in children: A treatment development study. *Cognitive Therapy and Research*, 26, 221–229.
- Beck AT, Shaw BF, Rush AJ, & Emery G (1979). *Cognitive therapy of depression*. New York: Guilford Press.
- Bell EC, Marcus DK, & Goodlad JK (2013). Are the parts as good as the whole? A meta-analysis of component treatment studies. *Journal of Consulting and Clinical Psychology*, 81(4), 722–736. [PubMed: 23688145]
- Brent D, Emslie G, Clarke G, Wagner K, Asarnow J, Keller M, ... Zelazny J(2008). Switching to another SSRI or to venlafaxine with or without cognitive behavioral therapy for adolescents with SSRI-resistant depression: The TORDIA randomized controlled trial. *Journal of the American Medical Association*, 299(8), 901–913. [PubMed: 18314433]
- Budman SH, Soldz S, Demby A, & Davis M (1993). What is cohesiveness? An empirical examination. *Small Group Research*, 24(2), 199–216.
- Butler LD, Mieizitis S, Friedman R, & Cole E (1980). The effect of two school-based intervention programs on depressive symptoms in preadolescents. *American Educational Research Journal*, 17(1), 111–119.
- Burlingame GM, Fuhriman A, & Johnson JE (2001). Cohesion in group psychotherapy In Norcross JC (Ed.), *Psychotherapy relationships that work: Therapist contributions and responsiveness to patients* (pp. 71–88). New York: Oxford.
- Chambers WJ, Puig-Antich J, Hirsch M, Paez P, Ambrosini PJ, Tabrizi MA, & Davies M (1985). The assessment of affective disorders in children and adolescents by semistructured interview: Test-

retest reliability for the Schedule for Affective Disorders and Schizophrenia for School-Age Children, Present Episode Version. *Archives of General Psychiatry*, 42(7), 696–702. [PubMed: 4015311]

Christensen H, Griffiths KM, MacKinnon AJ, & Brittliffe K (2006). Online randomized control trial of brief and full cognitive behavioral therapy for depression. *Psychological Medicine*, 36, 1737–1746. [PubMed: 16938144]

Chu BC, & Harrison TL (2007). Disorder-specific effects of CBT for anxious and depressed youth: A meta-analysis of candidate mediators of change. *Clinical Child and Family Psychology Review*, 10, 352–372. [PubMed: 17985239]

Coffman S, Martell C, Dimidjian S, Gallop R, & Hollon S (2007). Extreme nonresponse in cognitive therapy: Can behavioral activation succeed where cognitive therapy fails?. *Journal of Consulting and Clinical Psychology*, 75(4), 531–541. [PubMed: 17663608]

Cohen J (1992). A power primer. *Psychological Bulletin*, 112, 155–159. [PubMed: 19565683]

Curry J, Rohde P, Simons A, Silva S, Vitiello B, Kratochvil C,...March J (2006). Predictors and moderators of acute outcome in the Treatment of Adolescents with Depression Study (TADS). *Journal of the American Academy of Child and Adolescent Psychiatry*, 45(12), 1427–1439. [PubMed: 17135988]

David-Ferdon C, & Kaslow NJ (2008). Evidence-based psychosocial treatments for child and adolescent depression. *Journal of Clinical Child & Adolescent Psychology*, 37(1), 62–104. [PubMed: 18444054]

Dimidjian S, Hollon SD, Dobson KS, Schmaling KB, Kohlenberg RJ, Addis M....Jacobson, N.S. (2006). Randomized trial of behavioral activation, cognitive therapy, and antidepressant medication in the acute treatment of adults with major depression. *Journal of Consulting and Clinical Psychology*, 74, 658–670. [PubMed: 16881773]

Dobson KS, Hollon S, Dimidjian S, Schmaling K, Kohlenberg R, Gallop R....Jacobson NS (2008). Randomized trial of behavioral activation, cognitive therapy, and antidepressant medication in the prevention of relapse and recurrence in major depression. *Journal of Consulting and Clinical Psychology*, 76(3), 468–477. [PubMed: 18540740]

Durlak JA, Furhman T, & Lampman C (1991). Effectiveness of cognitive-behavior therapy for maladapting children: A meta-analysis. *Psychological Bulletin*, 110, 204–214. [PubMed: 1835106]

Feehan C, & Vostanis P (1996). Cognitive-behavioural therapy for depressed children: Children's and therapists' impressions. *Behavioural and Cognitive Psychotherapy*, 24(2), 171–183.

Fixsen DL, Naoom SF, Blase KA, Friedman RM, & Wallace F (2005). Implementation research: A synthesis of the literature Tampa, FL: University of South Florida, Louis de la Parte Florida Mental Health Institute, The National Implementation Research Network (FMHI Publication # 231)

Friedberg R, & McClure J (2002). Review of "Clinical practice of cognitive therapy with children and adolescents." *Journal of Developmental and Behavioral Pediatrics*, 23(6), 457–458.

Galambos NL, Leadbeater BJ, & Barker ET (2004). Gender differences in and risk factors for depression in adolescence: A 4-year longitudinal study. *International Journal of Behavioral Development*, 28, 16–25.

Gould MS, King R, Greenwald S, Fisher P, Schwab-Stone M, Kramer R, ... Shaffer D (1998). Psychopathology associated with suicidal ideation and attempts among children and adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry*, 37(9), 915–923. [PubMed: 9735611]

Grave J, & Blissett J (2004). Is cognitive behavior therapy developmentally appropriate for young children? A critical review of the evidence. *Clinical Psychology Review*, 24, 399–420. [PubMed: 15245828]

Hankin BL & Abramson LY (2001). Development of gender differences in depression: An elaborated cognitive vulnerability-transactional stress theory. *Psychological Bulletin*, 127, 773–796. [PubMed: 11726071]

Hayes A, Castonguay L, & Goldfried M (1996). Effectiveness of targeting the vulnerability factors of depression in cognitive therapy. *Journal of Consulting and Clinical Psychology*, 64(3), 623–627. [PubMed: 8698959]

- Hollon S, Evans MD, Auerbach A, DeRubeis RJ, Elkin I, Lowery A, ... Piasecki J (1988). *Development of a system for rating therapies for depression: Differentiating cognitive therapy, interpersonal psychotherapy, and clinical management pharmacotherapy*. Unpublished manuscript.
- Karver MS, Handelsman JB, Fields S, & Bickman L (2006). Meta-analysis of therapeutic relationship variables in youth and family therapy: the evidence for different relationship variables in the child and adolescent treatment outcome literature. *Clinical Psychology Review*, 26(1), 50–65. [PubMed: 16271815]
- Kendall PC (2011). "Guiding Theory for Therapy with Children and Adolescents" In Kendall PC (Ed.), *Child and adolescent therapy: Cognitive-behavioral procedures* (4th ed.), 3–24. New York, NY US: Guilford Press.
- Kendall PC, & Braswell L (1982). Cognitive-behavioral self-control therapy for children: A components analysis. *Journal of Consulting and Clinical Psychology*, 50(5), 672–689. [PubMed: 7142541]
- Kennard B, Clarke G, Weersing V, Asarnow J, Shamseddeen W, Porta G, ... Brent DA (2009). Effective components of TORDIA cognitive-behavioral therapy for adolescent depression: Preliminary findings. *Journal of Consulting and Clinical Psychology*, 77(6), 1033–1041.
- Lewinsohn PM, Hops H, Roberts RE, Seeley JR, & Andrews JA (1993). Adolescent psychopathology: I. Prevalence and incidence of depression and other DSM-III-R disorders in high school students. *Journal of Abnormal Psychology*, 102, 133–144. [PubMed: 8436689]
- McCarty CA, & Weisz JR (2007). Effects of psychotherapy for depression in children and adolescents: What we can (and can't) learn from meta-analysis and component profiling. *American Academy of Child and Adolescent Psychiatry*, 46(7), 879–886.
- Morey M, Arora PG, & Stark KD (2015). Multiple stage screening of youth depression in schools. *Psychology in the Schools*, 52(8), 800–814.
- National Health and Medical Research Council. (1997). *Depression in young people: Clinical practice guidelines*. Canberra: Australian Government Publishing Service.
- Ollendick TH, Grills AE, & King NJ (2001). Applying developmental theory to the assessment and treatment of childhood disorders: Does it make a difference? *Clinical Psychology and Psychotherapy*, 8, 304–314.
- Puig-Antich J, Kaufman J, Ryan ND, Williamson DE, Dahl RE, Lukens E, ... Nelson B (1993). The psychosocial functioning and family environment of depressed adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, 32(2), 244–253. [PubMed: 8444751]
- Raudenbush SW, & Bryk AS (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed., Vol. 1). Thousand Oaks, CA: Sage Publications.
- Rohde P, Lewinsohn PM, & Seeley JR (1991). Comorbidity of unipolar depression II: Comorbidity with other mental disorders in adolescents and adults. *Journal of Abnormal Psychology*, 100(2), 214–222. [PubMed: 2040773]
- Shirk SR, Jungbluth N, & Karver M (2012). Change processes and active components. In Kendall PC (Ed.), *Child and adolescent therapy: Cognitive-behavioral procedures* (pp. 471–498). New York, NY: Guilford Press.
- Shirk SR, & Karver M (2003). Prediction of treatment outcome from relationship variables in child and adolescent therapy: A meta-analytic review. *Journal of Consulting and Clinical Psychology*, 71, 452–464. [PubMed: 12795570]
- Soldz S, Bernstein E, Rothberg P, Budman S, Demby A, Feldstein M, ... Davis M (1987). *Rater manual: Harvard Community Health Plan Group Cohesiveness Scale, Version II*. Boston, MA: Harvard Community Health Plan, Mental Health Research Program.
- Southam-Gerow MA, McLeod BD, Arnold CA, Rodriguez A, Cox JR, Reise SP, Bonifay WE, Weisz JR, & Kendall PC (2016). Initial development of a treatment adherence measure for cognitive-behavioral therapy for child anxiety. *Psychological Assessment*, 28(1), 70–80. [PubMed: 26011477]
- Spangler DL (1998). *The CBT coding scale for bulimia nervosa*. Unpublished manuscript.
- Spangler DL, Beckstead DJ, Hatch A, Radpour-Wiley M, & Agras WS (2001). Components of cognitive behavioral therapy: The factor structure of the Cognitive Coding Scale for Bulimia Nervosa. *Journal of Cognitive Psychotherapy*, 15, 75–92.

- Stark KD, Arora P, & Funk C (2011). CBT for youth depression: Implications for training school psychologists to become cognitive behavioral therapists. *Psychology in the Schools*, 48(3), 272–282.
- Stark KD Schnoebelen S, Simpson JP, Hargrave J Molnar JM, & Glenn R (2006). Treating depressed girls: Therapist manual for ACTION. Ardmore, PA: Workbook Publishing.
- Stark KD, Streusand W, Arora P, & Patel P (2012). Childhood depression: The ACTION treatment program. In Kendall PC (Ed.), *Child and adolescent therapy: Cognitive-behavioral procedures* (4th ed., pp. 190–233). New York, NY: Guilford Press.
- TADS Team. (2007). The Treatment for Adolescents With Depression Study (TADS): Long-term effectiveness and safety outcomes. *Archives of General Psychiatry*, 64(10), 1132–1144. [PubMed: 17909125]
- Weissman MM, Wolk S, Goldstein RB, Moreau D, Adams P, Greenwald S, ... Wickramaratne P (1999). Depressed adolescents grown up. *Journal of the American Medical Association*, 281(18), 1707–1713. [PubMed: 10328070]
- Young J, & Beck AT (1980). Cognitive therapy scale: Rating manual Unpublished manuscript, University of Pennsylvania, Philadelphia, PA.

Figure 1.
Behavioral intervention component implementation and depression symptom improvement depends on age.

Figure 2.
Relational intervention component implementation and depression symptom improvement depends on age.

Table 1

Demographic Information

Demographic Variable	N	%
Grades		
4	12	30.0
5	14	35.0
6	4	10.0
7	10	25.0
Age		
9	9	22.5
10	13	32.5
11	7	17.5
12	9	22.5
13	1	2.5
14	1	2.5
Primary Diagnosis		
Major Depressive Disorder (MDD)	33	82.5
Dysthymic Disorder (DD)	4	10.0
MDD & DD	2	5.0
Depressive Disorder NOS	1	2.5
Number of Diagnoses		
1	17	42.5
2	9	22.5
3 or more	14	35.0
Ethnicity		
White/Non Hispanic	16	40.0
White/Hispanic	16	40.0
African American	7	17.5
Multiracial	1	2.5
Overall Attendance (Number of Sessions)		
16	3	7.5
17	1	2.5
18	6	15.0
19	6	15.0
20	24	60.0
Group Size		
2	10	25.0
3	18	45.0
4	12	30.0

* Other diagnoses included Anxiety Disorder NOS, Eating Disorder, Oppositional Defiant Disorder, etc.

Table 2

Behavioral Interventions subscale (n = 20)

Item	Description
Identification of Problematic Behaviors	Were specific problematic behavior(s) elicited?
Exploration of Problematic Behaviors	Did the therapist probe for and discuss client's problematic behavior(s)?
Identification of Adaptive Behaviors	Were specific adaptive behavior(s) elicited?
Exploration of Adaptive Behaviors	Did the therapist probe for and discuss client's adaptive behavior(s)?
Planning/Practicing Alternative Behaviors	Did the therapist work with the client to plan OR to practice an alternative overt behavior(s) for the client to utilize outside of therapy?
Coping Skills Training	Did the therapist teach the client coping skills and practice the coping skills in the session?
Mood Monitoring Education	Did the therapist and client work together to identify the client's internal experience of mood and apply it by using the mood meter or the 3 B's (brain, body and behavior) in the session?
Interpersonal Skills Training	Did the therapist and client work together to effectively develop the client's interpersonal skills in the session?
Increasing Mastery	Did the therapist encourage the client to engage in activities which would provide a sense of accomplishment for the client?
Behavioral Activation	Did the therapist work with the client to schedule and structure one or more specific activities?
Homework Assigned/Reviewed	Did the therapist and/or client develop one or more specific assignments for the client to engage in between sessions?
Managing Behavior via Reinforcement	Did the therapist help the client to arrange for reinforcements for the client's specific thoughts or behaviors in order to manage the occurrence of those behaviors?
Managing and Building Behavior via Stimulus Control	Did the therapist help the client to arrange for cues (stimulus control) for the client's specific thoughts or behaviors in order to manage the occurrence of those behaviors?
Self-Monitoring	Did the therapist encourage the client to record feelings, activities, or events between sessions? Or in the session, did the therapist review the client's records of feelings, activities, or events?
Identifying Problematic Situations	Was the client helped to identify situations in which problem-solving could be effective?
Identifying the Problem	Was the client helped to identify a specific or most central problem?
Identifying Desired Outcome	Was the client encouraged to consider what she wanted the outcome to be?
Creating Alternative Plans	Was the client encouraged to explore possible alternative solutions for solving the problem?
Predict and Pick Solutions	Was the client encouraged to consider which plan would be most effective for the situation?
Follow Up with Plans	Did the therapist and client discuss the efficacy of the implemented plan (plans from previous problem solving application)? If the first plan was not effective, was the client encouraged to try an alternative plan?
Pat on the Back	Was the client helped to self-reinforce for trying to solve the problem?

Table 3**Cognitive Interventions subscale (n = 20)**

Item	Description
Focusing on Key Cognitions	Did the therapist elicit specific (positive or negative) thoughts, assumptions, and images, of meanings?
Relationship of Thoughts and Feelings or Behaviors	Did the therapist encourage the student to relate affective states or behaviors that the student had experienced, is experiencing, OR will experience in the future to the student's ongoing thoughts?
Reporting Key Cognitions	Did the therapist ask the student to report specific thoughts (positive or negative) that the student experienced either in the session OR in a situation which occurred prior to the session?
Exploring Personal Meaning	Did the therapist probe for cognitions (both positive and negative) to explore the personal meaning (i.e., schemas) related to a thought, situation, event, list of "evidence" etc.?
Exploring Underlying Assumptions	Did the therapist explore with the client a general belief (positive or negative) that underlies many of the client's specific negative thoughts, behaviors, and affect across separate scenarios/incidents (of thoughts, behavior, affect)?
Development of Underlying Assumptions	Did the therapist explore with the client the origin or context surrounding the development of underlying beliefs?
Recognizing Cognitive Errors	Did the therapist help the client to identify specific types of cognitive distortions or errors (e.g., all-or-none thinking, overgeneralization) that were present in the client's thinking?
Distancing Beliefs	Did the therapist encourage the client to view her thoughts as cognitions which may or may not be true rather than as established facts?
Examining Available Evidence	Did the therapist help the client to use currently available evidence or information (including the client's prior experiences) to test the validity of the client's negative cognitions or to support positive cognitions/beliefs/schemas?
Testing Beliefs Prospectively	Did the therapist encourage the client to 1) engage in specific behaviors for the purpose of testing the validity of her cognitions OR 2) make explicit predictions about external events so that the outcomes of those events could serve as tests of those predictions OR 3) review the outcome of previously devised prospective tests?
Searching for Alternate Explanations	Did the therapist help the client to consider alternative explanations for events besides the client's initial explanations for those events?
Realistic Consequences	Did the therapist work with the client to determine what the realistic consequences would be if the client's negative thought or belief proved to be true?
Adaptive/Functional Value of Beliefs	Did the therapist guide the client to consider whether or not maintaining the specific thought/belief is adaptive for the client (regardless of whether or not it's accurate)?
Empiricism	Did the TX help girl to see new perspectives and draw own conclusions through empiricism ("guided discovery," hypothesis-testing) rather than debate?
Didactic Persuasion	Did the therapist use didactic persuasion to urge the client to change her beliefs?
Substituting Positive Thoughts to Improve Mood or Behavior	Did the therapist encourage the client to substitute a more positive cognition for another (whether or not the substitute cognition was more accurate or realistic), solely because the client would feel better/behave more adaptively if she thought another way?
Practicing Rational Responses	Did the therapist and client practice possible rational responses to the client's negative thoughts or beliefs?
Recording/Monitoring Thoughts	Did the therapist encourage the client to record OR monitor thoughts between sessions or review the client's records (written or mentally noted) of her thought?
Building a Positive Schema	Did the therapist help the client to identify positive characteristics to support a new, more positive alternative view of the self, world, and/or future?
Relate Improvement to Cognitive Change	Did the therapist relate improvement that has occurred in the client's depressive symptoms or related problems to changes in the client's cognitions?
Application of Cognitive Techniques	Did the therapist apply techniques skillfully and resourcefully?

Table 4Descriptive Statistics for and Intercorrelations Between Variables ($N = 40$)

Variable	1	2	3	4	5	6	7
1. Number of Diagnoses at Pretest ($M = 1.93$, $SD = .89$)	--	-.18	-.01	-.04	.15	-.17	.20
2. Attendance (out of 20 possible; $M = 19.18$, $SD = 1.24$)		--	.13	.14	-.03	.46**	-.11
3. Age ($M = 10.58$, $SD = 1.28$)			--	.34*	.09	.40*	.38*
4. Behavioral Component ($M = 35.09$, $SD = 9.32$)				--	.63***	.54***	.19
5. Cognitive Component ($M = 27.15$, $SD = 8.68$)					--	.47**	-.06
6. Relational Component ($M = 58.31$, $SD = 6.55$)						--	.19
7. Depression Symptom Improvement ($M = 17.75$, $SD = 12.58$)							--

Note.

*
 $p < .05$ **
 $p < .01$ ***
 $p < .001$

Table 5

Fixed and Random Effects for Models Predicting Depression Symptom Improvement

Model	Effect	Point Estimate	Variance	Test
M1: Behav Comp				
	Fixed Effects	Coefficient	se	t-ratio
	Intercept, <i>G00</i>	-.004	.09	-.05
	Attendance, <i>G10</i>	.02	.07	.23
	# of Diagnoses, <i>G20</i>	.02	.10	.20
	T1 Depression, <i>G30</i>	.83 ***	.09	9.81
	Behav Comp, <i>G40</i>	.18 *	.09	2.09
	Random Effects	Variance Component	<i>SD</i>	χ^2
	Group-level variance	.02	.14	17.26
	Level 1 Residual variance	.23	.48	n/a
M2: Cog Comp				
	Fixed Effects	Coefficient	se	t-ratio
	Intercept, <i>G00</i>	-.06	.12	-.49
	Attendance, <i>G10</i>	.05	.07	.75
	# of Diagnoses, <i>G20</i>	.03	.10	.29
	T1 Depression, <i>G30</i>	.85 ***	.09	9.72
	Cog Comp, <i>G40</i>	.06	.15	.38
	Random Effects	Variance Component	<i>SD</i>	χ^2
	Group-level variance	.08 +	.28	21.69
	Variance in Cog Comp	.13 *	.37	24.64
	Level 1 Residual variance	.19	.43	n/a
M3: Relat Comp				
	Fixed Effects	Coefficient	se	t-ratio
	Intercept, <i>G00</i>	-.004	.10	-.04
	Attendance, <i>G10</i>	-.02	.08	-.32
	# of Diagnoses, <i>G20</i>	.06	.10	.62
	T1 Depression, <i>G30</i>	.80 ***	.09	8.80
	Relat Comp, <i>G40</i>	.15	.10	1.51
	Random Effects	Variance Component	<i>SD</i>	χ^2
	Group-level variance	.06 *	.25	25.37
	Level 1 Residual variance	.21	.46	n/a
M4: Behav, Cog, and Relat Comp				
	Fixed Effects	Coefficient	se	t-ratio
	Intercept, <i>G00</i>	-.001	.08	-.01
	Attendance, <i>G10</i>	-.05	.08	-.64
	# of Diagnoses, <i>G20</i>	.08	.10	.81

Model	Effect	Point Estimate	Variance	Test
	T1 Depression, <i>G30</i>	.78***	.09	8.98
	Behav Comp, <i>G40</i>	.28*	.11	2.55
	Cog Comp, <i>G50</i>	-.24 ⁺	.12	-2.03
	Relat Comp, <i>G60</i>	.13	.12	1.12
	Random Effects	Variance Component	<i>SD</i>	χ^2
	Group-level variance	.01	.08	15.31
	Level 1 Residual variance	.47	.22	n/a
M5: Age Moderator				
	Fixed Effects	Coefficient	se	<i>t</i> -ratio
	Intercept, <i>G00</i>	.16*	.07	2.17
	Attendance, <i>G10</i>	-.04	.06	-.67
	# of Diagnoses, <i>G20</i>	.08	.09	.95
	T1 Depression, <i>G30</i>	.82***	.08	10.60
	Behav Comp, <i>G40</i>	-.01	.11	-.08
	Cog Comp, <i>G50</i>	.002	.11	.02
	Relat Comp, <i>G60</i>	-.03	.11	-.24
	Age, <i>G70</i>	.25**	.08	3.37
	AgeXBehav, <i>G80</i>	-.22*	.09	-2.36
	AgeXCog, <i>G90</i>	.10	.09	1.14
	AgeXRelat, <i>G100</i>	-.16 ⁺	.07	-2.08
	Random Effects	Variance Component	<i>SD</i>	χ^2
	Group-level variance	.001	.005	7.87
	Level 1 Residual variance	.15	.39	n/a

Note.

⁺ $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$. Behav = behavioral, cog = cognitive, relat = relational, comp = component, T1 = timepoint 1.