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Cognitive-Behavioral Therapy for Depression Using Mind Over Mood: CBT Skill Use and Differential Symptom Alleviation

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Cognitive-behavioral therapy (CBT) for depression is highly effective. An essential element of this therapy involves acquiring and utilizing CBT skills; however, it is unclear whether the type of CBT skill used is associated with differential symptom alleviation. Outpatients (N = 356) diagnosed with a primary mood disorder received 14 two-hour group sessions of CBT for depression, using the *Mind Over Mood* protocol. In each session, patients completed the Beck Depression Inventory and throughout the week they reported on their use of CBT skills: behavioral activation (BA), cognitive restructuring (CR), and core belief (CB) strategies. Bivariate latent difference score (LDS) longitudinal analyses were used to examine patterns of differential skill use and subsequent symptom change, and multigroup LDS analyses were used to determine whether longitudinal associations differed as a function of initial depression severity. Higher levels of BA use were associated with a greater subsequent decrease in depressive symptoms for patients with mild to moderate initial depression symptoms relative to those with severe symptoms. Higher levels of CR use were associated with a greater subsequent

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decrease in depressive symptoms, whereas higher levels of CB use were followed by a subsequent increase in depressive symptoms, regardless of initial severity. Results indicated that the type of CBT skill used is associated with differential patterns of subsequent symptom change. BA use was associated with differential subsequent change as a function of initial severity (patients with less severe depression symptoms demonstrated greater symptom improvement), whereas CR use was associated with symptom alleviation and CB use with an increase in subsequent symptoms as related to initial severity.

Keywords: behavioral activation; cognitive restructuring; core beliefs

Numerous randomized controlled clinical trials have shown that cognitive-behavioral therapy (CBT) is highly efficacious in the treatment of major depressive disorder (MDD; Epp & Dobson, 2010). Treatment efficacy may extend to patients with more severe depressions (DeRubeis, Gelfand, Tang, & Simons, 1999; DeRubeis et al., 2005), although that has not always been the case (Dimidjian et al., 2006; Elkin et al., 1989). One of the most widely used, structured CBT manuals for depression is *Mind Over Mood* (MOM; Greenberger & Padesky, 1995), with over 900,000 copies in print. MOM teaches individuals to implement a variety of evidence-based CBT strategies including (but not limited to) behavioral activation (BA), cognitive restructuring (CR), and core belief (CB) exercises. Several studies examining the clinical use of MOM support its efficacy. Guided use of the MOM workbook produced symptom alleviation comparable to results obtained during individual therapy (Arkowitz, 1996), and was associated with decreases in hopelessness and dysfunctional attitudes (Whitfield, Williams, & Shapiro, 2001). Further, individual and group MOM-based CBT have been shown to be equally effective (Scott, 2005).

While the exact mechanisms underlying the beneficial effects of CBT have not been fully clarified (Bennett-Levy, 2003; Garratt, Ingram, Rand, & Sawalani, 2007), it has been proposed that the acquisition of CBT mood management skills is an important factor in CBT's effectiveness (see Hundt, Mignogna, Underhill, & Cully, 2013; Strunk, Hollars, Adler, Goldstein, & Braun, 2014, for reviews). Typical CBT homework assignments involve recommendations for engaging in CBT skills between sessions, and clients can self-initiate as well. Meta-analyses demonstrate that the amount of homework completed is related to treatment outcome (e.g., Kazantzis, Deane, & Ronan, 2000; Kazantzis, Whittington, & Dattilio, 2010) and that greater use of CBT skills is associated with greater symptom relief (e.g., Barber & DeRubeis, 2001; Boswell, Anderson, & Barlow, 2014; Connolly Gibbons et al., 2009; Jarrett, Vittengl, Clark, & Thase, 2011). Further, the extent to which patients have acquired CBT skills has been found to predict decreased relapse risk following successful treatment (Strunk, DeRubeis, Chiu, & Alvarez, 2007). What remains unclear is how different types of specific CBT skills are associated with differential patterns of symptom change during the course of treatment.

In the initial phase of treatment, BA strategies are introduced in which patients examine the relationship between their behavior and mood in order to engage in more adaptive, reinforcing behaviors that lead to symptom alleviation (Martell, Addis, & Jacobson, 2001). Several studies have demonstrated that the frequency of BA skill use predicts depression scores at the end of treatment (Christopher, Jacob, Neuhaus, Neary, & Fiola, 2009; Hunter et al., 2002; Neuhaus, Christopher, Jacob, Guillamot, & Burns, 2007; Rees, McEvoy, & Nathan, 2005). For example, Jacob, Christopher, and Neuhaus (2011) found that variation in BA frequency predicted posttreatment depression scores. In another study using the Skills of Cognitive Therapy scale (SoCT: Jarrett et al., 2011), both patient and therapist skill ratings predicted posttreatment depression symptoms. Further, a component analysis of CBT found that BA strategies alone were no less efficacious than the full CBT treatment package (Jacobson et al., 1996), and a subsequent trial suggested that BA may be superior to cognitive therapy among patients with more severe depressions (Dimidjian et al., 2006).

Once patients start engaging in BA interventions, the next stage of CBT treatment involves learning cognitive restructuring strategies that involve evaluating negative automatic thoughts. Thought records are typically used to examine evidence for and against specific negative beliefs in order to generate more balanced ways of thinking. Several theorists (e.g., Barber & DeRubeis, 1989, 2001) have proposed that the central mechanism of therapeutic change in CBT involves the acquisition of cognitive skills that allow individuals to cope more effectively with stressful life events. This premise is supported by several studies that have demonstrated that greater frequency of CR skill use predicts lower depression scores at the end of treatment (Jacob et al., 2011). For example, Hunter et al. (2002) found that the frequency of both BA and CR intervention strategies predicted decreased depression scores. Notably, Strunk et al. (2014) demonstrated that skill use ratings (using the Competencies of Cognitive Therapy Scale) of all three strategies were correlated with concurrent and subsequent changes in depressive symptoms. Further, qualitative evaluations of thought records demonstrate that use of thought records are associated with reduced relapse rates (Neimeyer & Feixas, 1990).

In the final stage of treatment, core belief or schema strategies are used to identify and modify deeply held, fundamental beliefs about the self, the world, and the future. CB interventions include developing an alternative case formulation, use of the continuum technique, CB logs, and historical reviews (Padesky, 1994). A substantial body of clinical research has recognized the role of CBs in the onset and maintenance of depression (e.g., see Blatt, 2004, for an overview). For example, Hawley, Moon-Ho, Zuroff, and Blatt (2006) demonstrated that overly self-critical, perfectionistic CBs are dynamically associated with symptom alleviation during CBT treatment, and Dozois et al. (2009) demonstrated that the content and structure of self-schema undergo change during CBT treatment.

These findings support the notion that patients' use of these three widely taught CBT skills might be important mechanisms of change underlying treatment response in CBT. The purpose of the current study was to examine whether the frequency of usage of these three CBT skills (BA, CR, and CB) is differentially associated with subsequent symptom change throughout group CBT depression treatment. Further, we examined whether the severity of patients' initial depression symptoms (comparing patients experiencing mild to moderate symptoms with those experiencing severe symptoms) moderated the dynamic, longitudinal association between skill use and symptom change.

Method

PARTICIPANTS

Potential participants included outpatients between the ages of 18 and 65 referred to the Centre for Addiction and Mental Health (CAMH) Mood and Anxiety Ambulatory Service, who met the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR; American Psychiatric Association, 1994) criteria for a primary diagnosis of MDD or dysthymia as determined by the administration of the Structured Clinical Interview for Axis I Disorders (SCID-I/P; First, Spitzer, Gibbon, & Williams, 2002). Diagnoses were established by experienced clinical psychologists or staff psychiatrists, graduate-level clinical psychology students, or a clinical psychometrist. All had extensive formal training in the administration of the SCID and completed an interrater reliability training program prior to administration of clinical interviewers. The predoctoral assessors attended weekly clinical case conferences with senior staff psychologists (Dr. Hawley, Dr. Laposa) to establish consensus psychiatric diagnoses. All participants received an initial psychiatric consultation with a CAMH physician; during this meeting, medication recommendations were provided. Exclusion criteria included a current diagnosis of bipolar disorder, substance abuse disorder, posttraumatic stress disorder, schizophrenia, or a trial of electroconvulsive therapy within the past six months. A total of 356 participants met all inclusion and exclusion criteria. Participants were on average middle-age (mean age = 41.73, *SD* = 9.71); 67% were female, and 37% were married. Of the full sample, 81% self-identified as Caucasian, 6% Asian, 3% Hispanic, 2% Black/African Canadian, 2% other, and 6% unknown. Patients exhibited diagnostic comorbidity (26% generalized anxiety disorder, 11% social anxiety disorder, 4% panic disorder, 2% obsessive compulsive disorder). The majority of patients (59.6%) were taking prescribed psychotropic medications (i.e., selective serotonin reuptake inhibitors). There were no significant differences among the depression severity groups on these variables.

MEASURES

Beck Depression Inventory–II (BDI-II)

The BDI-II (Beck, Steer, & Brown, 1996) is a 21-item self-report measure of depression symptom severity with well-established internal consistency, reliability, and validity (Dozois & Covin, 2004).

Homework Practice Questionnaire (HPQ)

The HPQ is a basic homework log that was developed by our clinic, in which individuals report the frequency and duration of their homework practice. An earlier version of this practice log was used in a study conducted by one of the authors (Z.V.S.) examining the frequency of patients' mindfulness practices (Segal et al., 2010). The HPQ was adapted from this questionnaire to examine the frequency of CBT skill use. Patients used the HPQ as a simple homework log throughout treatment whenever they engaged in a CBT skill. The HPQ includes the instructions "Please complete an entry on this form each time you engage in a CBT skill." The current analyses examined the cumulative frequency of engaging in BA, CR, and CB strategies over each 1-week time period across the course of treatment. The HPQ demonstrates acceptable reliability and validity (Hawley et al., 2006; Hawley, Rector, & Laposa, 2016). In our sample, this measure demonstrated acceptable internal consistency and divergent

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validity.[1] The test–retest reliability of this simple frequency log is suboptimal; however, this likely reflects legitimate sessional fluctuations in client reports of their CBT skill use.

PROCEDURE

The CAMH Research Ethics Board approved the study protocol. All participants provided written informed consent prior to any research activity. During the initial assessment session, trained pre- and postdoctoral-level evaluators administered the SCID interview and provided an overview of treatment. Interviewers included licensed clinical psychologists and psychometrists, as well as predoctoral interns and graduate students in clinical psychology, all of whom were trained to "gold-standard" reliability status (Grove, Andreasen, McDonald-Scott, Keller, & Shapiro, 1981). All clinical assessors observed (while providing independent ratings) a minimum of two clinical interviews conducted by a senior clinician and then conducted a minimum of two interviews while under direct observation. All clinical diagnoses were coded independently and 100% agreement was required among the interviewers before assessors conducted interviews independently. Participants were offered group CBT treatment for depression, consisting of 14 weekly 2-hour treatment sessions employing learning exercises and assignments from the MOM client manual (Padesky & Greenberger, 1995). Groups typically consisted of nine patients led by two group leaders (one an experienced clinical psychologist or psychometrist and the other a clinical psychology graduate student or allied health care worker). Patients completed the BDI-II at the start of each session and the HPQ on an ongoing basis throughout the ensuing weeks. Prior to and following each treatment session, clinicians met with senior staff clinical psychologists to discuss clinical issues, review session content, and ensure adherence to the MOM CBT protocol.

Data Analysis

Univariate analyses of variance (ANOVAs) were used to examine whether the cumulative frequency of each CBT skill differed as a function of initial depression severity, comparing patients who exhibited mild to moderate depression (CBT_M: $N = 145$) with patients who exhibited severe depression (CBT_S: $N = 167$). Symptom severity was determined using a BDI cutoff score of 29 (CBT_M: BDI < 29 = mild to moderate), (CBT_S: BDI ≥ 29 = severe).

The Latent Difference Score (LDS; McArdle & Hamagami, 2001) framework was used to explore the longitudinal and temporal dynamic associations between depression symptoms and use of three CBT skills (BA, CR, and CB). LDS is a structural modeling approach for longitudinal data that integrates features of latent growth curve models (Meredith & Tisak, 1990) and cross-lagged regression models (Jöreskog & Sorbom, 1979). LDS combines features of both classes of models by considering dynamic longitudinal growth within a time series while also examining multivariate relationships and determinants. Using the latent rate of change as the outcome variable, there are several ways to model change in the process of interest. First, a univariate model is established, clarifying how each variable changes independently over time (McArdle & Hamagami, 2001; McArdle & Nesselroade, 2002). Next, bivariate LDS analyses evaluate temporal relationships between univariate series by considering cross-lagged regressions; the "coupling" of two univariate processes can be examined in terms of whether one process predicts the subsequent rate of change in the other. Finally, multigroup equivalence analyses clarify whether bivariate models differ across groups (see Hawley et al., 2006, for a detailed explanation of utilizing LDS analyses with clinical data).

The AMOS 20.0 program (Arbuckle, 2011) was used to evaluate all univariate, bivariate, and multigroup LDS models. Parameters were estimated by the maximum-likelihood method, which compares the fit of a hypothesized structural model with the observed variance–covariance matrix. Several indicators of absolute and relative model fit are considered. The chi-square index is a measure of absolute model fit; chi-square to degrees of freedom ratios (χ^2/df) near two are considered to represent acceptable model fit (Byrne, 1989). The root mean square error of approximation (RMSEA) is a measure of absolute model fit (Steiger & Lind, 1980). RMSEA indicates "model discrepancy per degree of freedom," with values near .05 indicating a

[1] In our sample, the internal consistency of the HPQ was acceptable. We examined the earliest session for which HPQ data were available (Session 2, $\alpha = .89$), midtreatment (Session 7, $\alpha = .76$), and the final session (Session 14, $\alpha = .91$). The HPQ demonstrated suboptimal test–retest reliability based on a significant Pearson product–moment correlation comparing the total scores for Sessions 2 and 7 ($r = .25$, $p < .01$) and comparing Sessions 7 and 14 ($r = .38$, $p < .01$). Notably, when specific HPQ ratings of BA and CR practice were examined separately for Sessions 2–8 (sessions in which patients consistently practiced both skills), the correlations were negligible for many sessions (e.g., Session 2, $r = .05$, $p = .36$; Session 3, $r = .02$, $p = .68$; Session 5, $r = .09$, $p = .16$; Session 7, $r = .10$, $p = .07$; Session 8, $r = .05$, $p = .44$). There were two exceptions to this: Session 4 ($r = .41$, $p < .01$) and Session 6 ($r = .53$, $p < .01$). This suggests that patient ratings of these two skills can be differentiated. Finally, the HPQ demonstrated acceptable divergent validity when examining a conceptually unrelated measure (Dysfunctional Attitudes Scale [Weissman & Beck, 1978]; $r = .01$, $p = .87$).

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"close fit," whereas RMSEA values larger than .10 suggest a "poor fit" (Browne & Cudeck, 1989). Further, we consider the *p* value for testing the null hypothesis that the population RMSEA is no greater than 0.05 (MacCallum, Browne, & Sugawara, 1996), reported as "*p* close fit." The comparative fit index (CFI) indicates the relative reduction in model misfit when comparing the target model relative to a baseline (independence) model; values greater than .90 indicate a good fit of the model to the observed data (Bentler, 1990). Further, the relative fit of competing models is compared using the Akaike information criterion (AIC; Akaike, 1973), which considers model complexity in relationship to the number of parameters. The model with a smaller AIC is preferred. Finally, certain key parameter estimates are considered, although they are not measures of overall model fit. To evaluate the theoretical cogency of competing models, the bivariate LDS models can be discriminated based on whether the cross-lagged coupling parameter (γ) is significant. If the coupling is not significant, the model postulating that effect may not be supported.

The present study considered four hypotheses. First, for the bivariate LDS analyses, we hypothesized that the coupling relationship between skill use and depression symptom change would differ when comparing each CBT skill. Specifically, we predicted that BA skill use would have the greatest association with symptom alleviation, in comparison to CR or CB skill use. BA has been demonstrated to have immediate antidepressant effects, and BA strategies are utilized first in treatment, when depression scores are elevated and the amount of potential change that could occur is greatest. Second, for the multigroup bivariate LDS analyses (considering initial depression severity), we hypothesized that patients experiencing severe initial depression symptoms would experience less symptom alleviation (compared with those experiencing mild to moderate symptoms) regardless of the CBT skill utilized. Third, we predicted that there would be a stronger coupling of symptom alleviation and skill use for patients experiencing mild to moderate symptoms (in comparison with patients experiencing severe symptoms) for all skills. Fourth, we hypothesized that severely depressed patients would experience greater symptom alleviation in association with BA skill use (in comparison with CR or CB use) consistent with the findings of Dimidjian and colleagues (2006).

Results

The existing data set was examined as is, without using any data imputation strategies. Missing data were accommodated in all LDS statistical models by using full maximum likelihood estimation. A square root transformation was applied to skill use variables at each time point in order to ensure that variables were normally distributed. Regarding the extent of missing data, 17% of participants were missing observations from one or more of the variables examined in these analyses. The data were examined for normality and extreme scores prior to analysis. All variables examined were within the acceptable range; no indices of skewness or kurtosis were out of range so as to preclude the planned analyses (George & Mallery, 2010). Weak longitudinal measurement invariance (i.e., equal factor loadings over time) was demonstrated for all measures before proceeding with the LDS analyses.

The original sample included 356 treatment-seeking individuals, comprising 43 CBT treatment groups. Each group comprised 8–10 participants. The mean number of sessions attended for the full sample was 9 of 14 ($M = 9.2$, $SD = 3.52$). Given that patients were exposed to the different CBT skills in a sequential fashion, we focused our primary analyses on those patients who had completed at least eight sessions (60% of the 14 sessions) in order to ensure adequate exposure to the respective homework skills, and we then conducted sensitivity analyses with the full intent-to-treat sample to assess the effects of attrition. Overall, 87.6% of this sample completed at least eight sessions (completers: $n = 312$), and 12.4% completed fewer than eight sessions (noncompleters: $n = 44$). An analysis comparing the treatment completers and noncompleters was performed; there were no significant group differences based on any of the demographic variables or BDI scores. However, there was a significant difference in skill use frequency scores, in that noncompleters engaged in fewer CBT skills, for example, for Time 1 BA, $F(1, 354) = 5.04$, $p < .05$. The primary sample for analysis comprised 312 treatment completers who received sufficient exposure to estimate the effects of the CBT skills being examined (BA, CR, and CB).

Tables 1, 2, and 3 display the correlations, means, and standard deviations for all measures. Patients with severe initial depression evidenced a decrease in BDI scores from severe levels ($M = 36.88$, $SD = 6.07$) to moderate levels ($M = 23.81$, $SD = 12.50$), and patients with moderate initial depression evidenced a decrease in BDI scores from moderate levels ($M = 21.94$, $SD = 6.24$) to minimal levels ($M = 12.42$, $SD = 9.26$). Observed BDI means decreased monotonically, whereas the frequency of BA, CR, and CB skill use scores demonstrated nonlinear change patterns. Consecutive assessments were typically correlated within each measure, with

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Table 1
Correlations, Means, and Standard Deviations for Study Measures (LDS BA Models)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. BDI$_{T1}$	1.00	—	—	—	—	—	—	—	—	—	—	—	—	—
2. BDI$_{T2}$	.77**	1.00	—	—	—	—	—	—	—	—	—	—	—	—
3. BDI$_{T3}$	.75**	.79**	1.00	—	—	—	—	—	—	—	—	—	—	—
4. BDI$_{T4}$	.71**	.77**	.83**	1.00	—	—	—	—	—	—	—	—	—	—
5. BDI$_{T5}$	.69**	.75**	.76**	.86**	1.00	—	—	—	—	—	—	—	—	—
6. BDI$_{T6}$	.67**	.74**	.75**	.77**	.84**	1.00	—	—	—	—	—	—	—	—
7. BDI$_{T7}$	.65**	.72**	.74**	.75**	.77**	.84**	1.00	—	—	—	—	—	—	—
8. BA$_{T2}$	-.19**	.08	.18**	.12*	.11	.10	.10	1.00	—	—	—	—	—	—
9. BA$_{T3}$	.04	-.07	-.03	-.05	-.03	-.05	.03	.10	1.00	—	—	—	—	—
10. BA$_{T4}$	-.02	.14*	.02	-.05	.03	.07	.15*	.06	.12*	1.00	—	—	—	—
11. BA$_{T5}$	.10	.10	.10	-.08	-.04	.04	-.02	-.08	.15**	.18*	1.00	—	—	—
12. BA$_{T6}$	.09	-.12*	.06	.03	.06	.03	-.02	.06	.28**	.20**	.18**	1.00	—	—
13. BA$_{T7}$	.07	.08	.04	.04	.04	.04	.03	-.03	.10	.16*	.29**	.38**	1.00	—
14. BA$_{Tot}$	.06	.13*	.03	.02	.05	.09	.01	.17*	.36**	.43**	.49**	.60**	.49**	1.00
$M_{CBT,M}$	21.94	19.92	19.64	19.35	18.61	17.16	16.75	5.44	4.69	3.25	3.06	3.61	3.29	17.93
SD	6.24	7.27	8.58	9.56	9.31	10.17	9.85	3.42	2.53	2.40	2.34	2.37	2.61	14.07
$M_{CBT,S}$	36.88	33.45	32.54	32.51	31.14	30.08	28.78	4.05	4.88	3.67	3.51	2.47	3.27	16.12
SD	6.07	8.59	9.16	9.78	10.52	11.40	11.77	2.16	3.94	2.31	2.38	2.06	1.79	13.38

Note. LDS = latent difference score; BA = behavioral activation (frequency); BDI = Beck Depression Inventory; $M_{CBT,M}$ = mean, CBT patients with mild to moderate initial symptoms; $M_{CBT,S}$ = mean, CBT patients with severe initial symptoms; *SD* = standard deviation; subscript $_T$ indicates time (treatment session number); subscript $_{Tot}$ indicates cumulative frequency during treatment.
*Significant at the 0.05 level, two-tailed test, ** significant at the .01 level, two-tailed test.

several significant correlations between the BDI and each skill over time. A repeated measures ANOVA comparing Session 1 and Session 14 BDI scores indicated that depression scores decreased significantly across the course of treatment, $F(1, 284) = 232.29$, $p < .001$. Univariate ANOVAs compared the cumulative frequency of skill use (BA, CR, and CB) for patients exhibiting mild to moderate initial symptoms (CBT_M: $n = 145$) versus those exhibiting severe initial symptoms (CBT_S: $n = 167$). There were

Table 2
Correlations, Means, and Standard Deviations for Study Measures (LDS CR Models)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. BDI$_{T3}$	1.00	—	—	—	—	—	—	—	—	—	—	—	—	—
2. BDI$_{T4}$	.83**	1.00	—	—	—	—	—	—	—	—	—	—	—	—
3. BDI$_{T5}$	.75**	.85**	1.00	—	—	—	—	—	—	—	—	—	—	—
4. BDI$_{T6}$	.75**	.78**	.84**	1.00	—	—	—	—	—	—	—	—	—	—
5. BDI$_{T7}$	.74**	.75**	.78**	.84**	1.00	—	—	—	—	—	—	—	—	—
6. BDI$_{T8}$	.73**	.73**	.76**	.83**	.89**	1.00	—	—	—	—	—	—	—	—
7. BDI$_{T9}$	.71**	.69**	.73**	.81**	.84**	.85**	1.00	—	—	—	—	—	—	—
8. CR$_{T4}$	-.08	-.04	-.18*	-.04	-.06	-.08	-.08	1.00	—	—	—	—	—	—
9. CR$_{T5}$	.08	-.05	-.09	-.05	-.07	-.04	-.07	.26**	1.00	—	—	—	—	—
10. CR$_{T6}$	-.05	.07	.08	.02	-.08	-.11*	-.08	.16*	.17*	1.00	—	—	—	—
11. CR$_{T7}$	-.06	-.04	-.08	-.08	-.11	-.08	.14*	.12*	.21**	.28*	1.00	—	—	—
12. CR$_{T8}$	.06	-.08	.11*	.14*	.02	-.11	-.04	.06	.14*	.42**	.23**	1.00	—	—
13. CR$_{T9}$	.04	-.07	.09	.09	.05	-.07	.03	-.03	-.08	.12	.18*	.17*	1.00	—
14. CR$_{Tot}$	-.01	.02	.04	.04	-.01	-.05	-.07	.17**	.43**	.52**	.44**	.51**	.51**	1.00
$M_{CBT,M}$	19.64	19.35	18.61	17.16	16.75	17.31	16.96	3.04	3.76	3.67	3.25	3.14	3.02	14.69
SD	8.58	9.56	9.31	10.17	9.85	10.01	9.66	1.71	1.04	1.73	1.89	2.01	1.85	6.21
$M_{CBT,S}$	32.54	32.51	31.14	30.08	28.78	28.25	27.70	3.14	3.59	3.91	3.04	3.42	3.07	13.61
SD	9.16	9.78	10.52	11.40	11.77	11.75	11.87	1.65	1.88	1.02	2.93	2.58	1.09	7.27

Note. LDS = latent difference score; CR = cognitive restructuring (frequency); BDI = Beck Depression Inventory; $M_{CBT,M}$ = mean, CBT patients with mild to moderate initial symptoms; $M_{CBT,S}$ = mean, CBT patients with severe initial symptoms; *SD* = standard deviation; subscript $_T$ indicates time (treatment session number); subscript $_{Tot}$ indicates cumulative frequency during treatment.
*Significant at the 0.05 level, two-tailed test, ** significant at the .01 level, two-tailed test.

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Table 3
Correlations, Means, and Standard Deviations for Study Measures (LDS CB Models)

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. BDI_{T9}	1.00	—	—	—	—	—	—	—	—	—	—	—
2. BDI_{T10}	.88**	1.00	—	—	—	—	—	—	—	—	—	—
3. BDI_{T11}	.83**	.87**	1.00	—	—	—	—	—	—	—	—	—
4. BDI_{T12}	.84**	.87**	.92**	1.00	—	—	—	—	—	—	—	—
5. BDI_{T13}	.78**	.82**	.87**	.89**	1.00	—	—	—	—	—	—	—
6. BDI_{T14}	.76**	.80**	.84**	.88**	.92**	1.00	—	—	—	—	—	—
7. CB_{T10}	-.05	-.03	.06	.04	-.03	.08	1.00	—	—	—	—	—
8. CB_{T11}	.03	-.04	-.03	.03	.03	.33**	.32**	1.00	—	—	—	—
9. CB_{T12}	.09	.04	.04	.04	.03	.03	.24**	.27**	1.00	—	—	—
10. CB_{T13}	.05	.05	.05	-.05	-.04	.04	.25**	.22**	.46**	1.00	—	—
11. CB_{T14}	.03	.04	.04	.06	.02	.06	.11	.24**	.29**	.33**	1.00	—
12. CB_{Tot}	.01	-.01	-.03	-.02	-.04	.04	.29**	.56**	.68**	.68**	.64**	1.00
$M_{CBT,M}$	16.91	17.75	16.95	15.27	14.73	12.42	3.76	2.64	2.93	2.82	2.37	9.71
SD	9.66	10.72	9.67	8.98	9.62	9.26	2.31	1.88	1.97	0.24	1.80	4.11
$M_{CBT\ S}$	27.70	28.13	26.30	26.67	26.55	23.81	2.88	2.66	2.39	1.95	2.71	7.25
SD	11.87	12.72	13.12	11.41	12.31	12.50	1.02	1.62	2.08	0.86	1.57	3.77

Note. LDS = latent difference score; CB = core belief (frequency); BDI = Beck Depression Inventory; $M_{CBT,M}$ = mean, CBT patients with mild to moderate initial symptoms; $M_{CBT,S}$ = mean, CBT patients with severe initial symptoms; *SD* = standard deviation; subscript $_T$ indicates time (treatment session number); subscript $_{Tot}$ indicates cumulative frequency during treatment.
*Significant at the 0.05 level, two-tailed test, ** significant at the .01 level, two-tailed test.

no significant differences regarding skill use based on depression symptom severity, $F(1, 310) = 2.51$, *ns*.

UNIVARIATE LDS MODELS: DEPRESSION SYMPTOMS, BA, CR, AND CB SKILL USE

Univariate LDS analyses examined longitudinal change in sessional BDI depression scores and the frequency of BA, CR, and CB skill use. The BA analysis was restricted to treatment Sessions 1–7, since the main clinical focus on BA assignments occurred during these sessions. Although patients were still encouraged to continue with BA interventions throughout treatment, the mean frequency approached zero, which is problematic for longitudinal models. LDS univariate analyses considered four models, consisting of the *no change* model, the additive *constant change* model, the *proportional change* model, and the combined *dual change* model for each time series separately. Both time-varying and time-invariant proportional effects, $\beta(t)$ were considered in all models. Examination of parameter significance and goodness-of-fit indices indicated that the univariate dual change BDI model was supported, $\chi^2(28) = 57.46$, $\chi^2/df = 2.05$, AIC = 111.46, CFI = 0.96, RMSEA = .06, with time-invariant proportional effects. The univariate dual change BA model was supported, $\chi^2(15) = 40.74$, $\chi^2/df = 2.71$, AIC = 64.74, CFI = .90, RMSEA = .06, with time-varying proportional effects. All parameter estimates were statistically significant ($p < .05$).

The CR analysis was restricted to treatment Sessions 3–9, since the main clinical focus on CR homework assignments occurred during these sessions (although patients were encouraged to continue with CR assignments following Session 9). Examination of parameter significance and goodness-of-fit indices supported the univariate constant change BDI model, $\chi^2(29) = 61.15$, $\chi^2/df = 2.11$, AIC = 132.82, CFI = 0.96, RMSEA = .06. The univariate dual change CR model was supported, $\chi^2(11) = 24.21$, $\chi^2/df = 2.19$, AIC = 57.32, CFI = .89, RMSEA = .06, with time-varying proportional effects. All parameter estimates were statistically significant ($p < .05$).

The CB univariate analysis was restricted to treatment Sessions 9–14, since the main clinical focus on CB interventions occurred during these sessions. The dual change BDI model was supported, $\chi^2(13) = 13.33$, $\chi^2/df = 1.90$, AIC = 39.33, CFI = 0.99, RMSEA = .05. The univariate dual change CB model was supported, $\chi^2(6) = 12.05$, $\chi^2/df = 2.01$, AIC = 41.05, CFI = .96, RMSEA = .06, with time-varying proportional effects. All parameter estimates were statistically significant ($p < .05$).[2]

[2] The resulting univariate models can be used to develop each equation estimating change over time:
Univariate dual change BDI model: $E(\Delta BDI[t]_n) = \alpha_s \times E(s_{sn}) + \beta_n \times E(BDI[t-1]_n)$
Univariate dual change BA model: $E(\Delta BA[t]_n) = \alpha_s \times E(s_{sn}) + \beta_n \times E(BA[t-1]_n)$
Univariate dual change CR model: $E(\Delta CR[t]_n) = \alpha_s \times E(s_{sn}) + \beta_n \times E(CR[t-1]_n)$
Univariate dual change CB model: $E(\Delta CB[t]_n) = \alpha_s \times E(s_{sn}) + \beta_n \times E(CB[t-1]_n)$.

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BIVARIATE AND MULTIVARIATE LDS MODELS: BA SKILL USE AND DEPRESSION SYMPTOMS

Next, bivariate analyses of BDI and BA were used to examine the association of these two univariate series; summary results are presented in the Appendix A. Four models were considered, indicating parameter and fit indices for (a) the *no coupling* model, in which BDI and BA are unrelated; (b) the *depression-related compliance* model, a unidirectional model in which a latent BDI value is associated with the subsequent rate of change in BA values; (c) the *skill use* model, a unidirectional model in which a latent BA value is associated with the subsequent rate of change in BDI values; or (d) a *reciprocal skill use* model involving bidirectional cross-lagged linkages between both univariate series. Examination of goodness of fit and parameter estimates indicated that the skill use model was the best model among the four candidate models, particularly given that this model reported the lowest AIC and RMSEA, the lowest χ^2/df ratio, and the highest CFI, $\chi^2(75) = 160.37$, $\chi^2/df = 2.13$, AIC = 220.37, CFI = .93, RMSEA = .06. All parameter estimates were statistically significant (*p*s ranging from < .001 to < .05). Furthermore, the coupling coefficient from BDI to subsequent change in BA use was not significant, so the depression-related compliance model and the reciprocal skill use models were not supported. The unidirectional coupling coefficient (γ_{ba}) from BA to subsequent change in BDI was significant ($p < .05$), with the unstandardized estimate being $\gamma_{ba} = -1.47$.

Using this bivariate skill use model, a multigroup LDS analysis compared patients who experienced mild to moderate initial depression scores (CBT_M) with those who experienced severe symptoms (CBT_S). The first step in a multigroup analysis involves consideration of parameter equivalence across groups. Nonredundant parameters included the mean ($\alpha \times s_n$) term, and the mean and variance of Time 1 BDI and BA; these differed across groups. All additional parameter estimates (i.e., mean, variance, and error estimates) did not significantly differ between the two groups. Although coupling was significant for both groups, the time-invariant γ_{ba} coupling term was greater in magnitude for the CBT_M group ($\gamma_{ba} = -4.45$) compared with the CBT_S group ($\gamma_{ba} = -1.45$). Table 4 presents the resulting parameter and goodness-of-fit indices for this multigroup skill use model, which provided the best model fit to the data, $\chi^2(165) = 332.67$, $\chi^2/df = 2.01$, AIC = 418.28, CFI = .90, RMSEA = .05. Results indicated that bivariate coupling, in which greater BA use is associated with greater subsequent symptom alleviation, was significant across the range of symptom severity. However, greater BA use was followed by a greater subsequent decrease in depressive symptoms for patients with mild to moderate depression symptoms at baseline relative to those with severe symptoms.

Table 4
Multigroup Bivariate Skill Use Model (BDI ← BA) Comparing CBT_M and CBT_S

Parameters and fit indices	CBT_M		CBT_S	
	BDI ← BA		BDI ← BA	
Additive coefficient				
$E(s_n)$	11.30 [c]	1.17 [a]	11.30 [c]	1.17 [a]
$\sigma^2(s_n)$	3.61	0.17	3.61	0.17
Proportional coefficients				
β_a	-.36 [c]	-.18 [c]	-.36 [c]	-.48 [c]
β_b	-.33 [c]	-.18 [c]	-.33 [c]	-.48 [c]
β_c	-.31 [c]	-.18 [c]	-.31 [c]	-.48 [c]
β_d	-.34 [c]	-.18 [c]	-.34 [c]	-.48 [c]
β_e	-.35 [c]	-.18 [c]	-.35 [c]	-.48 [c]
β_f	-.36 [c]	-.18 [c]	-.36 [c]	-.48 [c]
Cross-lag coefficient				
γ_{bdi} /γ_{ba}	0 (=)	-4.45 [a]	0 (=)	-1.45 [a]
Goodness-of-fit indices				
Parameters	208			
Degrees of freedom	165			
RMSEA (*p* close fit)	.05 (.30)			
CFI	.90			
AIC	418.28			
χ^2	332.67			
χ^2/df	2.01			

Note. BDI = Beck Depression Inventory; BA = behavioral activation (frequency); $M_{CBT\ M}$ = mean, CBT patients experiencing mild to moderate initial symptoms; $M_{CBT\ S}$ = mean, CBT patients experiencing severe initial symptoms; subscript $_T$ indicates time; 0 (=) indicates parameter is not estimated; *p* close fit = *p* value for testing the null hypothesis that the population RMSEA (root-mean-square error of approximation) is no greater than .05 (MacCallum, Browne, & Sugawara, 1996); CFI = comparative fit index; AIC = Akaike information criterion; E(*sn*) = additive change coefficient; β = proportional change coefficient; in this model, the β coefficient is time varying; $\beta_{a\text{-}f}$ each represent distinct parameter estimates; γ_{bdi} /γ_{ba} = cross-lag coefficient.
[a] Significant at the .05 level.
[b] Significant at the .01 level.
[c] Significant at the .001 level.

Results from the BA skill use multigroup model can be used to establish an equation,[3] indicating the expected longitudinal BDI change trajectories based on BA skill use and initial depression severity as shown in Figure 1. The BDI latent change trajectories

[3] $E(\Delta BDI[t]_n) = \alpha_{bdi} \times E(s_{bdi,n}) + \beta_s \times E(BDI[t-1]_n) + \gamma_{ba} \times E(BA[t-1]_n)$

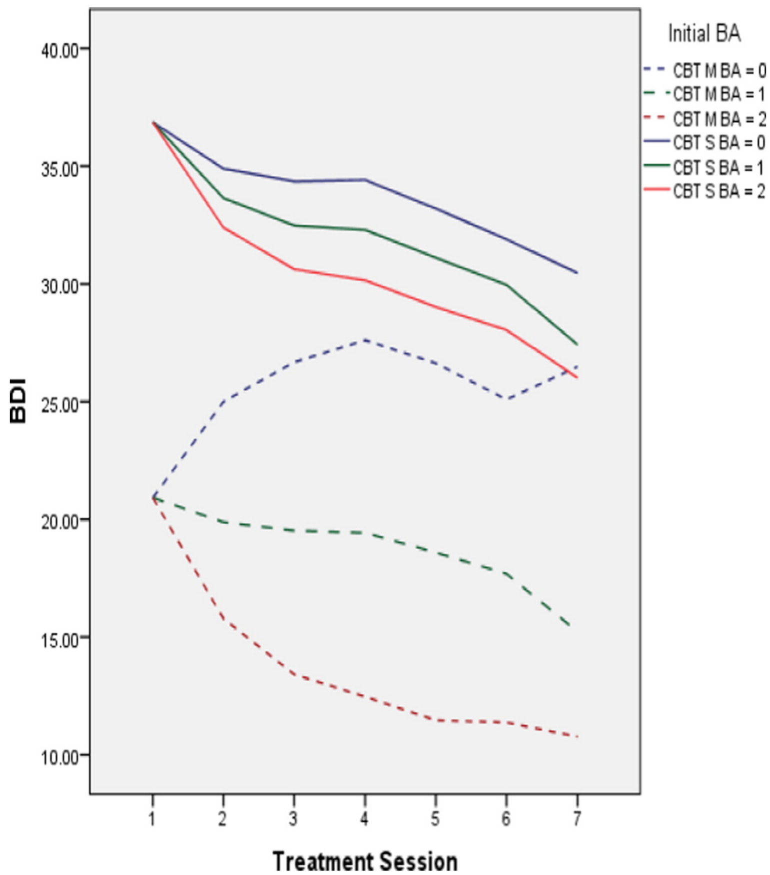

FIGURE 1 Estimated change trajectories involving change in Beck Depression Inventory (BDI) scores during each treatment session based on varying levels of behavioral activation (BA) and based on client subgroup.
Note. CBT_M = patients experiencing mild to moderate initial depression scores. CBT_S = patients experience severe initial depression scores. Calculations are based on the formula:

$$\begin{aligned} E(\Delta BDI[t]_n) &= \alpha_{bdi} \times E(s_{bdi},_n) + \beta_s \times E(BDI[t-1]_n) + \gamma_{ba} \times E(BA[t-1]_n) \\ &= 11.30 \times E(s_{bdi},_n)((.31 \text{ to } .36) \times E(BDI[t-1]_n)) + ((\text{-}1.45 \text{ or } \text{-}4.45) \times E(BA[t-1]_n)), \quad \text{for } T1 < t \leq T7 \end{aligned}$$

For example, predicted mean expected change of BDI, given initial BDI and estimated BA values:
BA = 0 refers to a BDI change trajectory in which no initial BA intervention occurs.
BA = 1 refers to a BDI change trajectory in which one initial BA intervention occurs.
BA = 2 refers to a BDI change trajectory in which two initial BA interventions occur.

differed significantly based on the level of BA; this can be demonstrated by substituting in initial BA values of 0, 1, and 2 into this equation. Patients in the CBT_M group who did not engage in BA (BA = 0) experienced a cumulative increase of 6.02 BDI points over the first seven sessions, while those who initially completed one BA exercise (BA = 1) experienced a cumulative decrease of 5.69 BDI points, and those who engaged in two initial BA exercises (BA = 2) experienced a cumulative decrease of 11.15 points. Patients in the CBT_S group who do not engage in BA (BA = 0) experienced a cumulative decrease of 3.02 BDI points, while those who completed one initial BA exercise (BA = 1) experienced a cumulative decrease of 6.90 BDI points, and those who completed two BA exercises (BA = 2) experienced a cumulative decrease of 9.82 points.

BIVARIATE AND MULTIVARIATE LDS MODELS: CR SKILL USE AND DEPRESSION SYMPTOMS

Bivariate analyses of BDI and CR were completed, examining the association of these two univariate series; summary results are presented in the Appendix A. Four bivariate models were considered, as defined previously (no coupling model, depression-related compliance model, skill use model, reciprocal skill use model). Examination of goodness of fit and parameter estimates indicated that the skill use model (greater CR use is associated

Table 5
Multigroup Bivariate Skill Use Model (BDI ← CR) Comparing CBT_M and CBT_S

Parameters and fit indices	CBT_M		CBT_S	
	BDI ← CR		BDI ← CR	
Additive coefficient				
$E(s_n)$	2.76 [c]	0.59 [a]	2.76 [c]	.59 [a]
$\sigma^2(s_n)$	.44	0.11	.44	0.11
Proportional coefficients				
β_a	0 (=)	-.17 [c]	-.25 [c]	-.17 [c]
β_b	0 (=)	-.29 [c]	-.21 [c]	-.29 [c]
β_c	0 (=)	-.67 [c]	-.19 [c]	-.67 [c]
β_d	0 (=)	-.34 [c]	-.23 [c]	-.34 [c]
β_e	0 (=)	-.74 [c]	-.23 [c]	-.74 [c]
Cross-lag coefficient				
γ_{bdi} /γ_{cr}	0 (=)	-2.49 [c]	0 (=)	-2.49 [c]
Goodness-of-fit indices				
Parameters	208			
Degrees of freedom	169			
RMSEA (*p* close fit)	.05 (.41)			
CFI	.93			
AIC	382.40			
χ^2	305.89			
χ^2/df	1.81			

Note. BDI = Beck Depression Inventory; CR = cognitive restructuring (frequency); $M_{CBT,M}$ = Mean, CBT patients experiencing mild to moderate initial symptoms; $M_{CBT,S}$ = Mean, CBT patients experiencing severe initial symptoms, Subscript $_T$ indicates time. 0 (=) indicates parameter is not estimated "*p* close fit" = *p* value for testing the null hypothesis that the population root-mean-square error of approximation (RMSEA) is no greater than .05 (MacCallum, Browne, & Sugawara, 1996); CFI = comparative fit index; AIC = Akaike information criterion; E(*sn*) = additive change coefficient; β = proportional change coefficient. In this model, the β coefficient is time varying; $\beta_{a\text{-}e}$ each represent distinct parameter estimates. γ_{bdi} / γ_{cr} = cross-lag coefficient in which CR use leads to subsequent BDI change.
[a] Significant at the .05 level.
[b] Significant at the .01 level.
[c] Significant at the .001 level.

with greater subsequent BDI change) was the best model among the four candidate models, particularly given that this model reported the lowest AIC and RMSEA, the lowest χ^2/df ratio, and the highest CFI, $\chi^2(78) = 168.14$, $\chi^2/df = 2.15$, AIC = 237.14, CFI = .96, RMSEA = .06. Furthermore, the coupling coefficient from BDI to subsequent change in CR use was not significant, and so the depression-related compliance model and the reciprocal skill use models were not supported. All parameter estimates were significant (*p*s ranging from < .001 to < .05). The coupling coefficient (γ_{cr}) was significant ($p < .05$), with the unstandardized estimate being $\gamma_{cr} = -2.51$.

Using this bivariate skill use model, a multigroup LDS analysis compared patients based on initial depression severity (CBT_M vs. CBT_S). Considering parameter equivalence across groups, nonredundant parameters included the mean ($\alpha \times s_n$) term, and the mean and variance of Time 1 BDI and CR that differed across groups. All other parameter estimates (i.e., mean, variance, and error estimates) did not differ significantly between the two groups. Notably, the time-invariant γ_{cr} coupling term did not differ significantly between the groups. Table 5 presents the resulting parameter and goodness-of-fit indices for this multigroup LDS model, which provided the best model fit to the data, $\chi^2(169) = 305.89$, $\chi^2/df = 1.81$, AIC = 382.40, CFI = .93, RMSEA = .05. Results indicate that bivariate coupling, in which greater CR use is associated with greater subsequent change in BDI, did not differ as a function of initial symptom severity.

Results from the LDS skill use model can be used to establish an equation,[4] indicating the expected change in BDI as it relates to CR use during treatment Sessions 3–9 (see Figure 2). This can be demonstrated by substituting CR values of 0, 1, and 2 into this equation. Patients in the CBT_M group who did not engage in CR at session 3 (CR = 0) experienced a cumulative increase of 5.82 BDI points, while those who completed one CR exercise (CR = 1) experienced a cumulative decrease of 5.36 BDI points, and those who engaged in two CR exercises (CR = 2) experienced a cumulative decrease of 10.08 points. Patients in the CBT_S group who did not engage in CR (CR = 0) experienced a cumulative increase of 2.24 BDI points, while those who completed one CR exercise (CR = 1) experienced a cumulative decrease of 9.44 BDI points, and those who completed two CR exercises (CR = 2) experienced a cumulative decrease of 15.28 points.

BIVARIATE AND MULTIVARIATE LDS MODELS: CB SKILL USE AND DEPRESSION SYMPTOMS

Bivariate analyses of BDI and CB were used to examine the association of these two univariate series; summary results are presented in the Appendix A. The same four models were considered once again (no coupling, depression-related compliance, skill use, and reciprocal skill use). Examination of goodness of fit and parameter estimates indicated that the skill use model (increased CB use is followed by a greater subsequent change in depressive symptoms) was the best model

[4] $E(\Delta BDI[t]_n) = \alpha_{bdi} \times E(s_{bdi,n}) + \gamma_{cr} \times E(CR[t-1]_n)$

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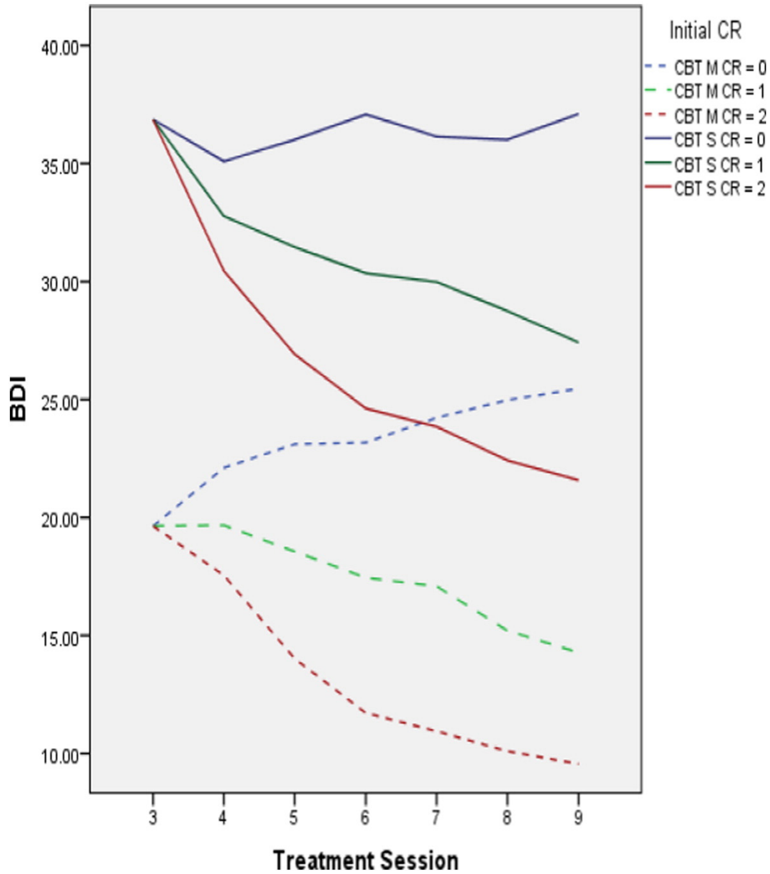

FIGURE 2 Estimated change trajectories involving change in Beck Depression Inventory (BDI) scores during each treatment session based on varying levels of cognitive restructuring (CR).
Note. CBT_M = patients experiencing mild to moderate initial depression scores. CBT_S = patients experience severe initial depression scores. Calculations are based on the formula:

$$E(\Delta BDI[t]_n) = \alpha_{bdi} \times E(s_{bdi,n}) + \gamma_{cr} \times E(CR[t-1]_n)$$
$$= 2.76 \times E(s_{bdi,n})(0 \text{ to } .25)) \times E(BDI[t-1]_n)) + (-2.49 \times E(CR[t-1]_n), \text{ for } T3 < t \leq T9$$

For example, predicted mean expected change of BDI, given initial BDI and estimated CR values:
CR = 0 refers to a BDI change trajectory in which no initial CR intervention occurs.
CR = 1 refers to a BDI change trajectory in which one initial CR intervention occurs.
CR = 2 refers to a BDI change trajectory in which two initial CR interventions occur.

among the four candidate models, having the lowest AIC and RMSEA, the lowest χ^2/df ratio, and the highest CFI, $\chi^2(77)$ = 84.80, χ^2/df = 1.76, AIC = 142.80, CFI = .96, RMSEA = .06. All parameter estimates were statistically significant (*p*s ranging from < .001 to < .05). Further, the coupling coefficient from BDI to subsequent change in CB use was not significant, so the depression-related compliance model and the reciprocal skill use models were not supported. The unidirectional coupling coefficient (γ_{cb}) from CB use to change in depression was significant ($p < .05$), with the unstandardized estimate being γ_{cb} = 1.24. This positive coefficient indicates that greater CB use was associated with subsequent symptom elevation.

Using this bivariate skill use model, a multigroup analysis compared patients based on initial depression severity (CBT_M vs. CBT_S). Considering parameter equivalence across groups, nonredundant parameters included the mean ($\alpha \times s_n$) term, and the mean and variance of Time 1 BDI and CB. All other parameter estimates (i.e., mean, variance, and error estimates), as well as the time-invariant γ_{cb} coupling term, did not differ significantly between groups. Table 6 presents the resulting parameter and model fit indices, $\chi^2(107)$ = 149.44, χ^2/df = 1.39, AIC = 243.44, CFI = .98, RMSEA = .04. Results indicated

Table 6
Multigroup Bivariate Skill Use Model (BDI ← CB) Comparing CBT_M and CBT_S

Parameters and fit indices	CBT_M		CBT_S	
	BDI ← CB		BDI ← CB	
Additive coefficient				
$E(s_n)$	1.98 [c]	0.26 [c]	1.98 [c]	.26 [a]
$\sigma^2(s_n)$	2.44	0.11	.44	0.11
Proportional coefficients				
β_a	-.24 [c]	-.39 [c]	-.18 [c]	-.39 [c]
β_b	-.24 [c]	-.31 [c]	-.12 [c]	-.31 [c]
β_c	-.22 [c]	-.40 [c]	-.15 [c]	-.40 [c]
β_d	-.20 [c]	-.47 [c]	-.14 [c]	-.47 [c]
β_e	-.23 [c]	-.47 [c]	-.15 [c]	-.47 [c]
Cross-lag coefficient				
γ_{bdi} /γ_{cb}	0 (=)	5.09 [a]	0 (=)	5.09 [a]
Goodness-of-fit indices				
Parameters		154		
Degrees of freedom		107		
RMSEA (*p* close fit)		.04 (.96)		
CFI		.98		
AIC		243.44		
χ^2		149.44		
χ^2/df		1.39		

Note. BDI = Beck Depression Inventory; CB = core belief (frequency); $M_{CBT,M}$ = Mean, CBT patients experiencing mild to moderate initial symptoms; $M_{CBT,S}$ = Mean, CBT patients experiencing severe initial symptoms, Subscript $_T$ indicates time. 0 (=) indicates parameter is not estimated "*p* close fit" = *p* value for testing the null hypothesis that the population root-mean-square error of approximation (RMSEA) is no greater than .05 (MacCallum, Browne, & Sugawara, 1996); CFI = comparative fit index; AIC = Akaike information criterion; E(*sn*) = additive change coefficient; β = proportional change coefficient. In this model, the β coefficient is time varying; $\beta_{a\text{-}e}$ each represent distinct parameter estimates. γ_{bdi} /γ_{cb} = cross-lag coefficient in which CB use leads to subsequent BDI change.
[a] Significant at the .05 level.
[b] Significant at the .01 level.
[c] Significant at the .001 level.

that bivariate coupling, in which greater CB use was associated with greater subsequent symptom elevation, occurred regardless of initial severity.

Results from the CB skill use multigroup LDS model can be used to establish an equation,[5] indicating the expected change in BDI as it relates to CB skill use during treatment Sessions 9–14, as shown in Figure 3 This can be demonstrated by substituting in initial CB values of 0, 1, and 2 into this equation. Patients in the CBT_M group who do not engage in CB homework (CB = 0) experienced a cumulative increase of 0.31 BDI points, while those who completed one initial CB exercise (CB = 1) experienced a cumulative increase of 7.02 BDI points, and those who engaged in two CB exercises (CB = 2) experienced a cumulative increase of 13.28 points. Patients in the CBT_S group who did not engage in CB (CB = 0) experienced a cumulative decrease of 7.03 BDI points, while those who completed one initial CB exercise (CB = 1) experienced a cumulative decrease of 1.08 BDI points, and those who completed two CB exercises (CB = 2) experienced a cumulative increase of 5.17 points.

[5] $E(\Delta BDI[t]_n) = \alpha_{bdi} \times E(s_{bdi,n}) + \beta_s \times E(BDI[t-1]_n) + \gamma_{cb} \times E(CB[t-1]_n)$

Discussion

The main goal of this study was to clarify the temporal relationship among BA, CR, and CB skill use and subsequent change in depression symptoms throughout CBT treatment, as a function of initial depression severity. In each case, only the skill use LDS bivariate model (greater skill use is associated with subsequent change in depression symptoms) was supported. Greater BA use was associated with a greater subsequent decrease in depression scores throughout CBT treatment for patients experiencing mild to moderate initial depression symptoms compared with patients experiencing severe symptoms. Greater CR use was associated with greater subsequent symptom alleviation as related to initial depression severity. However, greater CB use was associated with greater subsequent symptom elevation, as related to initial depression severity.

Our results demonstrate that a differential pattern of symptom alleviation was associated with differential use of BA and CR intervention strategies throughout brief group treatment of depression. Our BA analyses are relatively consistent with previous research suggesting that BA is an important intervention strategy that leads to significant symptom improvement (Dimidjian et al., 2006; Dobson et al., 2008). However, our analyses did not indicate that BA use provided superior results when considering depression severity (e.g., Dimidjian et al., 2006). In fact, the cross-lagged coupling coefficient (γ_{ba}) was larger for the CBT_M group, suggesting that BA use was associated with greater symptom alleviation for mild to moderately depressed patients.

Our CR analyses demonstrated that CR use was associated with a greater subsequent decrease in depression as related to initial depression severity. Unlike the Dimidjian et al. (2006) study, when comparing BA and CR use we found comparable amounts of subsequent change following the utilization of these two skills as related to depression severity. One possible reason for this pattern of results is that our LDS analyses are the first to consider symptom change

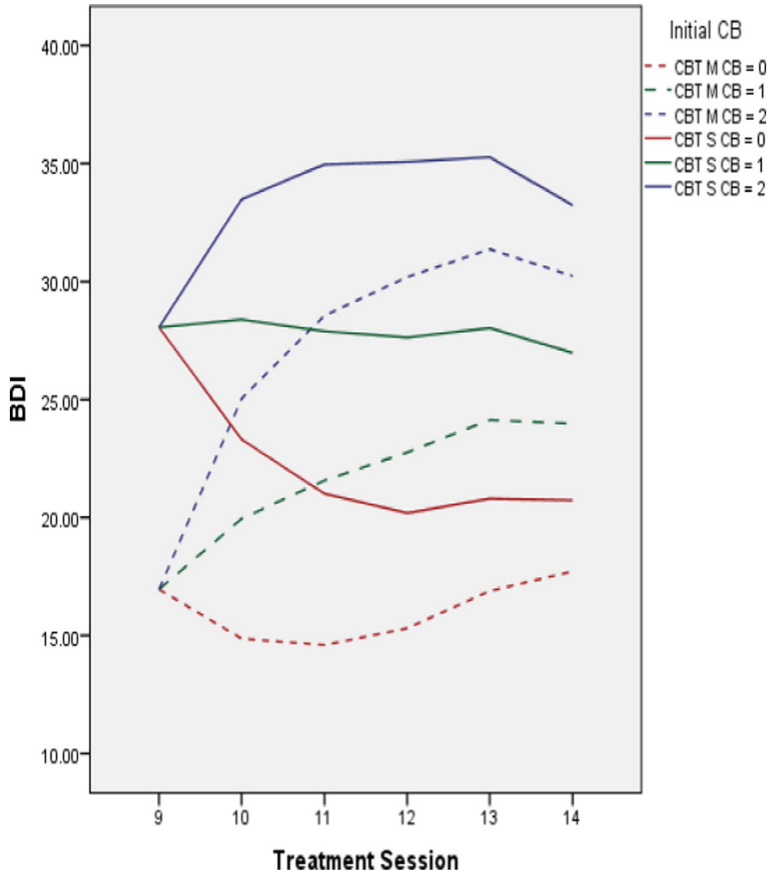

FIGURE 3 Estimated change trajectories involving change in Beck Depression Inventory (BDI) scores during each treatment session based on varying levels of core belief (CB) use.

Note. CBT_M = patients experiencing mild to moderate initial depression scores. CBT_S = patients experience severe initial depression scores. Calculations are based on the formula:

$$E(\Delta BDI[t]_n) = \alpha_{bdi} \times E(s_{bdi},_n) + \beta_s \times E(BDI[t{-}1]_n) + \gamma_{cb} \times E(CB[t{-}1]_n)$$
$$= 1.98 \times E(s_{bdi},_n)((.12 \text{ to } .24) \times E(BDI[t{-}1]_n)) + (5.09 \times E(CB[t{-}1]_n), \text{ for } T9 < t \leq T14$$

For example, predicted mean expected change of BDI, given initial BDI and estimated CB values:
CB = 0 refers to a BDI change trajectory in which no initial CB intervention occurs.
CB = 1 refers to a BDI change trajectory in which one initial CB intervention occurs.
CB = 2 refers to a BDI change trajectory in which two initial CB interventions occur.
Regarding Figure 3, please note that although we demonstrated a longitudinal relationship between BDI and CB use based on depression severity, our analysis did not indicate that there was a significant group difference.

following differential CBT skill use on a sessional level; further, BA, CR, and CB intervention strategies were practiced in tandem, as is usually done in clinical practice. Under these conditions, it appears that BA and CR interventions are associated with comparable amounts of symptom change.

Clinicians often choose to address CBs in depression treatment, especially for severely depressed patients who have strong CB activation. Our analyses suggest that focusing on negative CBs is associated with subsequent elevation in depression symptom scores. Therefore, clinicians should be aware that shifting from BA or CR to CB might increase the likelihood that depression symptoms will worsen. Alternatively, depression symptoms may have eventually decreased through use of CB techniques had we examined a longer time frame; however, given that our protocol was limited to 14 sessions, this could not be determined. It is also possible that this process may differ when examining individual CBT, since an individualized format might allow clinicians to provide additional individualized guidance to patients. Regardless, the CB analyses were surprising in that increased levels of CB interventions were associated with increases in symptom levels. Further, this finding is inconsistent with previous research and should be replicated before it guides clinical practice. For example, Hawley et al. (2006) and Dozois et al.

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(2009) found that changes in the structure and content of CBs underlie depression symptom alleviation. One possible explanation for this apparent discrepancy is that previous studies may have captured the reemergence of positive CBs once depression improves, rather than the diminution of negative CBs. That is, most people have paired CBs (positive and negative); negative CBs ("I'm a failure") are activated with depressed mood and positive CBs ("I'm competent") reemerge when depression lifts (Beck, Rush, Shaw, & Emery (1979); Padesky, 1994). For most patients, insofar as BA and CR are associated with reductions in depression symptoms, positive CBs are likely to emerge without direct clinical attention to the negative CBs. Direct CB interventions may only be required for those patients with chronic negative CBs who have not developed positive CBs. We are not suggesting that CB strategies be removed from CBT treatment. However, for certain patients, it might be important to help them construct and modify positive CBs over a longer time frame than what is typical for brief group therapy (Padesky, 1994).

These findings have potential implications for clinical practice. Our results suggest that encouraging patients to engage in BA and CR skills throughout treatment might promote optimal symptom alleviation. More consistent BA and CR homework practice also might have led to more rapid symptom reduction for these patients. These findings also suggest that the efficacy of group treatment for depression might be improved by focusing on current behavioral changes and using CR strategies to test negative automatic thoughts, rather than addressing long-standing CBs. When CBs emerge in treatment, it may be preferable to evaluate them at the automatic thought level, considering whether they may be specific to the situation. Examining evidence within specific situations and considering alternative explanations for mood changes might ultimately be more helpful than directing therapy's focus to a broader examination of CBs.

The current study has several strengths. To our knowledge, there have been no studies to date that have clarified the dynamic longitudinal relationship between patients' use of BA, CR, and CB skills and symptom change throughout CBT treatment. Prior dismantling studies often compared protocols that separated behavioral and cognitive components in a sequential fashion; however, this is not how CBT is typically delivered. Therefore, an advantage of this type of analysis is that specific CBT skills can be studied in a naturalistic therapeutic context during each session. This study supports the viability of utilizing Mind Over Mood in a group format for patients experiencing significant depressive symptoms. LDS modeling allowed us to statistically compare several theoretical models, considering the impact of initial depression severity on the association of skill use and subsequent symptom change. Furthermore, this was a naturalistic examination of these issues using a heterogeneous outpatient sample with considerable comorbidity; therefore, our results are likely representative of standard clinical practice.

It is challenging to determine how researchers might optimally assess therapy skill use. Both quantity and quality may be equally important, and although some patients may use skills frequently, they may not be implementing those skills optimally. The advantages of assessing the frequency of skill use is that the decision is relatively concrete—if a rating is completed immediately after using a skill, then the frequency count should not be significantly influenced by retrospective bias. However, quantity does not speak to quality, and thus an optimal balance may involve incorporating measures of skill quality, such as the SoCT scale (Jarrett et al., 2011).

There are several study limitations that should be considered. First, we used a self-report depression measure (the BDI-II), which may be prone to retrospective bias. Second, although all elements of the clinical process were carefully monitored by experienced clinical psychologists, a formal adherence measure was not used. Third, the LDS framework is helpful in that it allows researchers to compare several theoretical models with one another, examining inter- and intraindividual latent change over time, and considering reverse and reciprocal temporal relationships among variables. However, a noteworthy limitation involves our inability to draw causal inferences given our nonexperimental design. Participants were not randomized to different levels of treatment component utilization, so we cannot rule out the influence of third variables. Nonetheless, naturalistic observation often precedes controlled experimentation, and our findings suggest possible causal relations that deserve to be explored.

Considering future directions, the LDS statistical framework could be used to clarify the differential relationships among skills used in other empirically validated treatments (e.g., mindfulness-based CBT, dialectical behavior therapy), comparing individual and group treatment, and considering other Axis I diagnoses. Although our analyses examined specific time frames during treatment, future studies might examine whether ordering effects impact the association between skill use and subsequent depression change, experimental or otherwise. In summary, our results can provide meaningful clinical guidance as to the types of CBT skills that are most likely to be effective in alleviating depression symptoms in a naturalistic treatment setting, empowering both therapists and patients to make the best use of brief therapy.

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Conflict of Interest Statement

The authors declare that there are no conflicts of interest.

Appendix A. Supplementary Information

Supplementary information relating to this article can be found online at http://dx.doi.org/10.1016/j.beth.2016.09.003.

References

Akaike, H. (1973). Information theory and an extension of the maximum likelihood principle. In: B. N. Petrov, & F. Csaki (Eds.), Proceedings of the 2nd international symposium on information theory (pp. 267–281). Budapest, Hungary: Akademiai Kiado.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.) Washington, DC: Author. http://dx.doi.org/10.1176/appi.books.9780890425596

Arbuckle, J. L. (2011). Amos (Version 20.0) [computer program]. Chicago: SPSS.

Arkowitz, H. (1996, April). *Clients as cognitive therapists for their own depression*. Paper presented at the annual meeting of the Society for the Exploration of Psychotherapy Integration, Toronto, Canada.

Barber, J. P., & DeRubeis, R. J. (1989). On second thought: Where the action is in cognitive therapy for depression. *Cognitive Therapy and Research*, *13*, 441–457. http://dx.doi.org/10.1007/bf01173905

Barber, J. P., & DeRubeis, R. J. (2001). Change in compensatory skills in cognitive therapy for depression. *Journal of Psychotherapy Practice and Research*, *10*, 8–13. PMCID: PMC3330623

Beck, A. T., Rush, A. J., Shaw, B. F., & Emery, G. (1979). *Cognitive therapy of depression*. New York: Guilford Press.

Beck, A. T., Steer, R. A., & Brown, G. (1996). *Manual for Beck Depression Inventory–II*. San Antonio, TX: Pearson Assessment.

Bennett-Levy, J. (2003). Mechanisms of change in cognitive therapy: The case of automatic thought records and behavioural experiments. *Behavioural and Cognitive Psychotherapy*, *31*(3), 261–277. http://dx.doi.org/10.1017/S1352465803003035

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, *107*, 238–246. http://dx.doi.org/10.1037/0033-2909.107.2.238

Blatt, S. J. (2004). *Experiences of depression: Theoretical, clinical, and research perspectives* (pp. 255–295). Washington, DC: American Psychological Association.

Boswell, J. F., Anderson, L. M., & Barlow, D. H. (2014). An idiographic analysis of change processes in the unified transdiagnostic treatment of depression. *Journal of Consulting and Clinical Psychology*, *82*(6), 1060–1071. http://dx.doi.org/10.1037/a0037403

Browne, M. W., & Cudeck, R. (1989). Single sample cross-validation indices for covariance structures. *Multivariate Behavioral Research*, *24*, 445–455. http://dx.doi.org/10.1207/s15327906mbr2404_4

Byrne, B. M. (1989). Multigroup comparisons and the assumption of equivalent construct validity across groups: Methodological and substantive issues. *Multivariate Behavioral Research*, *24*, 503–523. http://dx.doi.org/10.1207/s15327906mbr2404_7

Christopher, M. S., Jacob, K. L., Neuhaus, E. C., Neary, T. J., & Fiola, L. A. (2009). Cognitive and behavioral changes related to symptom improvement among patients with a mood disorder receiving intensive cognitive-behavioral therapy. *Journal of Psychiatric Practice*, *15*(2), 95–102. http://dx.doi.org/10.1097/01.pra.0000348362.11548.5f

Connolly Gibbons, M. B., Crits-Christoph, P., Barber, J. P., Stirman, S. W., Gallop, R., Goldstein, L. A., . . . Ring-Kurtz, S. (2009). Unique and common mechanisms of change across cognitive and dynamic psychotherapies. *Journal of Consulting and Clinical Psychology*, *77*, 801–813. http://dx.doi.org/10.1037/a0016596

DeRubeis, R. J., Gelfand, L. A., Tang, T. Z., & Simons, A. D. (1999). Medications versus cognitive behaviour therapy for severely depressed outpatients: Mega-analysis of four randomized comparisons. *American Journal of Psychiatry*, *156*(7), 1007–1013.

DeRubeis, R. J., Hollon, S. D., Amsterdam, J. D., Shelton, R. C., Young, P. R., Salomon, R. M., . . . Gallop, R. (2005). Cognitive therapy vs. medications in the treatment of moderate to severe depression. *Archives of General Psychiatry*, *62*, 409–416. http://dx.doi.org/10.1001/archpsyc.62.4.409

Dimidjian, S., Hollon, S. D., Dobson, K. S., Schmaling, K. B., Kohlenberg, R. J., Addis, M. E., . . . Dunner, D. L. (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. http://dx.doi.org/10.1176/ajp.156.7.1007

Dobson, K., Rizvi, S., & Gollan, J. (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. http://dx.doi.org/10.1037/0022-006X.76.3.468

Dozois, D. J. A., Bieling, P. J., Patelis-Siotis, I., Hoar, L., Chudzik, S., McCabe, K., & Westra, H. A. (2009). Changes in self-schema structure in cognitive therapy for major depressive disorder: A randomized clinical trial. *Journal of Consulting and Clinical Psychology*, *77*, 1078–1088. http://dx.doi.org/10.1037/a0016886

Dozois, D. J. A., & Covin, R. (2004). The Beck Depression Inventory–II (BDI-II), Beck Hopelessness Scale (BHS), and Beck Scale for Suicide Ideation (BSS). In M. Hersen (Series Ed.), D. L. Segal, & M. Hilsenroth (Vol Eds.), *Comprehensive handbook of psychological assessment: Volume 2. Personality assessment and psychopathology* (pp. 50–69). Hoboken, NJ: Wiley.

Elkin, I., Shea, M. T., Watkins, J. T., Imber, S. D., Sotsky, S. M., Collins, J. F., . . . Parloff, M. B. (1989). NIMH treatment of depression collaborative research program, I: General effectiveness of treatments. *Archives of General Psychiatry*, *46*, 971–982. http://dx.doi.org/10.1001/archpsyc.1989.01810110013002

Epp, A. M., & Dobson, K. S. (2010). *The evidence base for cognitive-behavioral therapy*. New York, NY: Guilford Press.

First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W. (2002). *Structured clinical interview for DSM-IV-TR Axis I disorders, research version, patient edition (SC1D-1/P)*. New York, NY: Biometrics Research, State Psychiatric Institute.

Garratt, G., Ingram, R. E., Rand, K. L., & Sawalani, G. (2007). Cognitive processes in cognitive therapy: Evaluation of the mechanisms of change in the treatment of depression. *Clinical Psychology: Science and Practice*, *14*(3), 224–239. http://dx.doi.org/10.1111/j.1468-2850.2007.00081.x

George, D., & Mallery, M. (2010). *SPSS for windows step by step: A simple guide and reference, 17.0 update* (10a ed.), Boston, MA: Pearson.

Greenberger, D., & Padesky, C. A. (1995). *Mind over mood: Change how you feel by changing the way you think*. New York, NY: Guilford Press.

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Grove, W., Andreasen, N., McDonald-Scott, P., Keller, M., & Shapiro, R. (1981). Reliability studies of psychiatric diagnosis. *Archives of General Psychiatry*, *38*, 408–413. http://dx.doi.org/10.1001/archpsyc.1981.01780290042004

Hawley, L. L., Moon-Ho, R. H., Zuroff, D. C., & Blatt, S. J. (2006). The relationship of perfectionism, depression and therapeutic alliance during treatment for depression: Latent difference score analysis. *Journal of Consulting and Clinical Psychology*, *74*(5), 930–942. http://dx.doi.org/10.1037/0022-006X.74.5.930

Hawley, L. L., Rector, N. A., & Laposa, J. M. (2016). Examining the dynamic relationships between exposure tasks and cognitive restructuring in CBT for SAD: Outcomes and moderating influences. *Journal of Anxiety Disorders*, *39*, 10–20. http://dx.doi.org/10.1016/j.janxdis.2016.01.010

Hundt, N. E., Mignogna, J., Underhill, C., & Cully, J. A. (2013). The relationship between use of CBT skills and depression treatment outcome: A theoretical and methodological review of the literature. *Behavior Therapy*, *44*(1), 12–26. http://dx.doi.org/10.1016/j.beth.2012.10.001

Hunter, M. S., Ussher, J. M., Cariss, M., Browne, S., Jelley, R., & Katz, M. (2002). Medical (fluoxetine) and psychological (cognitive-behavioural therapy) treatment for premenstrual dysphoric disorder: A study of treatment processes. *Journal of Psychosomatic Research*, *53*(3), 811–817. http://dx.doi.org/10.1016/S0022-3999(02)00338-0

Jacob, K. L., Christopher, M. S., & Neuhaus, E. C. (2011). Development and validation of the Cognitive-Behavioral Therapy Skills Questionnaire. *Behavior Modification*, *35*, 595–618. http://dx.doi.org/10.1177/0145445511419254

Jacobson, N. S., Dobson, K. S., Truax, P. A., Addis, M. E., Koerner, K., Gollan, J. K., . . . Prince, S. E. (1996). A component analysis of cognitive-behavioral treatment for depression. *Journal of Consulting and Clinical Psychology*, *64*(2), 295–304. http://dx.doi.org/10.1037/0022-006X.64.2.295

Jarrett, R. B., Vittengl, J. R., Clark, L. A., & Thase, M. E. (2011). Skills of Cognitive Therapy (SoCT): A new measure of patients' comprehension and use. *Psychological Assessment*, *23*(3), 578–586. http://dx.doi.org/10.1037/a0022485

Jöreskog, K. G., & Sorbom, D. (1979). *Advances in factor analysis and structural equation models*. Cambridge, MA: Abt Books.

Kazantzis, N., Deane, F., & Ronan, K. (2000). Homework assignments in cognitive and behavioral therapy: A meta-analysis. *Clinical Psychology: Science and Practice*. 7(2), 189–202. http://dx.doi.org/10.1093/clipsy.7.2.189

Kazantzis, N., Whittington, C., & Dattilio, F. (2010). Meta-analysis of homework effects in cognitive and behavioral therapy: A replication and extension. Clinical Psychology: Science and Practice. 17(2), 144–156. http://dx.doi.org/10.1111/j.1468-2850.2010.01204.x

MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods*, *1*, 130–149. http://dx.doi.org/10.1037/1082-989X.1.2.130

Martell, C. R., Addis, M. E., & Jacobson, N. S. (2001). *Depression in context: Strategies for guided action*. New York, NY: Norton.

McArdle, J. J., & Hamagami, F. (2001). Latent difference score structural models for linear dynamic analyses with incomplete longitudinal data. In L. M. Collins & A. G. Sayer (Eds.), *New methods for the analysis of change* (pp. 139–175). Washington, DC: American Psychological Association.

McArdle, J. J., & Nesselroade, J. R. (2002). Growth curve analysis in contemporary psychological research. In J. Schinka & W. Velicer (Eds.), *Comprehensive handbook psychology: Volume 4. Research methods in psychology*. New York: Wiley.

Meredith, W., & Tisak, J. (1990). Latent curve analysis. *Psychometrika*, *55*(1), 107–122. http://dx.doi.org/10.1007/BF02294746

Neimeyer, R., & Feixas, G. (1990). The role of homework and skill acquisition in the outcome of group cognitive therapy for depression. *Behavior Therapy*, *21*, 282–292. http://dx.doi.org/10.1016/S0005-7894(05)80331-4

Neuhaus, E. C., Christopher, M., Jacob, K., Guillamot, J., & Burns, J. P. (2007). Short-term cognitive behavioral partial hospital treatment: A pilot study. *Journal of Psychiatric Practice*, *13*(5), 298–307. http://dx.doi.org/10.1097/01.pra.0000290668.10107.f3

Padesky, C. A. (1994). Schema change processes in cognitive therapy. *Clinical Psychology and Psychotherapy*, *1*(5), 267–278. http://dx.doi.org/10.1002/cpp.5640010502

Padesky, C. A., & Greenberger, D. (1995). *Clinician's guide to Mind Over Mood*. New York, NY: Guilford Press.

Rees, C. S., McEvoy, P., & Nathan, P. R. (2005). Relationship between homework completion and outcome in cognitive behaviour therapy. *Cognitive Behaviour Therapy*, *34*, 242–247. http://dx.doi.org/10.1080/16506070510011548

Scott, R. H. (2005). Effectiveness of group versus individual psychotherapy for depression in a community counselling setting using the "Mind Over Mood" cognitive therapy manual. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, *65*(12-B), 6673.

Segal, Z. V., Bieling, P. J., Young, T., MacQueen, G., Cooke, R., Martin, L., . . . Levitan, R. D. (2010). Antidepressant monotherapy versus sequential pharmacotherapy and mindfulness-based cognitive therapy, or placebo, for relapse prophylaxis in recurrent depression. *Archives of General Psychiatry*, *67*(12), 1256–1264. http://dx.doi.org/10.1001/archgenpsychiatry.2010.168

Steiger, J. H., & Lind, J. C. (1980). Statistically-based tests for the number of factors. *Paper presented at the annual spring meeting of the psychometric society*.

Strunk, D. R., DeRubeis, R. J., Chiu, A. W., & Alvarez, J. (2007). Patients' competence in and performance of cognitive therapy skills: Relation to the reduction of relapse risk following treatment for depression. *Journal of Consulting and Clinical Psychology*, *75*(4), 523–530. http://dx.doi.org/10.1037/0022-3514.58.5.844

Strunk, D. R., Hollars, S. N., Adler, A. D., Goldstein, L. A., & Braun, J. D. (2014). Assessing patient's cognitive therapy skills: Initial evaluation of the competencies of Cognitive Therapy Scale. *Cognitive Therapy and Research*, *38*(5), 559–569. http://dx.doi.org/10.1007/s10608-014-9617-9

Weissman, A. N., & Beck, A. T. (1978). Development and validation of the dysfunctional attitude scale: A preliminary investigation. *Paper presented at the annual meeting of the American Educational Research Association*: Toronto, Ontario

Whitfield, G. E., Williams, C. J., & Shapiro, D. (2001). Assessing the take up and acceptability of a self-help room used by patients awaiting their initial outpatient appointment. *Behavioural and Cognitive Psychotherapy*, *29*, 333–343. http://dx.doi.org/10.1017/S135246580100306X

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