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The Role of Dyadic Discord in Outcomes in Acute Phase Cognitive Therapy for Adults With Recurrent Major Depressive Disorder

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Major depressive disorder (MDD) and relationship discord between cohabiting partners frequently co-occur, with bidirectional effects established. As relationship quality influences understanding and treatment of MDD, the current analyses clarified the relations of pretreatment dyadic discord with outcomes during and at the end of acute phase cognitive therapy (CT) for adults with recurrent MDD. Married or cohabiting patients (n = 219) completed the Dyadic Adjustment Scale (DYS) before and after a 16–20 session, 12–14 week CT protocol. Lower levels of dyadic adjustment indicated higher levels of dyadic discord. Response to CT was defined as the absence of a major depressive episode and ≤ 12 on the 17-item Hamilton Rating Scale for Depression. Pretreatment dyadic discord, whether defined as a continuous or categorical variable (using DYS cutoff score of 97), was not associated with treatment completion or response but was positively associated with levels of depressive symptoms at the end of acute phase CT. Furthermore, CT was associated with declines in dyadic discord, with 23.3% of initially

discordant couples moving to nondiscordant status at the end of CT. Depressive symptoms did not significantly mediate changes in dyadic discord. Finally, pre- (but not mid-) treatment dyadic discord was associated with subsequent changes in depressive symptoms, suggesting limited mediation. These findings replicate prior research indicating that individual CT is associated with reductions in depressive symptoms and dyadic discord while clarifying that lower pre-treatment dyadic discord may predict initial improvement in depressive symptoms.

Keywords: cognitive therapy; couples; depression; dyadic discord; marital satisfaction

In addition to major depressive disorder's (MDD) prevalence (Kessler et al., 2005) and economic consequences (Greenberg et al., 2003), the disorder frequently co-occurs with interpersonal dysfunction. Criticism, hostility, and rejection are common among social interactions involving a depressed person, as are a lack of positive emotions and behaviors (Gabriel, Beach, & Bodenmann, 2010; Hames, Hagan, & Joiner, 2013; Rehman, Gollan, & Mortimer, 2008). The marital discord model of depression has posited that marital dissatisfaction is associated with future depressive symptoms (Beach, Sandeen, & O'Leary, 1990) while depression contagion research has demonstrated one person's depression is associated with increased symptoms of depression in a close other, such as a romantic partner (Coyne, 1976; Joiner & Katz, 1999).

Targeting interpersonal relationship dysfunction is important in the comprehensive treatment of depression and may represent one efficacious treatment mechanism. Past research has examined relationship dysfunction in a variety of interpersonal relationships, including marital/cohabiting relationships, as a predictor and/or moderator of depression treatment outcomes such as symptom response and remission through both cognitive therapy (CT) and pharmacotherapy. Pretreatment relationship distress is associated with CT nonresponse (Jarrett et al., 2013) while deterioration in social-interpersonal functioning, including marital/intimate relationships, is associated with relapse/recurrence after CT (Vittengl, Clark, & Jarrett, 2009; Vittengl, Clark, Thase, & Jarrett, 2016b). Past studies suggest relationship functioning will improve moderately after acute (Dunn et al., 2012; Vittengl, Clark, & Jarrett, 2004) or continuation phase cognitive therapy (Jha, Minhajuddin, Thase, & Jarrett, 2014; Vittengl et al., 2016b). While social-interpersonal functioning improves less frequently and more slowly than depressive symptoms (Hirschfeld et al., 2002; Vittengl et al., 2004), and social-interpersonal impairment after CT or pharmacotherapy is evident (Hirschfeld et al., 2002; Kennedy, Foy, Sherazi, McDonough, & McKeon, 2007; Vittengl et al., 2004), early improvement in social-interpersonal functioning may aid later reduction in depressive symptoms throughout CT (Dunn et al., 2012). Social-interpersonal functioning in many kinds of relationships, such as with family, friends, and marital or cohabiting partners, may therefore affect CT treatment outcomes like completion and response, such that targeting interpersonal functioning could yield depressive symptom reduction.

Here we drill down from the array of previously studied relationship types to focus on one specific aspect of social-interpersonal functioning: the relationship of married or cohabiting partners, one of whom presented for individual CT for recurrent depression. We ask the extent to which pretreatment dyadic discord (i.e., low levels of dyadic adjustment or satisfaction) predicts CT outcomes among depressed adults with cohabiting/married partners. There are several reasons for focusing specifically on dyadic discord in an analysis of CT. Overall, depressive symptoms and behaviors are clearly associated with relationship discord. For example, lower levels of direct anger and higher levels of hostility have been associated with later depressive symptoms (Rude, Chrisman, Burton Denmark, & Maestas, 2012), angry or depressive conflict resolution mediated the association between marital dissatisfaction and depressive symptoms (Du Rocher Schudlich, Papp, & Cummings, 2011), and hostility has been associated with both relationship distress and depressive symptomatology (Knobloch-Fedders, Knobloch, Durbin, Rosen, & Critchfield, 2013). This research also relates to stress generation, or the concept that depressive symptoms are associated with subsequent interpersonal conflict stressors, such as arguments with one's romantic partner (Hammen, 1991).

Furthermore, the ending of close relationships has also been associated with subsequent depression, as 43% of participants who experienced a separation, divorce, or serious relationship ending also experienced a depressive episode over 3-year follow-up (Gilman et al., 2013). Similarly, at 10-year follow-up of depressed inpatients with MDD, 42% of previously-married participants were currently separated or reported relationship dissatisfaction; in addition, almost 90% of participants who reported being in a dissatisfying relationship at follow-up also reported having at least one recurrence of depression within this interval (Kronmuller et al., 2011).

Given the impact of dyadic discord on depressive symptoms and diagnoses, substantial prior research

has investigated the temporal relationship between the two. There is evidence that dyadic discord precedes depression (Peterson-Post, Rhoades, Stanley, & Markman, 2014; Whisman & Bruce, 1999), that depression precedes dyadic discord (Ulrich-Jakuvowski, Russell, & O'Hara, 1988), and, most commonly, that there is a bidirectional influence (Bodenmann & Randall, 2013; Choi, 2016; Gustavson, Roysamb, von Soest, Helland, & Mathiesen, 2012; Kouros & Cummings, 2011; Tilden, Gude, Hoffart, & Sexton, 2010; Whisman & Uebelacker, 2009) between the two. Experimental studies with CT support the hypothesis that changes in dyadic discord follow changes in depressive severity, although these studies do not exclude the possibility of bidirectional influences. For example, lower pretreatment marital adjustment (i.e., greater discord) was significantly associated with increased depressive symptomatology at the conclusion of treatment across a variety of psychotherapy and antidepressant medication conditions (Whisman, 2001). In other studies, outpatients with chronic depression and dyadic discord at baseline were less likely to achieve remission when treated with psychotherapy, antidepressant medication, or their combination (Denton et al., 2010), and outpatients with chronic depression were less likely to achieve depression remission through pharmacotherapy if they endorsed higher levels of pretreatment dyadic discord (Miller et al., 1998). In a different trial of recurrent depression, CT responders were more likely to have better social-interpersonal functioning before beginning treatment (Vittengl et al., 2004). Finally, daily diary studies have shown similar effects as with longitudinal studies; for example, one study among women indicated that, on days in which women endorsed lower levels of marital satisfaction, they also endorsed higher levels of depressive symptoms (Smith, Breiding, & Papp, 2012).

While the bidirectional association between depression and relationship discord is established, its implications for treatment decisions are unclear. Some studies of conjoint behavioral marital therapy combined with individual cognitive therapy found that individually delivered CT improved depressive symptoms but not levels of dyadic discord (Emanuels-Zuurveen & Emmelkamp, 1996; Jacobson, Fruzzetti, Dobson, Schmaling, & Salusky, 1991; O'Leary & Beach, 1990). Other studies have found that individual CT was associated with improved depressive severity and levels of dyadic discord (Vittengl et al., 2004; Whisman, 2001). In the Whisman study, improvement in dyadic discord symptoms was mediated by improvement in depression. Following recommendations to employ a more relational and dyadic framework to depression treatment (Hollon & Sexton, 2012), recent work has proposed several couple-based or partner-assisted interventions for depression (Brandon et al., 2012; Cohen, O'Leary, Foran, & Kliem, 2014; Cohen, O'Leary, & Foran, 2010; Denton, Wittenborn, & Golden, 2012; Whisman & Beach, 2012) that involve partners in the treatment of depressed adults.

In this analysis, we build off of prior research linking baseline dyadic discord to poorer CT treatment outcomes, such as the continued presence of depressive symptoms or lack of remission at end of treatment (Denton et al., 2010; Miller et al., 1998; Whisman, 2001). We first ask the extent to which dyadic discord before beginning treatment is associated with treatment outcomes, including treatment completion, response, and symptom reduction after acute phase CT (Jarrett & Thase, 2010). We also ask whether dyadic discord reduces from pre- to post-CT, whether changes in dyadic discord parallel changes in depressive symptoms, and whether relations between dyadic discord and depressive symptoms are bidirectional throughout psychotherapy. We computed a cross-lagged analysis in order to elucidate potential mechanisms of depressive symptom/dyadic discord reduction throughout CT.

Method

PARTICIPANTS

Patients (n = 523) provided informed consent to participate in the Continuation-Phase Cognitive Therapy Relapse Prevention [C-CT-RP] Trial, registered at ClinicalTrials.gov [NCT00118404, NCT00183664, and NCT00218764] at the University of Texas Southwestern Medical Center and the Western Psychiatric Institute and Clinic of the University of Pittsburgh Medical Center (Jarrett et al., 2013; Jarrett & Thase, 2010). Patients were recruited between January 3, 2000 and July 30, 2008 from print media, Internet ads, professional referrals, and word-of-mouth. The research was approved by Institutional Review Boards at both sites and renewed annually by a Data Safety and Monitoring Board. Complete details of the primary results and methods are available (Jarrett et al., 2013; Jarrett & Thase, 2010).

Male and female adults were eligible if they met the criteria for recurrent major depressive disorder as diagnosed by the Structured Clinical Interview for the DSM-IV (SCID-I: First, Spitzer, Gibbon, & Williams, 1997) and scored 14 or more on the 17-item Hamilton Rating Scale for Depression (HRSD-17: Hamilton, 1960) at both an initial and second assessment interview. Exclusion criteria were: (a) comorbid medical disorder(s) that could be causing depression or requiring medication that

could be causing depression; (b) the presence of: any psychotic disorder, dementia, bipolar disorder, an active substance use disorder, a primary diagnosis of obsessive compulsive disorder, or eating disorder; (c) inability to complete questionnaires in English; (d) represented an active suicide risk; (e) had previously failed to respond to treatment with at least 8 weeks of cognitive therapy conducted by a certified cognitive therapist; (f) had previously failed to respond to at least 6 weeks of treatment with 40 mg of fluoxetine; (g) pregnant or planning to become pregnant during the first 11 months of the study; and (h) did not give written informed consent.

PROCEDURE

Participants in this research were recruited for a longitudinal randomized controlled trial on the efficacy and durability of continuation phase cognitive therapy to prevent recurrent major depressive disorder compared to: antidepressant medication (fluoxetine) with clinical management or to pill placebo with clinical management (Jarrett & Thase, 2010). In the parent trial, 523 patients consented to receive 16 or 20 individual sessions of acute phase CT, with session amount based on rapidity of response. Responders (defined below) were then randomized to one of three treatment conditions. The present study analyzes an intention-to-treat sample of cohabiting patients who began the acute phase CT. Given the lack of a control group, analyses in this paper focus on pre/post-test differences in dyadic discord and/or depressive symptoms before and after acute-phase CT. Therefore, we cannot establish a causal link that changes in depressive symptoms/dyadic discord are necessarily due to CT.

Other reports focusing exclusively on the acute phase of treatment with $n = 523$ are available (e.g., Dunn et al., 2012; Jarrett et al., 2013; Jarrett, Vittengl, Clark, & Thase, 2011; Jha et al., 2014; Koenig, Jarrett, Gallop, Barrett, & Thase, 2014; Renner et al., 2012; Smits, Minhajuddin, Thase, & Jarrett, 2012; Vittengl, Clark, Thase, & Jarrett, 2013, 2014, 2016a, 2017).

Acute phase CT followed the model of Beck and colleagues (Beck, Rush, Shaw, & Emery, 1979). The first 8 sessions occurred twice weekly. After this point, early responders moved to 1 session/weekly visits for 8 weeks (16 total sessions) while late responders continued 2 sessions/week for 4 weeks followed by 1 session/week for 4 weeks (20 total sessions). Early response was defined as a 40% or larger decrease in HRSD-17 scores by Session 8. Up to 14 weeks were allowed to complete the sessions to provide time to make up missed appointments.

Therapy was delivered by 16 experienced cognitive therapists who each received at least 1 year of supervised CT training before serving as study therapists. Therapists all achieved and maintained scores ≥ 40 on the Cognitive Therapy Scale, indicating CT competency (Vallis, Shaw, & Dobson, 1986). Weekly group supervision was provided by experienced faculty, and randomly selected video recordings were reviewed to continually monitor therapist competence.

SCHEDULE OF ASSESSMENTS

The SCID-I interview (First et al., 1997), Hamilton Rating Scale for Depression (Hamilton, 1960), and Dyadic Adjustment Scale (DYS; Spanier, 1976) were administered before the start of CT and within 1 week after its acute-phase conclusion by independent evaluators. The patient's therapist administered the HRSD-17 weekly and the current major depressive episode section of the SCID at weeks 4, 8, and 12. Patients completed the 30-item self-report Inventory of Depressive Symptomatology (IDS-SR; Rush, Gullion, Basco, Jarrett, & Trivedi, 1996) and 21-item self-report Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) before the start of CT, weekly during CT, and at the post-CT assessment session within 1 week of the end of the acute-phase CT-protocol.

MEASURES

Demographics

Patient demographics (including gender, age, sex, marital status, education) were collected during the initial evaluation through a self-report form.

Psychiatric Diagnosis

The diagnosis of recurrent MDD was made by use of the SCID-I (First et al., 1997), administered at the initial evaluation. The SCID-I section for current major depressive episode was repeated at weeks 4, 8, and 12 of the acute CT phase and at the blind evaluation conducted within 7 days of the last acute phase CT session.

Depressive Severity

Clinicians completed the 17-item HRSD and patients completed the 21-item BDI (Beck et al., 1961) and 30-item IDS-SR (Rush et al., 1996). These measures reflect the same construct during depression treatment (Vittengl, Clark, Kraft, & Jarrett, 2005; Vittengl et al., 2013). Consequently, we standardized ($M = 50$, $SD = 10$) the measures' total scores based on their distributions at acute-phase intake and averaged them to form a robust composite. Higher scores indicated more severe depressive symptomatology. Treating the three scales as items,

Table 1
Depressive Symptom Intensity and Dyadic Adjustment Scale Scores During Acute Phase Cognitive Therapy (CT) for Depression

Variable	Time Period	*N*	*M*	*SD*
Depressive symptoms	Pre-CT	219	49.79	10.04
	Mid-CT	187	28.13	12.48
	Post-CT	181	22.08	13.40
Dyadic Adjustment Scale	Pre-CT	216	89.10	23.05
	Mid-CT	177	94.89	22.93
	Post-CT	162	96.69	23.17

Note. CT = Cognitive Therapy. Depressive symptom scores are a standardized composite of the Hamilton Rating Scale for Depression, Beck Depression Inventory, and Inventory for Depressive Symptomatology—Self-report. Lower Dyadic Adjustment Scale scores mark greater dyadic discord.

alpha internal consistency reliability for the composite was high [pre- (.81), mid- (.94), and post- (.95) CT].

Treatment Completion and Response

Completion of acute-phase CT was defined as missing no more than two CT sessions in the 16- or 20-session protocol described above. Acute-phase response was defined as no longer meeting criteria for a major depressive episode and having a final acute-phase HRSD score ≤ 12. Among the 219 analyzed cohabiting patients, 79.9% completed and 63.5% responded to CT, similar to the full sample (Jarrett et al., 2013).

Dyadic Discord

Patients completed the DYS (Spanier, 1976), a widely used (Graham, Liu, & Jeziorski, 2006) 32-item self-report measure assessing both the quality of marriages or similar dyads and satisfaction with that relationship. Lower scores indicate higher levels of dyadic discord. Spanier reported an internal consistency reliability of $\alpha = .96$, and a meta-analysis of studies using the DYS found a mean internal consistency reliability of $\alpha = .92$ across a wide range of relationship types (Graham et al., 2006). Spanier provides evidence for content, criterion-related, and construct validity of the DYS via comparisons with the Locke-Wallace Marital Adjustment Test (MAT; Locke & Wallace, 1959), factor analysis of the scale, and comparison of normal and divorced couple groups. Total DYS scores have regularly differentiated distressed and nondistressed couples (Crane, Busby, & Larson, 1991; Spanier, 1988). The DYS was administered during the initial evaluation, at roughly the midpoint of CT, and at the independent evaluation conducted within 7 days of the final cognitive therapy session. In the current study, coefficient alpha for the DYS was .94, .95, and .95 at pre-, mid-, and post-CT, respectively.

ANALYSIS OF MARRIED AND COHABITING PARTICIPANTS

We focused our analyses on the 219 (of 523) patients who reported that they were married and living together or were unmarried but cohabiting at intake to acute-phase CT. Table 1 shows mean depressive symptom intensity and DYS scores observed for these patients during acute-phase CT, while Figure 1 shows the CONSORT diagram. Decreases in sample size over acute-phase CT primarily reflect treatment attrition.

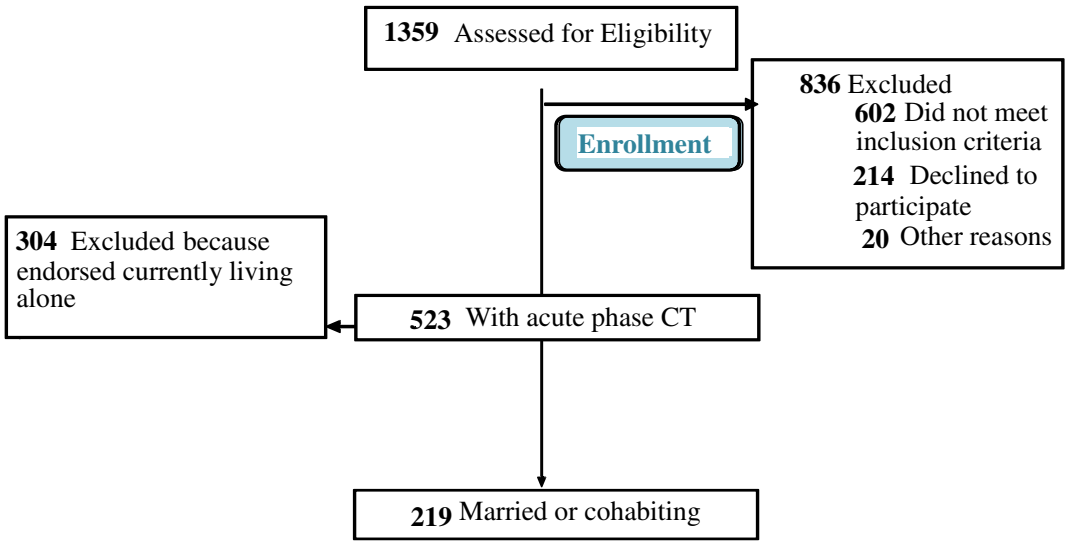

FIGURE 1 CONSORT diagram.

TREATMENT OF MISSING DATA

To include all 219 patients in our intent-to-treat analyses, we multiply imputed missing data using the Markov chain Monte Carlo method in PROC MI, computed standard analyses on each dataset, and pooled the results via PROC MIANALYZE in SAS software version 9.3 (SAS Institute, Inc., Cary, NC). Using multiple imputation to retain cases with missing data is preferable to excluding cases with missing data (Allison, 2003; Schafer & Graham, 2002), as excluding patients with missing data can reduce statistical power and bias results.

STATISTICAL ANALYSES

We analyzed data from the DYS in two ways. First, we analyzed total scores as a continuous variable, with lower values marking progressively greater dyadic discord. Second, we analyzed a categorical variable coded 1 = dyadic discord present or 0 = dyadic discord absent. In particular, DYS scores ≤ 97 are more than 1 *SD* below a community mean and mark substantive discord, whereas higher scores may signal the absence of notable discord (Spanier, 1976).

First, we tested whether pre-CT dyadic discord (either continuous DYS scores or categorical discord versus nondiscord) was associated with CT outcomes, using logistic regression for dichotomous outcomes (CT completion, CT response) and linear models for continuous depressive symptom severity (Study Question 1). Second, we tested whether discord reduced during CT using repeated-measures multilevel linear (continuous DYS scores) and logistic (categorical discord versus nondiscord) models. The multilevel models tested the fixed main effect of time (pre-, mid-, or post-CT, modeled discretely and evaluated with *F*-tests), and controlled nesting of repeated measures within participants using compound symmetric error structures (Study Question 2). As a post-hoc analysis, we also evaluated the proportion of patients with nondiscordant versus discordant relationships, using categorical levels of dyadic adjustment. Third, as a post-hoc analysis, we tested the correspondence of change in continuous DYS and depression scores from pre- to post-CT using a Pearson correlation (Study Question 3). Finally, we tested cross-lagged relations between continuous depressive symptoms and DYS scores from pre- to mid-, and from mid- to post-CT, using a structural equation model (Study Question 4). We evaluated this model's fit using the root mean square error of approximation (RMSEA), goodness of fit index (GFI), and comparative fit index (CFI). All described analyses were a priori, except where indicated above.

Results

IS PRETREATMENT DYADIC DISCORD ASSOCIATED WITH CT OUTCOMES?

Yes, dyadic discord is associated with some, but not all, CT outcomes. Pretreatment dyadic discord was not associated with the completion of CT (beta = 0.008, *SE* = 0.008, $p = .32$) or response to CT (beta = -0.007, *SE* = 0.006, $p = .22$) in logistic regression models. However, pretreatment dyadic discord was associated with more depressive symptoms post-CT (beta = 0.114, *SE* = 0.043, $p = .01$, $r = .19$), in a linear regression model. This effect remained significant after controlling for pre-CT depressive symptoms (beta = 0.083, *SE* = 0.042, $p = .048$, $r = .14$).

Parallel analyses substituting categorically defined dyadic discord (coded 1 = discordant, 0 = not discordant) for the continuous DYS score produced the same pattern of findings: Pretreatment discord was not associated with CT completion (beta = 0.107, *SE* = 0.354, $p = .76$) or response (beta = -0.411, *SE* = 0.291, $p = .16$). However, categorically defined pretreatment discord was associated with higher depressive symptoms post-CT (beta = 5.727, *SE* = 2.032, $p = .005$, $r = .21$), and this finding survived adjustment for pretreatment depressive symptom severity (beta = 4.188, *SE* = 1.962, $p = .03$, $r = .15$).

DOES DYADIC DISCORD DECREASE DURING INDIVIDUAL CT?

Yes, dyadic discord does decrease during CT. We analyzed change in continuous DYS scores and proportion of patients who were in discordant versus nondiscordant levels of dyadic adjustment using repeated-measures multilevel linear and logistic models, respectively. In the linear model of continuous scores, mean dyadic discord decreased significantly, $F(2, 410) = 35.56$, $p < .001$. Similarly, in the logistic model of categorical discord, the proportion of patients with discordant relationships decreased significantly, $F(2, 1035) = 11.92$, $p < .001$, during CT (Figure 2). Post-hoc pairwise comparisons indicated that pre-CT values differed from both the mid-point and post-CT values, $ps < .001$, two-tailed, but the mid-point and post-CT values did not differ from one another, $ps > .25$. From before to after CT, effect sizes for the decrease in dyadic discord (increases in DYS total scores from 89.26 to 96.42, $d = 0.31$) and the decrease in the proportion of discordant relationships (from 58.9% to 49.1%, odds ratio = 0.67) were relatively small.

Among the subset of patients with dichotomously defined relationship discord pre-CT, an estimated 23.3% moved into the nondiscordant range on the

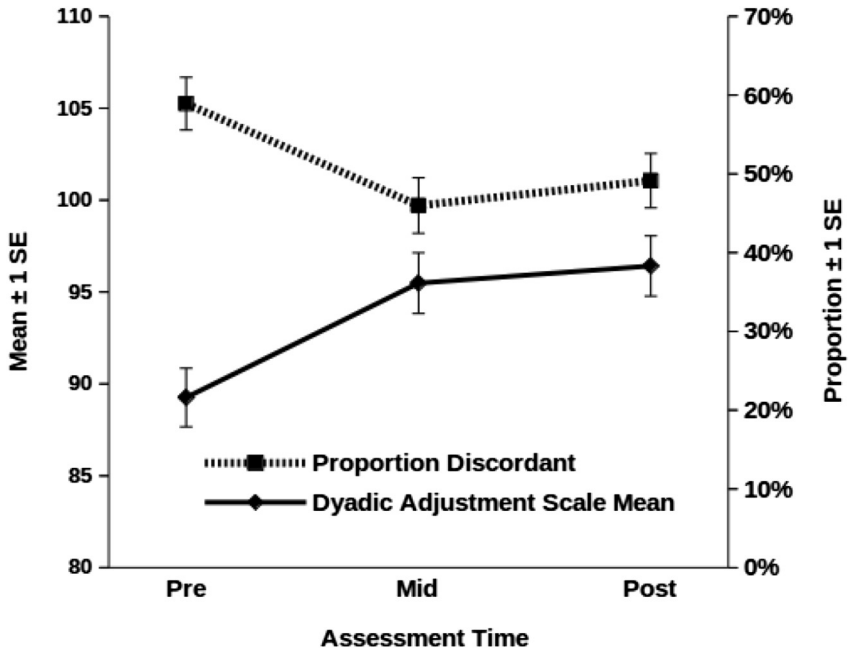

FIGURE 2 Dyadic discord decreased during acute-phase CT for depression. Discord was operationalized in two ways, as continuous scores on the Dyadic Adjustment Scale (higher scores mark lower discord) and as the proportion of patients with Dyadic Adjust Scale scores ≤ 97.

DYS post-CT. A somewhat smaller proportion (19.5%) both moved from the discordant to the nondiscordant range and had an increase in continuous DYS scores (indicating a reduction in dyadic discord) of at least 10 points, exceeding the measure's reliable change threshold (Jacobson & Truax, 1991).

DO PATIENTS WITH GREATER REDUCTION OF DYADIC DISCORD EXPERIENCE LARGER DECREASES IN DEPRESSIVE SYMPTOMS?

Yes; there is a small-to-moderate relation between reduction in dyadic discord and decreases in measures of depressive symptoms, again demonstrating a positive association between dyadic discord and depressive symptoms. The correlation between changes in decreases in continuously scaled dyadic discord and depressive symptom scores from pre- to post-CT was $r = .17$, $p = .03$. Thus, reduction in dyadic discord was related to, but far from redundant with, reduction in depressive symptoms.

DOES DYADIC DISCORD MEDIATE CHANGES IN DEPRESSIVE SYMPTOMS OR VICE VERSA?

There was limited evidence that dyadic discord mediated changes in depressive symptoms during the first (but not second) half of CT, but no evidence that depressive symptoms mediated changes in dyadic discord during either half of CT. We tested whether dyadic discord predicted subsequent changes in depressive symptoms and vice versa in a cross-lagged path analysis. The model shown in Figure 3 fit well, RMSEA = 0.04, GFI = 1.00, CFI = 1.00. Dyadic discord and depressive symptoms were significantly positively correlated before ($r = .14$) and after ($r = .11$) acute-phase CT. Moreover, lower pre-CT dyadic discord significantly predicted decreases in depressive symptoms from pre- to mid-CT ($r = .15$). However, mid-CT dyadic discord did not significantly predict changes in depressive symptoms during the second half of CT. Finally, depressive symptoms did not significantly predict changes in dyadic discord in the first or second half of CT.

Discussion

Building on prior work showing baseline dyadic discord was associated with higher depressive symptoms and reduced likelihood of depression remission after CT (Denton et al., 2010; Miller et al., 1998; Whisman, 2001), we tested the bidirectional relationship between dyadic discord and depressive symptoms during acute phase CT. In accordance with prior research, pretreatment dyadic discord was associated with greater depressive symptoms after CT, even after controlling for baseline depressive symptoms. Dyadic discord after (and at the midpoint of) therapy was lower than that before treatment. Furthermore, the correlation

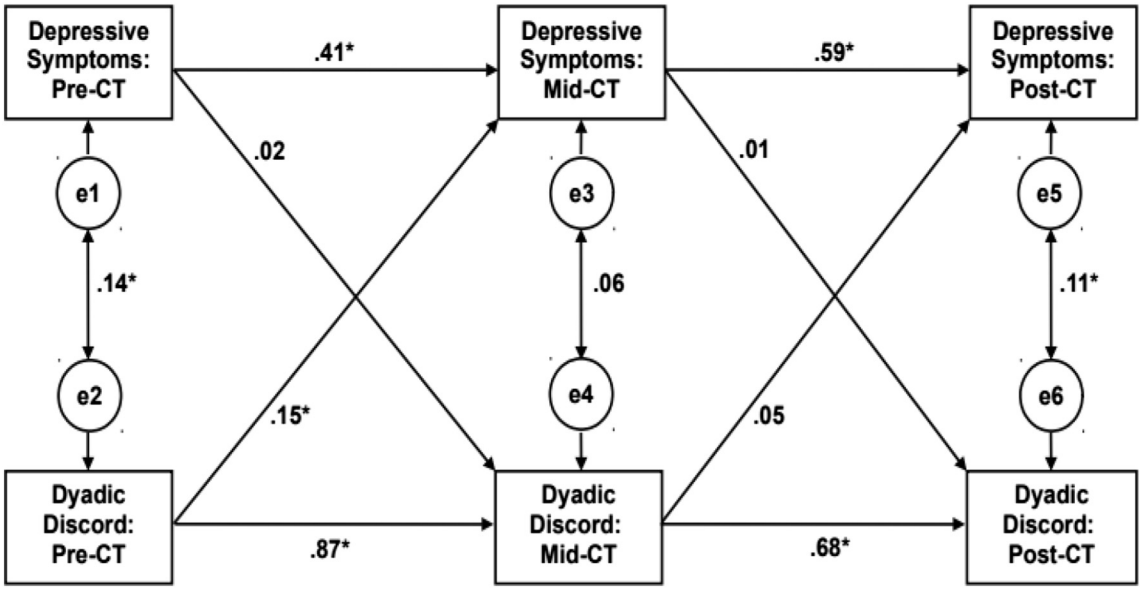

FIGURE 3 Standardized relations between continuously-scaled dyadic discord and depressive symptom severity during acute-phase cognitive therapy for depression (N = 219). Lag-2 retest (pre/post) correlations for discord and symptoms also modeled but not depicted. * $p < .05$, two-tailed.

between pre-to-post CT changes in depressive symptoms and dyadic discord was statistically significant, with an effect size between the small-to-medium range. In fact, nearly all significant associations were of a small statistical effect size, but nonetheless comparable and sometimes higher than other esteemed, clinically important public health and mental health findings (Meyer et al., 2001; Rutledge & Loh, 2004).

These findings suggest that acute phase CT is associated with depressive symptom reduction that may also confer reductions in dyadic discord, at least from the perspective of the partner who presents for CT. Nonetheless, the pre/post-test design precludes determining that CT causes depressive symptom and/or dyadic discord reduction, and recent prior research has indicated that after controlling for non-specific therapy factors (i.e., therapist empathy), psychotherapies such as CT failed to demonstrate a clinical depressive symptom response when compared to wait-list controls (Palpacuer et al., 2017). However, non-specific factors such as therapist empathy and therapist/client trust are also a hallmark of CT (Beck et al., 1979) and substantial prior research has indicated that CT reduces depressive symptoms when compared to wait-list control groups (Hofmann et al., 2012). Taken together, the current study lacking a control group cannot definitively state that CT causes a reduction in depressive symptoms and/or dyadic discord, but our results are in a similar direction as prior research using wait-list control groups that has stated so (i.e., Beach & O'Leary, 1992; Hofmann et al., 2012). The extent to which nonspecific, CT-specific, and nontreatment (e.g., life events, regression to the mean) processes produce decreases in dyadic discord among coupled patients with recurrent MDD is an important topic for empirical clarification in future controlled clinical trials.

The finding that dyadic discord was not associated with post-CT response replicates Vittengl et al. (2004), who found a nonsignificant relationship between pre-CT relationship discord and response to CT among outpatients with recurrent depression receiving acute CT, but differs from that by Denton and colleagues (2010), who studied outpatients with chronic depression and used a different form of psychotherapy. They showed that pretreatment dyadic discord was associated with reduced depression remission following antidepressant medication; Cognitive Behavioral Analysis System of Psychotherapy, a form of psychotherapy for chronic depression; or their combination. Furthermore, dyadic discord improved from baseline to end of treatment in all groups, except for the group receiving antidepressant medication, where dyadic discord was more frequent at study exit.

The current results that pretreatment dyadic discord was associated with higher posttreatment depressive symptoms among depressed outpatients replicates that of prior research (Whisman, 2001) showing a moderate association between pretreatment dyadic discord and changes in depression

severity across four kinds of depression treatment, both at the treatment end and at 6-month follow-up. Whisman also found that marital adjustment improved after all four kinds of depression treatments—interpersonal psychotherapy, cognitive therapy, antidepressant plus clinical management and placebo plus clinical management—but that changes in depressive symptoms mediated this relationship, a finding that our study did not replicate. Differences in analytic approaches might explain the divergent findings, as our study used cross-lagged path analyses and investigated the midpoint of therapy, while the Whisman study used repeated measure ANOVAs and only examined pre- and posttreatment effects. It is noteworthy that in our study, dyadic discord was associated with symptom reduction but not with formal CT response and suggests that dyadic discord alone might be related to symptom improvement, but not enough reduction to achieve the absence of a DSM-IV diagnosis of MDD at an established threshold level, a possibility that Whisman did not test.

Our results also showed that dyadic discord improved both after CT and at the midpoint of CT, compared with pretreatment discord values. We further determined that, after completing CT, 23% of initially discordant couples moved to nondiscordant status using a categorical definition of discord, with 20% also having crossed the measure's defined reliable change threshold (Jacobson & Truax, 1991). These findings are consistent with earlier findings that the severity of dyadic discord improved after CT (Vittengl et al., 2004; Whisman, 2001) but extend such research by indicating that discord also improves by the midpoint of CT. It is also important to note, however, that the average level of post-CT dyadic discord was still in the discordant range (DYS scores of ≤ 97), and that 49% of couples were still discordant after CT. There is therefore clearly additional room for CT to reduce dyadic discord so as to also reduce the risk of depressive relapse, especially given prior research that both pre- and posttreatment dyadic discord are associated with higher levels of depressive symptoms at follow-up (Whisman, 2001). One efficacious approach to improve dyadic discord and depressive symptoms may be through the use of a dyadic intervention involving a depressed partner that utilizes CBT, problem solving, and effective communication-training modules and that also involves both partners simultaneously in treatment (i.e.,Cohen et al., 2010; Cohen et al., 2014).

Interestingly, studies comparing CT to behavioral marital therapy (i.e., with couples) have not found that CT was associated with an improvement in the severity of dyadic discord (Jacobson et al., 1991; O'Leary & Beach, 1990). Whether addressing relationship issues more directly during CT for recurrent MDD or having the partner present would increase the stability of response is an interesting but untested question, although interventions involving both partners have recently been tested (Cohen et al., 2010; Cohen et al., 2014). Nonetheless, such work is also in line with the recent emphasis on partner-assisted interventions (Baucom, Belus, Adelman, Fischer, & Paprocki, 2014; Brandon et al., 2012; Whisman & Baucom, 2012) to bring both members of a couple in for treatment of one member's psychopathology (such as depression and anxiety) that are commonly treated at the individual level.

Although previously it was reported that improvement in dyadic discord is mediated by improvement in depressive severity (Denton et al., 2010; Whisman, 2001), our results did not confirm this, as we found no evidence for depressive symptoms mediating dyadic discord change, in either the earlier or later portions of CT. However, we found that lower pretreatment dyadic discord was associated with decreases in depressive symptoms at the CT midpoint.

These results confirm prior findings that a significant amount of symptom improvement happens within the early phases (i.e., first 4–8 sessions) of CT (Ilardi & Craighead, 1994; Strunk, Brotman, & DeRubeis, 2010; Tang & DeRubeis, 1999) and suggest merit in identifying the conditions under which brief interventions for depression (e.g., brief behavioral activation: Hopko, Lejuez, LePage, Hopko, & McNeil, 2003; Lejuez, Hopko, Acierno, Daughters, & Pagoto, 2011) can improve outcomes, among some people with subtypes of depression. Mid-CT dyadic discord, however, did not significantly predict changes in depressive symptoms during the second half of CT, perhaps because the majority of improvement occurred earlier in treatment.

Study strengths include a large sample size with careful assessment and follow-up, and well-trained, experienced therapists with ample access to continued consultation. At the same time, our analysis is limited by reliance on a pre/post open trial rather than a randomized controlled trial with either a positive or negative control comparator. Thus, we are unable to make causal claims that CT solely caused or improved depressive symptoms or reduced dyadic discord with such a design.

Other limitations involve the inclusion/exclusion criteria that limit external validity. Although including participants who endorsed being partnered and in a committed cohabiting or marital relationship represents a conservative approach toward

investigating how dyadic discord impacts depression treatment outcomes, this approach meant that we did not include participants with other types of partnerships (e.g., dating but not yet cohabiting). Additional limits on generalizability are the fact that study therapists and patients were predominantly Caucasian, and that study participants must have experienced recurrent depression. Finally, we have no measures of the partner's mental health or perceptions of relationship discord, such that our study on dyadic discord only includes data from one member of the dyad. Future research may evaluate similar questions with a more diverse sample in terms of depression course and history and demographic factors, including ethnicity and relationship status, and could also include positive or negative interventional comparators.

CONCLUSION

In conclusion, this study adds to understanding the role of dyadic discord in CT treatment. While in this sample we found no support for either midpoint dyadic discord or midpoint depressive symptoms mediating changes in depressive symptoms or dyadic discord, respectively, there was evidence that dyadic discord was associated with changes in depressive symptoms during the first half of CT. Results replicated the finding that CT provided to individuals is associated with the reduction of symptoms and frequency of MDD and is also associated with reductions in patients' negative perceptions of their marital/cohabitating relationship. Future research can evaluate the extent to which CT can be enhanced by including the partner as a collateral and/or coach during CT (Baucom et al., 2014; Beck, 1988; Whisman & Baucom, 2012; Whisman & Beach, 2012), as greater understanding of the dyad can be gained by assessing characteristics and processes involved in mental health from the perspective of the patient presenting for CT and their partner.

Conflict of Interest Statement

Dr. Trombello currently owns stock in Merck and Gilead Sciences, both of which are unrelated to the current manuscript. Dr. Vittengl is a paid reviewer for UpToDate. Dr. Thase reports the following relationships over the past three years: Advisory/Consultant—Acadia, Akili Interactive, Alkermes, Allergan (Forest, Naurex), AstraZeneca, Cerecor, Eli Lilly & Co., Gerson Lehrman Group, Fabre-Kramer, Guidepoint Global, Janssen (Johnson &Johnson), Lundbeck, Moksha8, MedAvante, Merck, Nestlé, Neuralstem, Novartis, Otsuka, Pfizer, Sunovion, and Takeda. Grant Support—Acadia, AHRQ, Alkermes, Assurex, Avanir, Axome, Forest Pharmaceuticals, Intracellular, Janssen, NIMH, Otsuka, PCORI and Takeda. Royalties—American Psychiatric Press Inc., Guilford Publications, Herald House, and W.W. Norton & Company, Inc. Employment — Dr. Thase's spouse works for Peleton Advantage, which does business with Pfizer, Astra Zeneca, and GSK. Dr. Jarrett's medical center collects the payments from the cognitive therapy she provides to patients. Dr. Jarrett is a paid consultant to the NIH, NIMH, and UpToDate. Drs. Denton and Minhajuddin have no disclosures to report.

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