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Acute Phase Cognitive Therapy for Recurrent Major Depressive Disorder: Who Drops Out and How Much do Patient Skills Influence Response?

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Abstract

Objective—The aims were to predict cognitive therapy (CT) noncompletion and to determine, relative to other putative predictors, the extent to which the patient skills in CT for recurrent major depressive disorder predicted response in a large, two-site trial.

Method—Among 523 outpatients aged 18-70, exposed to 12-14 weeks of CT, 21.6% dropped out. Of the 410 completers, 26.1% did not respond. To predict these outcomes, we conducted logistic regression analyses of demographics, pre-treatment illness characteristics and psychosocial measures, and mid-treatment therapeutic alliance.

Results—The 17-item Hamilton Rating Scale for Depression ($HRSD_{17}$) scores at entry predicted drop-out and nonresponse. Patients working for pay, of non-Hispanic white race, who were older, or had more education were significantly more likely to complete. Controlling for $HRSD_{17}$,

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We examined the rates of cognitive therapy (CT) non/completion and determined the extent to which the patient skills in CT for recurrent major depressive disorder predicted response in a large, two-site open trial, relative to other putative predictors.

significant predictors of nonresponse included: lower scores on the Skills of Cognitive Therapy-Observer Version (SoCT-O), not working for pay, history of only two depressive episodes, greater pre-treatment social impairment. Mid-phase symptom reduction was a strong predictor of final outcome.

Conclusions—These prognostic indicators forecast which patients tend to be optimal candidates for standard CT, as well as which patients *may* benefit from changes in therapy, its focus, or from alternate modalities of treatment. Pending replication, the findings underscore the importance of promoting patients' understanding and use of CT skills, as well as reducing depressive symptoms early. Future research may determine the extent to which these findings generalize to other therapies, providers who vary in competency, and patients with other depressive subtypes or disorders.

Keywords

depression; cognitive therapy; predictors; patient skills; response patterns; attrition

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The significant morbidity, social, and emotional costs of major depressive disorder (MDD) are well documented and are widely judged to constitute an important public health problem (Kessler et al., 2006; Kessler, Berglund, Demler, Jin, & Walters, 2005). The efficacy of cognitive therapy (CT) for improving short- and long-term outcomes in depressed adult outpatients is established (Craighead, Sheets, Brosse, & Illardi, 2007; Hollon & Shelton, 2001; Vittengl, Clark, & Jarrett, 2009). Yet within CT, completion of adequate trials and positive response are far from uniform, creating a need to understand which variables predict: a) attrition or completion and b) negative or positive responses among those patients who seek or begin CT.

This report has two aims. First, we searched for prognostic indicators of drop-out during acute phase CT in a large sample of adults presenting with recurrent MDD. Second, we tested the hypothesis that among patients with a full exposure to CT a higher level of their comprehension and use of CT skills will remain significant in accounting for variance in response, even in the presence of candidate predictors in four "competing" domains: a) demographics, b) pretreatment illness characteristics, c) pretreatment cognitive and interpersonal characteristics, and d) therapeutic alliance measured at the midpoint.

Discovering which variables predict the outcomes of antidepressant interventions has consumed depression research for several decades. To date, the research has been equivocal in identifying reliable predictors of CT response and dropout, as evident in comprehensive reviews (Driessen & Hollon, 2010; Hamilton & Dobson, 2002). Below we report findings relevant to the models developed.

Robust demographic predictors of CT attrition have been hard to find. Arnow and colleagues (2007) looked for predictors in the 156 dropouts within the 681 patients in the first large scale trial of Cognitive Behavioral Analysis System of Psychotherapy (CBASP). Low income, minority status, and young age predicted dropout for antidepressant medication, CBASP, and these treatments combined (Arnow et al., 2007). Falconnier (2009) reported that socioeconomic status did not predict attrition from interpersonal psychotherapy (IPT), cognitive behavior therapy (CBT), imipramine hydrochloride plus clinical management, or placebo plus clinical management, as tested in the National Institute of Mental Health (NIMH) Treatment of Depression Collaborative Research Program. Similarly, Carter et al. (2011) did not find that demographics predicted attrition in 177 adults with MDD receiving IPT or CBT.

Illness characteristics, such as chronic depression and comorbid diagnoses, have also been examined as predictors of attrition. In Fournier et al.'s study (2009) of 180 depressed outpatients receiving CT or antidepressant medication (ADM), patients with chronic depression were less likely to dropout than those with non-chronic depression. Persons, Burns, and Perloff (1988) found that in 70 private practice patients, approximately half dropped out before 12 weeks of CT; comorbid personality disorders, high pretreatment Beck Depression Inventory (BDI; (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961)) scores, and lack of endogenous symptoms predicted dropout. Arnow and colleagues (2007) found that patients with comorbid anxiety were more likely to dropout from antidepressant medication alone, but not from CBSAP. Comorbid personality disorders did not predict attrition in any treatment, but dropouts had significantly lower early therapeutic alliance scores than patients who completed CBASP. Similarly, Fournier and colleagues (2009) also found that patients who dropped out of psychotherapy had significantly lower therapeutic alliance scores.

Turning now to patients who had full exposure to CT, we wanted to test the hypothesis that patient skill and comprehension of CT predicts response even in the presence of other potential predictors. We reasoned that cognitive therapists tend to adopt a very optimistic stance when initiating CT. Specifically, as therapists, we assume that if we can teach patients to comprehend and use CT well enough, then depressive symptoms will decrease and good outcomes will follow, regardless of patients' "other" characteristics. Data on this central CT hypothesis are limited. We reason that this test is important because within the theory and practice of CT, the patient's comprehension and use of CT skill are assumed to play a fundamental role in moderating outcomes. Some may argue that CT skills play *the most fundamental role in influencing outcome*.

In fact, high levels of patient comprehension and use of CT skills have predicted response in *this* large acute phase sample (Jarrett, Vittengl, Thase, & Clark, 2011). Here we expanded this observation by exploring the extent to which patient skill predicts response in relation to other competing predictors (i.e.,both those that are changeable and those that are static).

In predicting nonresponse within Hamilton and Dobson's review (2002), marital status was the only consistent demographic predictor of treatment outcome. For example, married patients had fewer depressive symptoms at the end of CT than patients who were divorced, separated, or never married (Jarrett, Eaves, Grannemann, & Rush, 1991). Similarly, Fournier and colleagues (2009) found that married patients, as well as unemployed patients, had fewer residual symptoms after CT than after ADM. They also found that patients with lower intelligence and higher age had more residual symptoms following either type of treatment. Conversely, Carter and colleagues (2011) did not find any demographic characteristics (i.e., age, marital status, and gender) to predict response in 177 depressed patients receiving 16 weeks of either CT or IPT.

Several illness characteristics have consistently predicted therapeutic response: pretreatment symptom severity, age at onset, number of lifetime episodes, and comorbidity (Hamilton & Dobson, 2002). Pretreatment depression severity was associated with slower remission, more depressive symptoms throughout treatment, and higher HRSD and BDI scores post-CT (Jarrett et al., 1991; J. B. Persons, Bostrom, & Bertagnolli, 1999; Shea, Elkin, & Sotsky, 1999; Thase, Simons, Cahalane, McGeary, & Harden, 1991). Younger age of onset was associated with poorer response and less remission post-CT (Shea et al., 1999; Sotsky et al., 1991). Patients with multiple previous depressive episodes have responded worse (Thase et al., 1992). Patients with comorbid psychiatric disorders, such as anxiety or double depression, typically had worse outcomes (Gelhart & King, 2001; Laberge, Gauthier, Cote, & Plamondon, 1993), but it is noteworthy that null results have been reported also (Smits, Minhajuddin, & Jarrett, 2009).

Fournier and colleagues (2009) found that patients who had chronic depression responded worse to both CT and ADM, as shown by higher endpoint HRSD scores. Carter and colleagues (2011) found that 177 patients with recurrent depression had lower percent improvement on the Montgomery Asberg Depression Rating Scale (MADRS; (Montgomery & Asberg, 1979)) after either IPT or CBT. Symptoms of comorbid personality disorders predicted decreased response in patients receiving IPT, but did not influence the effect of CBT.

Within the cognitive domain, dysfunctional attitudes, and in the interpersonal domain, social adjustment, have been examined as predictors of treatment response and dropout. Hamilton and Dobson (2002) noted growing evidence that high levels of dysfunctional attitudes predict poor response to CT (Jarrett et al., 1991; Keller, 1983; Simons, Gordon, Monroe, & Thase, 1995; Sotsky et al., 1991). At the same time, Spangler, Simons, Monroe, and Thase (1997) found no relationship between Dysfunctional Attitudes Scale (DAS; (A. N. Weissman, 1979)) scores and outcome, as assessed by final HRSD scores in 53 depressed outpatients receiving CT. Carter and colleagues (2011), in contrast, found that the DAS predicted lower percent improvement on MADRS. Additionally, one interpersonal variable, the level of satisfaction subscale on the Social Adjustment Scale –Self Report (SAS-SR; (M. M. Weissman & Bothwell, 1976)) predicted response, whereby moderate satisfaction increased percent improvement on the MADRS.

Not only have psychotherapy researchers looked for predictors of outcome among pretreatment patient characteristics, but they have also investigated process variables (Krupnick et al., 1996; Martin, Garske, & Davis, 2000; Strunk, Brotman, & DeRubeis, 2010). For example, There is accumulating evidence that early or rapid response reliably predicts response to CT (Ilardi & Craighead, 1994; Lewis, Simons, and Kim, 2012). Also at a process level, clinical raters scored videotapes of 225 patients receiving IPT, CBT, or blinded imipramine or placebo plus clinical management within the NIMH Treatment of Depression Collaborative Research Program. Across treatments, high therapeutic alliance predicted improved outcome (defined by scores on the HRSD and the BDI) (Krupnick et al., 1996). Martin and colleagues (2000) conducted a meta-analysis of 79 studies finding that therapeutic alliance predicted outcome regardless of measurement type or other moderators tested. Strunk and associates (2010) found that therapeutic alliance was associated with prior symptom improvements during CT.

Persons et al. (1988) found that in 70 private practice patients with depression who received CT, homework completion predicted percent reduction in BDI scores. Similarly, Bryant, Simons, and Thase (1999) found that homework completion predicted outcome. Specifically, ratings of homework compliance from 26 CT sessions significantly predicted percentage of change in $HRSD_{17}$ scores from pre- to post-treatment and residual change in $HRSD_{17}$ scores.

In summary, which patients complete and respond to CT is an open question. The purpose here was to identify predictors of non/completion in a large open trial of CT for adults with recurrent MDD. Further, among the remaining patients with a full exposure to CT, we tested the hypothesis that high levels of CT skill usage and comprehension will account for variance in response, even in the presence of other prognostic predictors, within each competing domain. Candidate prognostic indicators pre-treatment include demographic, illness (both static), and interpersonal/cognitive domains (potentially changeable during therapy).

Method

Data in this report were taken from the Continuation Phase Cognitive Therapy Relapse Prevention (C-CT-RP) Trial registered at ClinicalTrials.gov (NCT00118404, NCT00183664, and NCT00218764). The C-CT-RP evaluates the durability of 8-month continuation phase therapies (continuation phase CT, fluoxetine, or pill placebo) in randomized responders at higher risk for relapse/recurrence. Below we describe the methods relevant to the diagnostic evaluations and acute phase CT. Refer to Jarrett and Thase (2010) for methods of all phases.

Patients

Consenting male and female outpatients aged 18 to 70 years were both self- and practitioner-referred to the Department of Psychiatry, Psychosocial Research and Depression Clinic at The University of Texas Southwestern Medical Center (Principal Investigator: Robin B. Jarrett, Ph.D.) and to the Mood Disorders Treatment Research Program at the Western Psychiatric Institute and Clinic of the University of Pittsburgh Medical Center (Principal Investigators: Michael E. Thase, M.D. and Edward S. Friedman, M.D.).

Patients were diagnosed with recurrent MDD by the Structured Clinical Interview (SCID-I; (First, Spitzer, Gibbon, & Williams, 1996)) for the Diagnostic and Statistical Manual (DSM-IV; (American Psychiatric Association, 1994)). Included patients met the following criteria: (a) had previously remitted between depressive episodes, had at least one prior depressive episode with complete inter-episode recovery, or had antecedent dysthymic disorder, and (b) scored 14 or more on the $HRSD_{17}$ at the initial and second interview.[1]

Excluded patients evidenced one or more of the following characteristics: (a) had concurrent medical conditions that could cause depression or required medication that could cause depressive symptoms; (b) had concurrent DSM-IV psychiatric disorders including: any psychotic or organic mental disorder, bipolar disorder, alcohol or drug dependence, predominant obsessive compulsive disorder or eating disorders; (c) were not literate in English; (d) were an active suicide risk; (e) had previously not responded to an adequately administered trial of CT or fluoxetine; (f) were pregnant or planned to become pregnant; or (g) did not provide written informed consent.

Five hundred twenty-three patients consented verbally and in writing to the IRB-approved CT protocol. Patients were withdrawn from any psychotropic medications at least one week before entering the study, and pharmacotherapy was not provided within the acute phase.

Sample Formation

We used an intention to treat sample of n = 523 to build predictive models for acute phase completion versus dropout. However, to build predictive models for acute phase response, we used a reduced sample of n = 410 CT completers, as we wanted to build the models among patients who have undergone a complete course of acute phase CT. This “adequate exposure sample” enabled us to include patients’ learning and use of CT skills (measured at mid-treatment) as predictors because the patients had sufficient exposure to CT concepts and skills.

[1]Two patients entered CT with $HRSD_{17}$ = 13 at one of the two diagnostic visits; of these during CT one responded and one dropped out.

Procedure

During the diagnostic phase patients completed assessments (detailed below) from the four predictor domains: a) demographics, b) illness history and severity, c) pre-treatment cognitive and social functioning, and d) mid-treatment processes (i.e., therapeutic alliance and patient use of and competence in CT skills).

Patients received 12 – 14 weeks of CT, conducted in accordance with Beck's treatment manual (Beck, Rush, Shaw, & Emery, 1979) by 16 experienced therapists whose Cognitive Therapy Scale (Young & Beck, 1980) scores, measuring competence, were routinely above 39, (Mode= 44.0; grand Mean = 45.9; Standard Deviation = 5.6). The first eight sessions occurred twice weekly. At Session 9, patients who exhibited ≥ 40% reduction in pre-treatment $HRSD_{17}$ scores began weekly sessions, whereas patients who had not yet achieved that level of improvement continued to receive twice weekly sessions for four more weeks.

In addition to CT sessions, patients attended two psychoeducational sessions, one before beginning therapy and the second approximately one week after CT Session 11. Through these visits, research staff: (a) taught important facts about the risk of relapse/recurrence in recurrent MDD, (b) reviewed the protocol treatment and visit plan, (c) verified informed consent, and (d) collected patient questionnaires and clinician ratings.

For patients taking psychoactive medications at the time of enrollment, all medications had to be discontinued prior to beginning CT and no psychoactive medications were prescribed during the acute phase CT protocol.

Measures

Candidate Predictors

Demographic Domain: Using a questionnaire, patients recorded their gender, age, race/ethnicity, marital and employment status, and years of education.

History of Illness Domain: Prior to CT, experienced evaluators collected characteristics of the history of psychiatric illnesses, including the current depressive episode. The SCID-I (First et al., 1996) with Psychotic Screen was used to systematically assess DSM-IV criteria for each disorder. Clinician raters using the $HRSD_{17}$ assessed depressive symptom severity on 3- or 5-point scales. The total score is a sum of the items, with higher scores reflecting greater severity. The current report used up to 19 $HRSD_{17}$ scores for each patient, collected from diagnostic phase to randomization (at end of acute phase); alpha internal consistency was acceptable (M = .75, median = .80, range = .49 - .84)

With respect to MDD, the evaluator recorded age of onset in years, length of illness in years, length of the current episode in months, and number of episodes. In addition, the evaluator assessed current and lifetime DSM-IV comorbid diagnoses, current diagnosis of double depression (major depressive disorder with dysthymia), DSM-IV melancholia, Research Diagnostic Criteria (RDC; Spitzer, Endicott, & Robins, 1978) for endogenous definite subtype, primary versus secondary depression diagnosis, and family history (Winkour, 1979; Winkour, Behar, van Valkenberg, & Lowry, 1978). In these analyses, family history was coded positive when the patient reported that a family member suffered from significant symptoms of a mood disorder, alcohol or drug abuse, or sociopathy.

Cognitive and Interpersonal Domain: The Attributional Style Questionnaire (ASQ; (Dykema, Bergbower, Doctora, & Peterson, 1996)) measures the extent to which the patient attributes the cause of negative events to global versus specific and stable versus unstable factors. This 12-item measure is completed by the patient on scales ranging from −3 to 3.

Higher scores indicate more stable or more global attributions. The current report used the ASQ from the diagnostic phase; alpha internal consistency was acceptable (global scale = .79, stable scale = .81). The Dysfunctional Attitudes Scale (DAS - Form A; (A. N. Weissman, 1979)) is a 40-item, self-report measure of the so-called "silent assumptions" frequent during depression. Patients rate statements related to self-worth, relationships, and requirements for happiness on a 7-point Likert scale ranging from "totally agree" to "totally disagree." Higher scores indicate more dysfunctional attitudes. The current report used the DAS from the diagnostic phase; alpha internal consistency was .93. The Inventory of Interpersonal Problems (IIP; (Horowitz, Rosenberg, Baer, Ureno, & Villasenor, 1988)) is a 127-item self-report measure where patients rate the distress associated with relationship problems on a 5-point Likert scale ranging from "not at all distressing" to "extremely distressing." Higher scores indicate higher levels of distress. The current report used three assessments from the diagnostic phase through first therapy session; mean alpha internal consistency for the total score was .96 (median = .97, range = .96 - .97). The Social Adjustment Scale - Self Report (SAS-SR; (M. M. Weissman & Bothwell, 1976)) is a 42-item self-report measure on the levels of satisfaction with their social roles. Items are rated on a 5-point scale, with higher scores indicating less adjustment. The current report used the SAS-SR from the diagnostic phase; alpha internal consistency for the total score was .80.

Process Domain: The Working Alliance Inventory - Therapist Version (WAI-T) and Client Version (WAI-C) are 36-item measures of the quality of the alliance between a client and therapist, completed as self-report measures from both perspectives (Horvath & Greenberg, 1989). The current report used both the WAI-T scores from two mid-acute phase sessions and WAI-C scores from one mid-acute phase session; mean alpha internal consistency for WAI-T was .95 (median = .95, range = .94 - .96) and for WAI-C was 0.94. The Skills of Cognitive Therapy – Patient & Observer Versions (SoCT-P & O; (Jarrett et al., 2011)) are 8-item measures of patient's understanding and use of cognitive therapy skills, as rated by patients and their therapists. (The SoCT was created in this trial from an original pool of 35 items, and reliability and validity of both shortened versions have been documented (Jarrett et al., 2011)). The 8 items included ratings of the patient's understanding of basic CT principles and the cognitive model, including such constructs as identifying automatic thoughts and assumptions, logical restructuring, and behavioral tests of cognition. The current report makes use of the 8-item SoCT-O, rated by the patient's therapist at a mid-acute phase session and the 8-item SoCT-P from the psychoeducational visit; mean alpha internal consistency for the SoCT-O was .90 (median = .90, range = .87 - .92). We also included a measure of mid-treatment improvement in depressive symptoms, defined as ≥ 50% reduction in pre-treatment $HRSD_{17}$ at approximately week 6.

Candidate Predictors: Summary

Patient's gender, race/ethnicity, age, martial and employment status, and education in years at diagnostic evaluation comprise the demographic domain. Marital status is defined as "partnered," if married or cohabiting, while all other patients were classified as "not partnered." Age of onset in years, length of illness in years, length of the current episode in months, number of episodes, current and lifetime DSM-IV comorbid diagnoses, current diagnosis of double depression, DSM-IV melancholia, RDC endogenous definite subtype, RDC primary versus secondary depression diagnosis, and positive family history (i.e., mood disorder, alcohol or drug abuse, or sociopathy) were included in the illness domain. The cognitive domain included pre-treatment ASQ global and stable subscales and DAS scores, while pre-treatment SAS-SR and IIP scores were included in the social-interpersonal domain. The process domain included the WAI-T and WAI-C scores as well as the measure of mid-treatment improvement in depressive symptoms (≥ 50% reduction in pretreatment

$HRSD_{17}$ by week 6 of CT). The SoCT-O and SoCT-P scores were included in all four domains of candidate predictors.

Definitions of Outcomes

Noncompleter—Patients who did not complete at least 14 of 16 or 18 of 20 planned CT sessions were categorized as noncompleters. Otherwise, a patient was considered a completer.

Nonresponder—CT completers who attended the first blinded evaluation ($n = 395$) were considered nonresponders if they (a) still met DSM-IV criteria for a Major Depressive Episode (MDE) and/or (b) scored >12 on the $HRSD_{17}$. In order to approximate an intention to treat sample, we used the following hierarchy to further define nonresponse. If a patient exited before the final CT session and completed a blind evaluation within four weeks of exit ($n = 11$), the $HRSD_{17}$ and MDE data from that visit was used to define response; if not, the final acute phase $HRSD_{17}$ and the final acute phase MDE completed by the treating therapist was used ($n = 42$). If the final MDE status completed by the treating therapist was not available, then a proxy based on two consecutive weeks of IDS-SR was used to determined MDE status and response was defined based on final CT $HRSD_{17}$ and the proxy MDE status ($n = 45$). Finally, 30 patients who did not have two consecutive weeks of IDS-SR to determine the proxy for MDE were all classified as nonresponders based on their full evaluation $HRSD_{17}$ score and MDE status (29 of these 30 patients dropped out of CT before the second CT session and one dropped before the sixth session).

For patients who left CT early, the final $HRSD_{17}$ and the final MDE were not always collected during the same session. The $HRSD_{17}$ was collected once weekly during CT, while the MDE was collected during weeks 4, 8, and 12. The average length in days between the final $HRSD_{17}$ and the final MDE is 12.7 (median = 14 days; range = 0 - 65 days).

Statistical Methodology

The data analyzed here were collected during the acute phase of the trial. All analyses were generated using SAS software, Version 9.2 of the SAS System for Windows (SAS Institute Inc., Cary, NC, USA). Continuous variables were summarized as mean (standard deviation) while categorical variables were reported as n (%). We built four models for each CT outcome with pre-treatment predictors. First, ***within*** each of the three domains of pre-treatment putative predictors, we conducted separate multiple logistic regression analyses of the CT outcomes: 1) CT completion versus non-completion, and 2) CT response versus non-response using a backward elimination algorithm with $\alpha = 0.05$ for retaining variables. We then included all significant predictors from each domain to build a multivariate logistic regression model ***across domains*.** Since the number of candidate predictors within each domain was not large, we used backward elimination ($\alpha = 0.05$) to build a more parsimonious model. This allowed us to assess the predictive ability of a candidate predictor in the presence of others despite possible interaction among them. Both models for CT completion and those for CT response were adjusted for pre-treatment $HRSD_{17}$. For the mid-treatment putative predictors, we conducted a multiple regression analysis using backward elimination ($\alpha = 0.05$) for CT non-response versus response. Results are presented as odds ratios (95% confidence interval) of CT outcomes for each model.

Following Heinze and Schemper (2003), we computed proportion of explained variances (PEV) by the significant predictors included in each of the predictive models. Specifically, we reported marginal PEV which measures the proportion of variance explained by a predictor by itself and partial PEV that measures the decline in the proportion of explained

variance if a predictor is removed from the model. As described in Heinze et. al. (2003), a comparison of relative importance of the predictors in terms of PEV is also computed using bootstrap re-sampling method.

Results

Sample Description

Patients (n = 1359) were considered for inclusion; 836 were excluded by criteria; and 523 consented to CT. The sample was 67.5% female with a mean age of 42.4 years (SD = 12.1) and 15.1 years of education (SD = 2.9); 58.1% were single; 80.9% were white (non-Hispanic), 10.3% African American, 5.2% Hispanic, and 3.6% were of other races/ethnicities. Table 1 characterizes the sample (n = 523) overall and by CT completion status. Table 2 characterizes the CT nonresponders (n=107) within the sample of completers (n = 410).

Preliminary Analyses: Pretreatment Severity and Session Attendance

Univariate Prediction of CT Non/completion by Pre-treatment $HRSD_{17}$—Mean (SD) of pre-treatment $HRSD_{17}$ for CT noncompleters was 21.2 (4.1) which was significantly higher than that for CT completers (M = 20.2, SD = 4.0, F1,521 = 6.25, $p < 0.013$; Table 1). In a simple logistic regression model for CT noncompletion as the outcome, patients with a higher pre-treatment $HRSD_{17}$ were significantly less likely to complete CT ($\chi^2 = 6.117$, $p < 0.013$, Odds Ratio (OR) = 0.937, 95% CI: 0.89, 0.99).

Univariate Prediction of CT Non/response by Pre-treatment $HRSD_{17}$—Mean (SD) of pre-treatment $HRSD_{17}$ for CT nonresponders was 21.4 (4.0) which was significantly higher than that for CT responders (M = 19.7, SD = 3.9, F1,408 = 15.16, $p < 0.001$; Table 2). In a simple logistic regression model for CT non/response as the outcome, patients with higher levels of pre-treatment $HRSD_{17}$ were significantly less likely to respond to CT ($\chi^2 = 14.15$, $p < 0.001$, OR = 0.897, 95% CI: 0.85, 0.95).

CT Completion versus Noncompletion

Amount of CT—There were 410 CT completers (78.4%) and 113 noncompleters (21.6%). The noncompleters attended an average of 5.73 sessions (SD = 4.9; median = 5.0). The 410 completers included 193 patients who had 16 planned sessions ($Mean$=15.96 sessions; SD = 0.4; median = 16) and 217 patients who had 20 planned sessions ($Mean$=19.93 sessions; SD = 0.3; median = 20).

Predictors of CT Completion

Question—What were the pre-treatment predictors of completing at least 14 out of 16 planned sessions for early responders and at least 18 of 20 planned sessions for late responders?

Demographic domain—Among the patient demographics, working for pay, non-Hispanic white race, age at study entry, and years of education were statistically significant predictors of CT completion, after controlling for pretreatment $HRSD_{17}$.

Controlling for pretreatment $HRSD_{17}$, patients are more likely to complete CT than to dropout if they are: working for pay (OR: 1.917, 95% CI: 1.20, 3.07), of non-Hispanic white race (OR: 2.692, 95% CI: 1.62, 4.48), are a year older (OR: 1.024, 95% CI: 1.00, 1.04), or had an additional year of education (OR: 1.149, 95% CI: 1.06, 1.25). Gender and marital status were not predictive of CT completion ($p > 0.46$).

In terms of proportion of explained variance (PEV), non-Hispanic, White race explains the most variance in CT non/completion (marginal PEV = 6.4%, partial PEV = 3.7%), followed by more years of education (marginal PEV = 4.9%, partial PEV = 2.5%). However, no one predictor explained significantly higher proportion of variance in CT non/completion compared to the other predictors included in the model ($p > .08$). Note that, the PEVs here measured the decline in PEV if a particular variable was removed from the full model containing all significant predictors and controlling for pre-treatment $HRSD_{17}$.

History of illness domain—Depressed patients with DSM-IV melancholia or longer length of illness were more likely to complete CT than to dropout, whereas patients with RDC endogenous definite subtype of depression were less likely to complete CT. Controlling for pretreatment $HRSD_{17}$, patients with a diagnosis of DSM-IV melancholia were more likely to complete than to dropout (OR: 2.612, 95% CI: 1.37, 4.99), while patients with a depressive subtype of RDC endogenous definite were less likely to complete CT (OR: 0.382, 95% CI: 0.21, 0.71). Additionally, patients with a year longer length of illness are more likely to complete CT compared to dropping out (OR: 1.029, 95% CI: 1.01, 1.05). Current and lifetime comorbidities, primary versus secondary diagnosis of depression (defined by Research Diagnostic Criteria; (Spitzer, Endicott, & Robins, 1978)), positive family type of depression, number of lifetime depressive episodes, length of current episode, and age of onset were not predictive ($p > 0.06$).

Among the predictors in the illness characteristics domain, length of illness explains the highest proportion of variance in the outcome of CT completion or not (marginal PEV = 1.4%, partial PEV = 1.8%). There was no significant difference in the PEVs among the predictors included in the model ($p > .11$).

Cognitive and interpersonal characteristics domain—None of the cognitive and interpersonal pretreatment characteristics predicted CT non/completion ($p > 0.14$).

Combined model across three pre-treatment domains—In the final model combining the previous three pretreatment domains, controlling for pretreatment $HRSD_{17}$, patients who were working for pay (OR: 1.943, 95% CI: 1.20, 3.14), of non-Hispanic white race (OR: 2.582, 95% CI: 1.53, 4.36), a year older (OR: 1.027, 95% CI: 1.01, 1.05), had an additional year of education (OR: 1.146, 95% CI: 1.05, 1.25), or had a diagnosis of DSM-IV melancholia (OR: 2.702, 95% CI: 1.36, 5.36) were more likely to complete CT. However, patients with an RDC definite endogenous subtype (OR: 0.423, 95% CI: 0.22, 0.81) were less likely to be complete CT compared to dropping out. Length of illness was eliminated from the combined domain model ($p > 0.25$).

The full model across all domains explained 14.4% of variability in the outcome with non-Hispanic White race explain the most (marginal PEV = 6.1%, partial PEV = 3.3%) followed by more years of education (marginal PEV = 4.5%, partial PEV = 2.1%) and working for pay (marginal PEV = 2.6%, partial PEV = 1.7%). At the other extreme, DSM-IV melancholia explains the least proportion of variance in CT non/completion (marginal PEV = 0.1%, partial PEV = 1.8%) which was significantly less than all the other predictors ($p < .05$) except RDC endogenous definite ($p= .48$). All the other predictors included in the model did not differ in terms of proportion of explained variance.

Because the diagnostic criteria for DSM-IV melancholia and RDC definite endogenous depression contain several common symptoms and are intended to measure similar construct, the discrepancy in findings was puzzling. To better understand these observations, we first confirmed that neither code was reversed and then calculated the concordance of the two subtypes. As might be expected, there was a high degree of concordance: approximately

85% of patients were either nonendogenous/nonmelancholic or definite endogenous/melancholic. We next repeated the predictor analyses for the subsets of patients who were either concordant or discordant for these subtype diagnosis. Among the concordant group, the definite endogenous/melancholic subgroup was not significantly more likely to complete treatment than the nonendogenous/nonmelancholic subgroup. Thus, the differences in prediction were explained by the relatively small subsets of patients who had discordant diagnoses: those who were definite endogenous but nonmelancholic were much more likely to drop out, whereas those who were melancholic but who did not meet RDC for definite endogenous depression were more likely to complete therapy. Examination of selected, clinically relevant characteristics revealed that the melancholic/nonendogenous patients were significantly younger and were more likely to be female than the nonmelancholic/nonendogenous patients. Groups did not differ in years of education or pretreatment symptom severity.

CT Nonresponse

Among the 410 CT completers, 107 (26.1%) met a priori study criteria for nonresponse; the remaining 303 (73.9%) were considered responders. All comparisons were adjusted for pre-treatment $HRSD_{17}$ score at the diagnostic follow-up visit). To assess if the patients' comprehension and use of cognitive therapy also predicted response to CT, we included and SoCT-P scores along with the other candidate predictors in each of the domain.

Question—What were the significant predictors of response to CT defined as 1) $HRSD_{17}$ score ≤ 12, and 2) absence of MDD at the end of CT among pretreatment patient characteristics and patients' skills of cognitive therapy?

Demographic domain: Controlling for pre-treatment $HRSD_{17}$, patients who were working for pay (OR: 1.749, 95% CI: 1.05, 2.92) and patients with higher scores on SoCT-O (OR: 2.124, 95% CI: 1.49, 3.04) were significantly more likely respond, whereas gender, race/ethnicity, marital status, age at study entry, and education were non-significant predictors of outcome ($p > 0.07$).

Total score on SoCT-O explained 4.9% (marginal PEV = 4.9%, partial PEV = 4.6%) of the variability in nonresponse to CT followed by working for pay (marginal PEV = 2.0%, partial PEV = 1.7%). The predictors included in the model did not differ in terms of PEV ($p > .19$).

History of illness domain: Controlling for pretreatment $HRSD_{17}$, patients with at least three lifetime depressive episodes were more likely to respond compared to those with only two lifetime episodes (OR: 2.36, 95% CI: 1.38, 4.04). Patients with higher SoCT-O scores are also more likely to respond (OR: 2.15, 95% CI: 1.50, 3.10). No other illness characteristic was statistically significant.

Among the predictors selected in this domain, total score of SoCT-O explains 4.9% (marginal PEV = 4.9%, partial PEV = 5.0%) of the variability in nonresponse while at least three lifetime episodes (versus two or fewer) explains 2.5% (marginal PEV = 2.5%, partial PEV = 2.7%). There was no significant difference in the PEVs for the predictors included in the model ($p > .33$).

Cognitive and interpersonal characteristics domain: Among cognitive and interpersonal variables, patients with higher total scores on the SAS-SR were less likely to respond to CT , after controlling for pretreatment $HRSD_{17}$ (OR: 0.517, 95% CI: 0.32, 0.83). However, patients with higher score on SoCT-O were more likely to respond to CT (OR: 2.002, 95%

CI: 1.48, 2.71). The ASQ global and stable subscales, DAS, and IIP scores were eliminated ($p > 0.12$).

The SoCT – Observer score explains 4.7% (marginal PEV = 4.7%, partial PEV = 3.7%) of the total variability in response versus nonresponse, while total score on SAS-SR at pre-CT explains 4.1% (marginal PEV = 4.1%, partial PEV = 1.5%). However, in terms of proportions of explained variance, there was no significant difference among the predictors included in the model (p > .32).

Combined model across three pretreatment domains: In the final combined model across three pretreatment domains, controlling for pretreatment $HRSD_{17}$, patients who had at least three depressive episodes (OR: 2.41, 95% CI: 1.40, 4.13) and patients with higher score on SoCT-O (OR: 1.98, 95% CI: 1.37, 2.87) were more likely to respond. However, patients with one unit higher score on SAS-SR pre-CT were less likely to be respond (OR: 0.53, 95% CI: 0.30, 0.93).

The full model across all domains explained 12.1% of total variability in response. Total score on SoCT-O explained 4.7% (marginal PEV = 4.7%, partial PEV = 3.7%) followed by total score on SAS-SR at pre-CT (marginal PEV = 4.1%, partial PEV = 1.3%), and at least three lifetime depressive episodes (versus two or fewer) (marginal PEV = 2.8%, partial PEV = 2.6%). However, no one predictor explained significantly higher proportion of variability in CT nonresponse (p > .26).

Mid-treatment Process Domain

Question—What mid-treatment processes predicted non-response to CT?

Mid-treatment process domain: In the process domain, after controlling for pretreatment depression severity, mid-treatment SoCT-O scores and achieving at least a 50% reduction in pre-treatment $HRSD_{17}$ scores by mid-treatment significantly predicted CT nonresponse. The following variables were included in the multivariate logistic regression model: SoCT-Observer (therapist) and SoCT-Patient total scores, WAI therapist and WAI client total scores, and achieving at least a 50% reduction in pre-treatment $HRSD_{17}$ scores by mid-treatment. Details of sample descriptions in terms of prognostic variables in the process domain are given in Table 3. The most important predictors were identified using a backward selection algorithm with $p < 0.05$ as the probability of retaining a variable.

Patients with one unit higher score on the SoCT-O were more likely to be CT responders (OR: 1.693, 95% CI: 1.16, 2.48). Similarly, patients who achieved at least 50% reduction in their $HRSD_{17}$ score by mid-CT were more than 3 times as likely to be a responder (OR: 3.752, 95% CI: 2. 12, 6.66) compared to patients who did not achieve such reduction. The SoCT-P, WAI-C and WAI-T total scores were eliminated as non-significant ($p > 0.11$).

Achieving at least 50% reduction in pretreatment depressive symptom severity explains 8.6% (marginal PEV = 8.6%, partial PEV = 5.1%) variability in CT response, while total SoCT-O score explains 4.8% (marginal PEV = 4.8%, partial PEV = 2.0%). However, there was no statistically significant difference in the PEVs for the two predictors (p > .18).

Question—Does the pattern of results change if the SoCT-P is included in the models without the SoCT-O?

The SoCT-O is a more expensive measure than the patient-rated SoCT. We therefore wanted to test if use of SoCT-P leads to similar findings. Including SoCT-P instead of SoCT-O did not change the pattern of results. We re-analyzed the data and estimated the models

considered above with SoCT-P along with the other candidate predictors in each of the domains. In these analyses, we omitted the SoCT-O as a predictor. We used backward elimination to identify the most parsimonious model in each domain. In each domain, we identified the same set of predictors in the process, with the SoCT-O now being replaced by SoCT-P as the significant predictor.

Discussion

It is important to identify predictors of both the positive and negative outcomes of CT for depression in order to improve clinical practice. As many people seeking treatment for depression indicate that they prefer psychotherapy to antidepressant medications and there are a finite number of fully trained and experienced therapists, identifying the characteristics of optimal candidates for CT is important.

In particular, these results highlight not only which adults with recurrent MDD are most likely to complete and respond to CT, but also those most likely to dropout or not benefit from therapy. In this sample, *completers* were patients who were older, non-Hispanic whites, and had more education, which replicates the findings from all treatments in a study of chronic forms of MDD (Arnow et al., 2007). Completers scored about one point lower on the $HRSD_{17}$ at pretreatment than noncompleters. In the current sample, patients who worked for pay and who met criteria for DSM-IV melancholia without meeting RDC for definite endogenous depression were more likely to complete CT. On the other hand, among those who did not meet criteria for DSM-IV melancholia, a diagnosis of RDC definite endogenous depression predicted dropout from CT. Given the relatively small proportion of patients who were discordant for the RDC and DSM-IV subtypes and the absence of prediction among the patients who were concordant for these subtype diagnoses, the potential clinical significance of these findings is also questionable.

Nonresponders were characterized as having two episodes of depression, higher pretreatment $HRSD_{17}$ scores, and poorer social adjustment; nonresponders were also less likely to work for pay. Significant mid-treatment predictors of response included: at least 50% reduction in $HRSD_{17}$ scores at the mid-treatment assessment, and greater understanding and use of cognitive therapy skills, as measured by the Skills of Cognitive Therapy-Observer Version (SoCT-O). Except for the finding pertaining to number of lifetime episodes, which is difficult to interpret without also studying first-episode depressions, these findings are consistent with the idea that patients who present with fewer symptoms and better functioning, show substantial improvement early in the course of therapy, and who learn the most about CT are also the most likely to benefit at the completion of 3 months of acute phase therapy. The importance of these findings in the context of the other predictors is that CT skill can be changed or improved, while other predictors of response such as number of episodes or pretreatment illness severity duration cannot. (It is noteworthy that the self-report version of the SoCT predicted response and its substitution in place of the SoCT-O did not affect findings. Thus, the less costly patient version gives practitioners to a cost-efficient tool to monitor patient skill use and comprehension in order to increase response). These findings suggest that, in practice, ongoing measurement of symptom levels and assessment of mastery of CT concepts and use might yield important information that could either lead to “an early to mid-phase correction” of the course of therapy or hasten consideration of alternate treatment modalities.

The definition of nonresponse used in this study is relatively strict: patients either had to still meet criteria for MDD or score higher than 12 on the final $HRSD_{17}$ despite completing a 16-20 session course of therapy. Thus, one can be reasonably confident that these patients

did not obtain a clinically meaningful benefit from CT. Conversely, the definition of response (used to match aims in the parent trial) is relatively generous and does include some patients who might be judged to be nonresponders by a stricter definition. In future work it will be important to try to differentiate among different gradations of benefit, such as remission versus response without remission.

Since the counterparts of each prognostic indictor also highlight those patients who are more likely to dropout or for whom CT fails, if replicable, these assessments can alert cognitive therapists to patients for whom CT needs to be provided differently or perhaps augmented. To illustrate, in considering how to reduce the likelihood that non-white patients will dropout from CT, we speculate that having early sessions focused on the risk of drop-out and strategies to reduce the likelihood are needed. Again, these analyses confirmed that the patients who evidence more skill in CT as also more likely to respond, even when other pretreatment and mid-treatment predictors were considered. Again, the pattern of results suggests that CT patient skills can be conveniently assessed by the SoCT-P in place of the more costly SoCT-O.

The findings are limited by low numbers of patients within some sub-categories of a variable, which could increase the chance of a Type II error. For example, there were few patients diagnosed with “double depression,” which limits the power of these analyses.

The total proportion of explained variance in the outcomes by the various predictive models considered was admittedly low (4.8%-14.4% for models for CT noncompletion and 9.6% - 12.1% for models for CT nonresponse). However, as Mittlbock and Heinzl (2001) suggest, this is not an indication of goodness-of-fit for the logistic regression models estimated here. A goodness-of-fit statistic for a logistic regression model is an estimate of how well the model predicts the observed probabilities, while an R^2-type measure of proportion of explained variability evaluates how well the individual outcomes are being predicted by the model. Cox and Wermuth (1992) also suggest that low values of R^2 are inevitable in logistic regression models even if an important relation is present.

The primary strengths of the study include a large sample, careful assessment of the patients, and proficient cognitive therapists. The selection on potential predictors was based on the literature as well as widely held assumptions among cognitive therapists. At the same time, these methodological strengths set limits on the generalizability of results. For instance, the patients were all adult outpatients with recurrent MDD. Patients with more depressive symptoms were less likely to complete CT. The therapists who received nearly weekly supervision were predominantly non-Hispanic and white. Further, this analysis is limited by the absence of positive and negative treatment comparators, which prevents testing for prescriptive indicators or predictors among interventions.

In future studies, it will be important to attempt to replicate these findings and test for prescriptive indicators. In such trials, positive findings in samples of adequate size would begin to shed light on when to recommend CT or another modality, such as pharmacotherapy, for a given patient. It will also be important to explore potential interactions between clinical predictors and putative neurobiological predictors of CT response (Siegle, Steinhauer, Friedman, Thompson, & Thase, 2011). After robust indicators, either prognostic or prescriptive, are found, it will be important to adapt, sequence, and/or create interventions which match the unique needs of the patients most likely to dropout from CT or for whom CT fails to eliminate depressive symptoms.

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We:

- examined the rates of cognitive therapy (CT) non/completion
- examined the rated of cognitive therapy non/response and
- determined the extent to which the patient skills in CT for depression predicted response in a two-site open trial.

Table 1

Pre-Treatment Characteristics by CT Completer and Non-Completer

Variable	Total (n = 523)	CT Non-Completer (n = 113)[a]	CT Completer (n = 410)[b]	Test Statistic
Demographics				
Gender, *n* (%)				
Male	170 (32.5)	36 (31.9)	134 (32.7)	χ^2=0.03,
Female	353 (67.5)	77 (68.1)	276 (67.3)	*p* = .87
White Race, *n* (%)				
White	423 (80.9)	70 (61.9)	353 (86.1)	χ2=33.40,
Non-White	100 (19.1)	43 (38.1)	57 (13.9)	*p* < .001
Marital Status/Living Condition, *n* (%)				
Living Alone	304 (57.1)	69 (69.1)	235 (57.3)	χ2=0.51,
Partnered[c]	219 (41.9)	44 (38.9)	175 (42.7)	*p* = .48
Employment Status, *n* (%)				
Works for pay	372 (71.1)	65 (57.5)	307 (74.9)	χ2=12.99,
Do not work	151 (28.9)	48 (42.5)	103 (25.1)	*p* < .001
Age at study entry in years, mean (*SD*)	42.4 (12.1)	38.9 (12.0)	43.3 (12.0)	F1,521=12.16, *p* < .001
Education in years, mean (*SD*)	15.1 (2.9)	13.9 (3.0)	15.4 (2.8)	F1,521=25.04, *p* < .001
Illness Characteristics				
Current Comorbidity, *n* (%)				
Yes	228 (43.6)	57 (50.4)	171 (41.7)	χ2=2.75,
No	295 (56.4)	56 (49.6)	239 (58.3)	*p* = .10
Lifetime Comorbidity				
Yes	400 (76.5)	93 (82.3)	307 (74.9)	χ2=2.71,
No	123 (23.5)	20 (17.7)	103 (25.1)	*p* = .10
Primary versus Secondary Depression, *n* (%)				
Primary	431 (82.7)	85 (75.9)	346 (84.6)	χ2=4.66,
Secondary	90 (17.3)	27 (24.1)	63 (15.4)	*p* = .03
Double Depression[d]				
Yes	27 (5.2)	6 (5.3)	21 (5.1)	χ2=0.01,
No	496 (94.8)	107 (94.7)	389 (94.9)	*p* = .94
DSM-IV Melancholia, *n* (%)				
Yes	187 (36.0)	37 (32.7)	150 (36.9)	χ2=0.65,
No	333 (64.0)	76 (67.3)	257 (63.1)	*p* = .42
RDC Endogenous Definite, *n* (%)				
Yes	201 (38.9)	51 (45.9)	150 (36.9)	χ2=2.97,
No	316 (61.1)	60 (54.1)	256 (63.1)	*p* = .09
Positive Family Type of Depression[e], *n* (%)				
Yes	329 (71.5)	66 (70.2)	263 (71.9)	χ2=0.10,

Variable	Total (n = 523)	CT Non-Completer (n = 113)[a]	CT Completer (n = 410)[b]	Test Statistic
No	131 (28.5)	28 (29.8)	103 (28.1)	$p = .75$
Number of Lifetime Episodes				
Less than 3 episodes	118 (22.6)	29 (25.7)	89 (21.7)	$\chi 2=0.79$,
At least 3 episodes	405 (77.4)	84 (74.3)	321 (78.3)	$p = .37$
Pre-Treatment $HRSD_{17}$, mean (*SD*)	20.4 (4.0)	21.2 (4.1)	20.2 (4.0)	F1,521=6.25, $p = .01$
Length of Illness in years, mean (*SD*)	20.7 (11.8)	18.0 (11.3)	21.5 (11.9)	F1,521=7.96, $p = .01$
Length of Current Episode in months, mean	25.0 (45.1)	23.4 (41.9)	25.4 (46.0)	F1,521=0.17, (*SD*) $p = .68$
Age of Onset, mean (*SD*)	21.2 (10.8)	20.4 (10.8)	21.4 (10.8)	F1,521=0.65, $p = .42$
Cognitive and Interpersonal				
ASQ Stable Score, mean (*SD*)	1.2 (0.9)	1.23 (0.8)	1.14 (0.9)	F1,484=0.93, $p = .34$
ASQ Global Score, mean (*SD*)	1.2 (1.0)	1.12 (1.0)	1.16 (1.0)	F1,482=0.13, $p = .721$
DAS - A total score, mean (*SD*)	150.6 (35.3)	152.62 (36.8)	150.10 (34.9)	F1,494=0.40, $p = .53$
IIP Mean Score, mean (*SD*)	1.7 (0.5)	1.63 (0.5)	1.67 (0.5)	F1,510=0.45, $p = .50$
SAS-SR Total Score, mean (*SD*)	2.6 (0.4)	2.66 (0.5)	2.57 (0.4)	F1,506=3.93, $p = .05$

Note. CT = Cognitive Therapy; *n* = Number; *SD* = Standard Deviation; $HRSD_{17}$ = Hamilton Rating Scale for Depression; RDC = Research Diagnostic Criteria; DSM-IV = Diagnostic and Statistical Manual, 4th Edition; ASQ = Attributional Style Questionnaire; DAS = Dysfunctional Attitudes Scale; IIP = Inventory of Interpersonal Problems; SAS-SR = Social Adjustment Scale –Self Report.

[a] n reduced to 112 for primary versus secondary depression, 111 for RDC endogenous definite, 94 for positive family type, 93 for ASQ, 99 for DAS - A, 106 for IIP, and 103 for SAS-SR due to missing data.

[b] n reduced to 409 for primary versus secondary depression, 407 for DSM-IV melancholia, 406 for RDC endogenous definite, 366 for positive family type, 391 for ASQ, 397 for DAS - A, 406 for IIP, and 405 for SAS-SR due to missing data.

[c] Partnered refers to patients who are married or are living with a partner.

[d] Double depression refers to major depressive disorder with dysthymia.

[e] Positive family history refers to the presence of a mood disorder, alcohol or drug abuse, or sociopathy.

Table 2

Pre-Treatment Patient Characteristics by CT Responder and Non-Responder Among Patients Completing Acute Phase CT.

Variable	Total (n = 410)	CT Non-Responder (n = 107)[a]	CT Responder (n = 303)[b]	Test Statistic
Demographics				
Gender, *n* (%)				
Male	134 (32.7)	34 (31.8)	100 (33.0)	χ^2=0.05,
Female	276 (67.3)	73 (68.2)	203 (67.0)	*p* = .82
White Race, *n* (%)				
White	353 (86.1)	90 (84.1)	263 (86.8)	χ^2=0.48,
Non-White	57 (13.9)	17 (15.9)	40 (13.2)	*p* = .49
Marital Status/Living Condition, *n* (%)				
Living Alone	235 (57.3)	60 (56.1)	175 (57.8)	χ^2=0.09,
Partnered[c]	175 (42.7)	47 (43.9)	128 (42.2)	*p* = .76
Employment Status, *n* (%)				
Works for pay	307 (74.9)	68 (63.6)	239 (78.9)	χ^2=9.88,
Do not work	103 (25.1)	39 (36.4)	64 (21.1)	*p* = .002
Age at study entry in years, mean (*SD*)	43.3 (12.0)	45.16 (11.7)	42.69 (12.0)	$F_{1,408}$=3.39, *p* = .07
Education in years, mean (*SD*)	15.4 (2.8)	14.94 (2.9)	15.55 (2.8)	$F_{1,408}$=3.60, *p* = .06
Illness Characteristics				
Current Comorbidity, *n* (%)				
Yes	171 (41.7)	53 (49.5)	118 (38.9)	χ^2=3.65,
No	239 (58.3)	54 (50.5)	185 (61.1)	*p* = .06
Lifetime Comorbidity				
Yes	307 (74.9)	84 (78.5)	223 (73.6)	χ^2=1.01,
No	103 (25.1)	23 (21.5)	80 (26.4)	*p* = .31
Primary versus Secondary Depression, *n* (%)				
Primary	346 (84.6)	89 (84.0)	257 (84.8)	χ^2=0.04,
Secondary	63 (15.4)	17 (16.0)	46 (15.2)	*p* = .83
Double Depression[d]				
Yes	21 (5.1)	6 (5.6)	15 (5.0)	χ^2=0.07,
No	389 (94.9)	101 (94.4)	288 (95.0)	*p* = .79
DSM-IV Melancholia, *n* (%)				
Yes	150 (36.9)	41 (38.7)	109 (36.2)	χ^2=0.21,
No	257 (63.1)	65 (61.3)	192 (63.8)	*p* = .65
RDC Endogenous Definite, *n* (%)				
Yes	150 (37.0)	40 (38.1)	110 (36.5)	χ^2=0.08,
No	256 (63.0)	65 (61.9)	191 (63.5)	*p* = .78
Positive Family Type of Depression[e], *n* (%)				

Variable	Total (n = 410)	CT Non-Responder (n = 107)[a]	CT Responder (n = 303)[b]	Test Statistic
Yes	263 (71.9)	71 (71.0)	192 (72.2)	χ^2=0.05,
No	103 (28.1)	29 (29.0)	74 (27.8)	p = .82
Number of Lifetime Episodes				
Less than 3 episodes	89 (21.7)	35 (32.7)	54 (17.8)	χ^2=10.31,
At least 3 episodes	321 (78.3)	72 (67.3)	249 (82.2)	p = .001
Pre-Treatment $HRSD_{17}$, mean (*SD*)	20.2 (4.0)	21.42 (4.0)	19.72 (3.9)	$F_{1,408}$=15.16, p < .001
Length of Illness in years, mean (*SD*)	21.5 (11.9)	22.34 (11.5)	21.17 (12.0)	$F_{1,408}$=0.77, p = .38
Length of Current Episode in months, mean (*SD*)	25.4 (46.0)	34.88 (58.0)	22.05 (40.6)	$F_{1,408}$=6.23, p = .01
Age of Onset, mean (*SD*)	21.4 (10.8)	22.36 (11.3)	21.00 (10.5)	$F_{1,408}$= 1.24, p = .27
Cognitive and Interpersonal				
ASQ Stable Score, mean (*SD*)	1.1 (0.9)	1.27 (0.8)	1.09 (0.9)	$F_{1,390}$=3.12, p = .08
ASQ Global Score, mean (*SD*)	1.2 (1.0)	1.39 (0.9)	1.09 (1.0)	$F_{1,389}$=7.56, p = .01
DAS - A total score, mean (*SD*)	150.1 (34.9)	150.95 (35.8)	149.79 (34.6)	$F_{1,395}$=0.09, p = .77
IIP Mean Score, mean (*SD*)	1.7 (0.5)	1.75 (0.6)	1.64 (0.5)	$F_{1,404}$=3.96, p = .05
SAS-SR Total Score, mean (*SD*)	2.6 (0.4)	2.72 (0.5)	2.51 (0.4)	$F_{1,403}$=18.54, p < .001

Note. CT = Cognitive Therapy; *n* = Number; *SD* = Standard Deviation; $HRSD_{17}$ = Hamilton Rating Scale for Depression; RDC = Research Diagnostic Criteria; DSM-IV = Diagnostic and Statistical Manual, 4th Edition; ASQ = Attributional Style Questionnaire; DAS = Dysfunctional Attitudes Scale; IIP = Inventory of Interpersonal Problems; SAS-SR = Social Adjustment Scale –Self Report.

[a] n reduced to 106 for primary versus secondary depression and DSM-IV melancholia, 105 for RDC endogenous definite, 100 for positive family type, 103 for ASQ, and 105 for DAS - A due to missing data.

[b] n reduced to 301 for DSM-IV melancholia and RDC endogenous definite, 266 for positive family type, 289 for ASQ, 292 for DAS - A, 299 for IIP, and 298 for SAS-SR due to missing data.

[c] Partnered refers to patients who are married or are living with a partner.

[d] Double depression refers to major depressive disorder with dysthymia.

[e] Positive family history refers to the presence of a mood disorder, alcohol or drug abuse, or sociopathy.

Table 3

Mid-Treatment Patient Characteristics by Outcomes of CT

	CT		
	Non-responder[a]	Responder[b]	
Mid-Treatment Patient Characteristics	***n* = 107**	***n* = 303**	**Test Statistic**
Skills of Cognitive Therapy (Observer) Total Score, mean (*SD*)	2.98 (0.6)	3.33 (0.7)	$F_{1,398}$=20.66, $p < .001$
Skills of Cognitive Therapy (Patient) Total Score, mean (SD)	3.15 (0.7)	3.41 (0.6)	$F_{1,380}$=12.29, $p < .001$
Working Alliance Inventory (Therapist) Score, mean (*SD*)	5.75 (0.6)	5.92 (0.6)	$F_{1,395}$=5.42, $p = .020$
Working Alliance Inventory (Patient) Score, mean (*SD*)	5.95 (0.7)	6.19 (0.6)	$F_{1,375}$=10.14, $p = .002$
Achieved at Least 50% Reduction in Pre-Treatment Depressive Symptom Severity, *n* (%)			χ^2=36.03, $p < .001$
Yes	19 (17.8)	153 (51.2)	
No	88 (82.2)	146 (48.8)	

Note. CT = Cognitive Therapy; *n* = Number; *SD* = Standard Deviation;

[a] n reduced to 100 for Working Alliance Inventory (Client) score, 105 for Working Alliance Inventory (Therapist) score, 104 for Skills of Cognitive Therapy (Observer) score, and 100 for Skills of Cognitive Therapy (Patient) score due to missing data.

[b] n reduced to 299 for at least 50% reduction in pre-treatment depressive symptom severity, 277 for Working Alliance Inventory (Client) score, 229 for Working Alliance Inventory (Therapist) score, 296 for Skills of Cognitive Therapy (Observer) score, and 282 for Skills of Cognitive Therapy (Patient) score due to missing data.