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## The role of pretreatment outcome expectancies and cognitive-behavioral skills in symptom improvement in an acute psychiatric setting

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### Abstract

**Background**—Prior research has found that pretreatment expectations of symptom improvement are positively correlated with depressive symptom change. The current investigation extends previous research by examining whether pretreatment outcome expectancies predict symptom change across several diagnostic categories within the context of an acute, naturalistic psychiatric setting.

**Methods**—Analyses were conducted to examine whether pretreatment outcome expectancies (credibility/expectancy questionnaire [CEQ]) predicted symptom improvement within major depression ( $N=420$ ), bipolar disorder ( $N=120$ ) and psychosis ( $N=36$ ). Bootstrap mediation analyses were conducted to examine whether acquisition of cognitive behavioral therapy (CBT) skills (cognitive behavior therapy skills questionnaire [CBTSQ]) may mediate expectancy–outcome relations.

**Results**—Results indicated a differential pattern of associations across diagnoses. Patient CBT skills emerged as a significant mediator of expectancy–outcome relations, but only in the major depression group. Both behavioral and cognitive skills were significantly, and independently, associated with symptom improvement.

**Limitations**—Sample sizes were small in the bipolar manic subgroup and psychosis group. CBT skills and symptom measures were assessed at concurrent time points.

**Conclusions**—The present findings suggest that patient expectancies and CBT skills may have a differential impact on symptom change as a function of diagnostic category. The implication of these results and directions for future research are discussed.

### Keywords

Cognitive behavior therapy; Partial hospital; Expectancies; Patient skills

### Conflict of interest

All authors declare that they have no conflicts of interests.

## 1. Introduction

The placebo effect has generated increased attention in both the adult (Fournier et al., 2010; Kirsch et al., 2008) and youth (Cohen et al., 2010) depression treatment literatures. Funding agencies, including the National Institute of Health (NIH), have recently called for increased research aimed at elucidating the mechanisms through which the placebo effect results in patient improvement (RFA-DA-12-003, RFA-DA-12-004). A growing body of research indicates that the placebo effect may account for a relatively large proportion of the symptom improvement experienced by depressed patients in treatment. Although estimates vary across clinical trials, approximately 50% of individuals “respond” (typically defined as 50% reduction in depressive symptoms from pretreatment to posttreatment) to either psychotherapy or antidepressant medication during the acute phase of treatment. In contrast, approximately 30% of depressed patients respond to a pill placebo (Hollon et al., 2002; Walsh et al., 2002).<sup>1</sup> These findings suggest that an estimated 60% (30%/50%) of symptom improvement in studies of antidepressants or psychotherapy for depression may be attributable to factors underlying placebo response (i.e., the expectation of symptom improvement, spontaneous remission of depressive symptoms), rather than due to the putative active ingredients of treatment. As stated by de la Fuente-Fernández et al. (2001), “the simple act of receiving any treatment (active or not) may, in itself, be efficacious because of expectation of benefit” (p. 1164). Indeed, prior research has found that pretreatment expectations of symptom improvement (i.e., *outcome expectancies*) are positively correlated with symptom change in the treatment of a range of different mental disorders, including depression and, perhaps to a lesser extent, anxiety disorders (e.g., Chambless et al., 1997; Joyce et al., 2003; Meyer et al., 2002; Westra et al., 2007; and see Constantino et al., 2011 for a recent meta-analytic review). It should be noted that expectancy–outcome findings are fairly mixed in the anxiety disorder literature (e.g., for non-significant findings in OCD, see Steketee et al., 2011; for GAD, see Borkovec et al., 2002). To date, the mechanisms through which the expectation of benefit may result in symptom improvement remain poorly understood.

In the field of psychotherapy research, a number of theorists have noted the important role that treatment outcome expectancies may play in contributing to symptom improvement (Deville and Borkovec, 2000; Frank and Frank, 1993; Greenberg et al., 2006; Wampold, 2001). Goal theorists have also suggested ways in which expectancies may influence future outcomes (e.g., Austin and Vancouver, 1996; Eccles and Wigfield, 2002). Namely, whereas optimistic or positive expectancies may fuel effort towards desired goals, negative expectancies may lead to disengagement from or abandonment of goals. In psychotherapy, positive treatment outcome expectancies may motivate active engagement in the treatment process. With regards to cognitive behavior therapy (CBT), greater acquisition and use of the central cognitive and behavioral skills encouraged in treatment may help account for expectancy–outcome associations. That is, those patients who enter CBT treatment with greater expectations of symptom improvement may be more likely to engage in treatment, and acquire and utilize cognitive and behavioral skills. In turn, and consistent with CBT

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<sup>1</sup>There is some evidence indicating that placebo response rates have been increasing over the years (Walsh et al., 2002).

theory (Beck et al., 1979; DeRubeis et al., 2010), acquisition and use of CBT skills may contribute to symptom improvement.

As discussed above, studies suggest that placebo response rates are relatively high in studies of depression treatment. Interestingly, studies have found that some mental disorders are associated with higher placebo response rates than others. Depressed patients, for example, have been found to exhibit higher levels of placebo response than patients suffering from psychosis (Khan et al., 2005). This may not be surprising given the various factors that may underlie and account for placebo response, including spontaneous remission of symptoms and the therapeutic benefit of positive treatment outcome expectancies. More specifically, higher placebo response rates in depression may be due in part to the typically episodic, or time-limited nature of depressive episodes. Moreover, depressive symptoms may be relatively more responsive to the hopefulness and remoralization engendered by positive treatment outcome expectancies (Frank and Frank, 1993). Findings regarding differential placebo response rates across disorders may be relevant to research examining the association between treatment outcome expectancies and symptom improvement. Namely, to the extent that a relatively large proportion of symptom improvement in a diagnostic group (e.g., depression) is due to factors underlying placebo response (e.g., treatment outcome expectancies), one might expect a stronger association between treatment outcome expectancies and actual symptom change within that disorder.

Previous research examining the role of pretreatment outcome expectancies has typically relied on depressed (or anxiety-disordered) samples receiving treatment within outpatient settings. To our knowledge, no published study has systematically examined what role pretreatment outcome expectancies may play in contributing to symptom improvement within other severe mental disorders (e.g., psychotic disorders) in the context of a psychiatric hospital setting. It may be that treatment outcome expectancies have a differential impact on symptom improvement depending on the diagnosis in question. As discussed above, given the relatively low placebo response rates in psychosis, and its chronic nature, one might expect a relatively small relationship between treatment outcome expectancies and symptom improvement in the latter disorder. Moreover, it is also unclear to what extent patient expectations of symptom improvement influence other mood states, for example bipolar manic symptomatology (e.g., Gaudiano and Miller, 2006). Finally, to the extent that pretreatment outcome expectancies do predict symptom improvement in a given disorder, what mediates this association? Within CBT, does patient acquisition and use of cognitive and behavioral skills mediate expectancy–outcome associations?

### 1.1. The current study

The current study had several objectives. First, within the context of an acute psychiatric setting, we examined whether the expectation of symptom improvement predicts symptom change across several, severe diagnostic categories. To assess symptom improvement, we included both a measure of depressive symptoms and a measure of broad symptomatology and functioning domains. Second, we examined whether patient acquisition and use of CBT skills were associated with symptom improvement across these diagnostic groups. Third, we

examined whether CBT skills mediated the association between treatment outcome expectancies and symptom improvement.

Accordingly, we tested three related hypotheses

1. Pretreatment expectations of symptom improvement will predict subsequent symptom change in the major depression and bipolar-depressed samples, but not in the psychosis or bipolar-manic samples.
2. Patient use of CBT skills will be associated with symptom improvement within all four diagnostic categories.
3. Patient use of CBT skills will mediate the association between treatment outcome expectancies and actual symptom improvement in the major depression and bipolar-depressed samples.

It is important to note that the current study was conducted in a naturalistic treatment environment, and accordingly, the data have limitations commonly found in other work in clinical settings (Westbrook and Kirk, 2005), including relatively elevated rates of missing data and lack of a control group to which patients are randomly assigned. However, because patients in this study were unselected and inclusion criteria were few, findings from this study are likely to be highly generalizable to other “real-world” psychiatric settings.

## 2. Method

### 2.1. Participants

Participants were patients presenting for treatment at the Behavioral Health Partial Program (BHPP), a partial hospital program at McLean Hospital, Belmont, MA. To be included in the present study, patients had to be admitted to the BHPP and have completed the self-report battery of measures at both admission and discharge (see Section 2.3). The present study focused on the association between treatment outcome expectancies (assessed at admission), CBT skill use (assessed at admission and discharge), and symptom improvement (assessed at admission and discharge) in patients presenting with primary diagnoses of current major depression, bipolar disorder, or psychosis. For this reason, inclusion criteria were that patients met criteria for a current, primary diagnosis of major depression, bipolar disorder (currently manic/hypomanic or depressed), or a psychotic disorder. A total of 576 patients met criteria for one of these diagnoses during the study period (July 2010 to July 2012), agreed to participate in the research study, and completed intake and discharge research assessments.

The average duration of treatment for these patients was 11.43 ( $SD=4.08$ ) patient days. Diagnostic comorbidity in this population was common: 73% ( $n=421$ ) of the current sample met criteria for more than one DSM-IV disorder, with an average of 3.4 diagnoses ( $SD=1.3$ ). Previous episodes of depression were exceedingly common, with a mean of 7.6 ( $SD=13.7$ ) reported previous depressive episodes.

Bipolar patients were divided into two subcategories based on their most recent symptomatic episode, including bipolar, current episode depressed (bipolar-depressed) or

current episode manic or hypomanic (bipolar-manic). The final sample included 576 patients: 420 in the depression group, 94 in the bipolar-depressed group, 26 in the bipolar-manic group, and 36 in the psychosis group.

## 2.2. Treatment

The BHPP offers both pharmacological and cognitive-behavioral treatment to patients presenting with symptoms across major diagnostic categories. The program focuses on the acquisition of cognitive behavioral skills and uses a flexible approach to treatment informed by CBT principles and current evidence, although it is adapted to the unique challenges of a naturalistic partial hospital setting (Neuhaus, 2006). The program offers more than 100, 50-min CBT-based groups per week. Individual treatment plans are constructed for each patient by clinical team managers who conduct initial intake assessments and oversee all aspects of treatment. The treatment consists of group CBT provided by BHPP staff including psychiatrists, psychologists, social workers, occupational therapists, postdoctoral and graduate level psychology trainees, and mental health counselors. Patients attend five 50-min CBT skill focused groups each day, five days per week (Monday-Friday). Of these, patients attend one group per day focused on behavioral activation, based on a protocol adapted from Martell et al., (2010). A second group teaches patients skills in identifying and challenging negative automatic thoughts and is guided by a protocol adapted from Beck et al., (1979). The remaining groups include modules on psychoeducation, self-monitoring, mindfulness, and interpersonal skills, adapted from other empirically supported CBT manuals (Beck et al., 1985; Linehan, 1993). To maintain treatment fidelity, groups utilize treatment protocols designed for the program, derived from established treatment manuals and groups are selectively observed by postdoctoral fellows and staff psychologists. In addition to group therapy, patients also receive two to three weekly individual, skills-based CBT sessions from a pre-doctoral psychology intern or postdoctoral fellow, which complement and individually tailor content from groups attended.

## 2.3. Measures

Miniature International Neuropsychiatric Interview (MINI; Sheehan et al., 1998) The MINI is a structured interview assessing for DSM-IV Axis I symptoms (e.g., mood, anxiety, substance abuse, psychosis). Each MINI diagnostic module consists of a series of screening items followed by questions about specific symptomatology. The MINI has strong reliability and validity in relation to the Structured Clinical Interview for DSM-IV (SCID-IV), with inter-rater reliabilities ranging from kappas of .89–1.0 (Sheehan et al., 1998). The MINI was administered by trained doctoral students in clinical psychology and psychology interns who met weekly with a postdoctoral fellow for supervision.

Credibility/expectancy questionnaire (CEQ; Devilly and Borkovec, 2000). The CEQ is a 6-item measure divided into two subscales assessing treatment credibility (CEQ-Credibility) and expectancy (CEQ-Expectancy), respectively, and it has demonstrated adequate reliability and validity in previous research (Deville and Borkovec, 2000). Cronbach's alpha for both subscales was high in the sample ( $\alpha=.81$  for credibility,  $\alpha=.89$  for expectancy).

Cognitive behavior therapy skills questionnaire (CBTSQ-16; Jacob et al., 2011) The CBTSQ is a 16-item measure designed to assess cognitive behavioral skills. The measure is divided into two subscales assessing cognitive restructuring (“Catch myself when I jump to conclusions”) and behavioral activation (“Socialize even though I don’t feel like it”). Items are rated on a 1 (*none of the time*) to 5 (*all of the time*) Likert-type scale. The CBTSQ-16 was validated among patients within the BHPP and demonstrated high internal consistency ( $\alpha=.84$  for cognitive restructuring,  $\alpha=.80$  for behavioral activation; see Jacob et al., 2011).

Center for the epidemiologic studies of depression scale-10 (CES-D-10; Andresen et al., 1994). The CES-D-10 is a widely used, brief instrument for assessing depressive symptoms. Response anchors range temporally from 0=rarely or none of the time (*less than 1 day*) to 3=most or all of the time (*5–7 days*). Previous studies have suggested cut-off scores for significant depression of 10 or greater (Andresen et al., 1994; Kuptniratsaikul et al., 2002). The CES-D-10 appears to be reliable and valid (Zhang and Li, 2011) and had high internal consistency in this study (pretreatment  $\alpha=.84$ ; posttreatment  $\alpha=.87$ ).

Behavior and symptom identification scale (BASIS-24; Eisen et al., 2004). The BASIS-24 is a 24-item measure that has demonstrated good psychometric properties across inpatient, outpatient, residential, and partial hospital settings as a broad assessment of psychopathology and associated distress. Previous literature supports the factor structure, reliability, validity and sensitivity to treatment changes of BASIS-24 (Eisen et al., 2006). The BASIS-24 was selected given that it assesses a wide array of symptoms relevant to the different diagnostic groups examined in the current study, rather than using multiple measures and increasing patient research burden in our primarily clinical setting. The BASIS-24 consists of six subscales which assess for symptoms over the past week: (1) depression/functioning (“Feel sad or depressed?”), (2) interpersonal problems (“Get along with people in your family?”), (3) self-harm (“Think about hurting yourself?”), (4) emotional lability (“Have mood swings?”), (5) psychosis (“Hear voices or see things?”), and (6) substance abuse/dependence (“Did you have an urge to drink alcohol or take street drugs?”). Respondents rate items on a 5-point Likert-type scale from 0 (*none of the time*) to 4 (*all of the time*) and higher scores indicating worse functioning. Subscales range from 0–8 (self-harm) to 0–24 (depression/functioning) and total scores reflect overall functioning. Reliability of BASIS-24 total scores in the current study was high (pretreatment  $\alpha=.84$ ; posttreatment  $\alpha=.86$ ).

#### 2.4. Procedure

Approval for the study was granted by the hospital’s Institutional Review Board (IRB). All data were collected on site at the hospital BHPP. Before receiving any form of treatment, patients completed the MINI, a demographics survey, and a battery of self-report measures described above; the battery of self-report measures was also completed at discharge. Study personnel provided instructions indicating the participant’s freedom to withdraw from the research study at any point or refuse to respond to any items.

### 3. Results

#### 3.1. Data analytic strategy

Analyses were conducted using SAS Version 9.2 PROC GLM and PROC REG (SAS Institute, Cary, NC). A SAS macro was used for bootstrap mediation analyses (see Preacher and Hayes, 2008). Simulation studies indicate that the traditional Baron and Kenny (1986) causal steps approach to testing mediation suffers from relatively low power (Fritz and MacKinnon, 2007; MacKinnon et al., 2002). Bootstrap mediation, a nonparametric sampling procedure, offers a more powerful alternative and does not make the assumption that the sampling distribution of the indirect effect is normal, when it is often asymmetric. Moreover, the SAS macro employed in the current study allows for the testing of several mediators simultaneously (in the current study, both cognitive and behavioral skills). We utilized 3000 bootstrap samples for coefficient and indirect effect estimation. Confidence intervals (95% CIs) for the indirect effect that exclude zero indicate that the indirect effect was statistically significant at the .05 level and mediation was demonstrated (see bold values in Mediation Tables 4 and 5). To adjust for pretreatment (wave 1) values, posttreatment (wave 2) variables were in the format of residualized change scores (standardized; MacKinnon, 2008).

Given that the study was conducted in a clinical (i.e., psychiatric hospital) rather than research setting, some patients did not complete all of the self-report and diagnostic measures at admission or discharge for a variety of reasons (e.g., conflicting appointments for individual or group therapy, clinical crises resulting in admission to clinical evaluation center or inpatient unit). Twenty-six percent % ( $n=148$ ) of the sample provided incomplete data and, thus, were excluded from the bootstrap mediation analyses predicting BASIS symptom improvement, whereas (19% [ $n=111$ ] patients had incomplete data for the analyses predicting CES-D-10 symptom change). As detailed in Footnote,<sup>2</sup> the mediation analyses reported in the results section were rerun after replacing missing data via imputation, yielding nearly identical findings.

Table 1 displays the raw observed means and standard deviations for all variables at pretreatment (T1) and posttreatment (T2) by diagnostic category. Of note, and as expected, self-reported depression scores (CES-D) were highest among major depression and bipolar depressed groups. Interestingly, the bipolar manic patients reported the highest T1 expectations of improvement (see CEQ scores). Björgvinsson et al. (submitted manuscript) have reported on the treatment outcome data for this sample. See Table 2 for diagnostic characteristics and comorbidity in each group and Table 3 for correlations between study variables at pretreatment.

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<sup>2</sup>To examine the possible impact of missing data on our findings mediation analyses were rerun following a hot deck imputation procedure. The procedure involves matching each case with missing data to another similar case in the dataset, based on researcher-defined characteristics, in this case age, gender, and race. The missing datapoint is then replaced with the matching case's value. This method has advantages over list wise deletion (see Andridge and Little, 2010; Myers, 2011). A very similar pattern of findings emerged with the imputed dataset as those reported in Tables 4 and 5. The only difference emerged for the psychosis group. Specifically, a nonsignificant trend emerged for the association between CBT skills and CESD symptom improvement see Table 5, path b).

**Hypothesis 1. Treatment outcome expectancies and symptom improvement—**

As seen in Table 4 (path *c*), pretreatment CEQ-Expectancy was a significant predictor of BASIS symptom improvement in the major depression group only. Similarly, higher CEQ-Expectancy scores were significantly associated with greater CES-D-10 symptom improvement only in the major depression group (see Table 5; path *c*).

**Hypothesis 2. CBT skills and symptom improvement—**

Next, we examined the association between the acquisition and use of CBT skills and symptom improvement across the four diagnostic groups. As seen in Table 4 (path *b*), greater acquisition and use of CBT skills was associated with greater BASIS symptom improvement in the major depression and bipolar-depressed (but not the bipolar-manic or psychosis) groups. The same pattern of findings emerged when the above analyses were rerun using CES-D symptom improvement as the dependent variable (see Table 5; path *b*).

**Hypothesis 3. Bootstrap mediation analyses—**

The necessity of establishing a statistically significant association between *X* (in the current study, CEQ-Expectancy) and *Y* (in this case, BASIS or CES-D-10 symptom improvement) in mediation analyses has been called into question by some researchers (e.g., Collins et al., 1998; MacKinnon, 2000; MacKinnon et al., 2000; Shrout and Bolger, 2002). Indeed, there are several approaches to statistical mediation that do not require a significant relationship between *X* and *Y*, including the bootstrap mediation approach employed in the current study (e.g., see Kraemer et al., 2002; Shrout and Bolger, 2002; MacKinnon et al., 2002). Thus, as noted above, although the expectancy-symptom improvement relationship was only significant for the major depression group, mediation analyses were carried out for all groups (see Tables 4 and 5).

First, bootstrap mediation analyses were conducted to test whether patient use of CBT skills mediated the relationship between the expectation of symptom improvement and BASIS symptom change. As seen in Table 4 (see bolded 95% CIs for indirect [i.e., mediation] effects), patient use of CBT skills only mediated the expectancy-symptom improvement relationship in the major depression sample.

Given the significant mediation findings for the major depression group, the latter mediation analysis was rerun while separating the CBT skills variable into its two constituent factors: Cognitive restructuring and behavioral activation (i.e., running a multiple mediator model with both factors included as mediating variables simultaneously). Interestingly, as seen in Table 4, both the behavioral activation and cognitive restructuring factors emerged as significant mediators. The same pattern emerged with regards to the prediction of CES-D-10 symptom improvement (see Table 5).

The sample size for major depression group was larger than for either the psychosis, bipolar-depressed, or bipolar-manic groups. The smaller sample size, and resulting lower power, in theory could account for the nonsignificant mediation findings for the latter three groups. However, even when pooling the samples for these three groups mediation analyses were nonsignificant for both the expectancy-CES-D-10 symptom change ( $N=125$ ; bootstrap 95% CI  $[-0.13, 0.01]$ ) and expectancy-BASIS symptom change relationships ( $N=110$ ; bootstrap 95% CI  $[-0.10, 0.01]$ ). Moreover, the standardized betas for the relations between treatment



expectancies, CBT skills and symptom improvement were consistently larger for the major depression group relative to other diagnostic groups, indicating stronger associations in the former sample (see paths *a–c* in Tables 4 and 5).

#### 4. Discussion

The placebo effect has received increased attention in the mental health treatment literature (Fournier et al., 2010; Kirsch et al., 2008). As stated by de la Fuente-Fernández et al. (2001), “the simple act of receiving any treatment (active or not) may, in itself, be efficacious because of expectation of benefit” (p. 1164). Although prior research has found that pretreatment expectations of symptom improvement correlate positively with symptom change across several different mental disorders, in particular depression (e.g., Chambless et al., 1997; Joyce et al., 2003; Meyer et al., 2002; Westra et al., 2007; see Constantino et al., 2011 for a recent meta-analytic review), the mechanisms underlying this association are poorly understood. Moreover, research in this area has typically relied on outpatient samples. Thus, it is unclear to what extent expectancy–outcome findings would replicate in relatively more acutely symptomatic inpatient populations. The present study builds on this literature by examining whether the expectation of symptom improvement predicts symptom change among patients suffering from major depression, bipolar disorder, or psychosis in the context of a severe patient population within an acute psychiatric setting. In addition, mediation analyses were conducted to test whether patient acquisition and use of CBT skills mediated expectancy–outcome associations.

Our hypotheses were partially supported. First, pretreatment expectations of symptom improvement significantly predicted symptom change in the major depression group, but not in the bipolar or psychosis samples. In line with these findings, it may be that positive treatment outcome expectancies are more therapeutically beneficial within depressed patients, relative to patients suffering from bipolar or psychotic symptomatology. This pattern of findings may be understood in light of evidence of high placebo response rates in depression relative to other disorders, including psychosis (e.g., Khan et al., 2005) and perhaps mania (e.g., Keck et al., 2000; see also Gaudiano and Miller, 2006 for nonsignificant expectancy–outcome findings in mania). To the extent that treatment outcome expectancies in part drive the magnitude of placebo response (Finniss et al., 2010), one might expect a stronger expectancy–outcome relationship within those disorders that are more responsive to placebo (e.g., unipolar depression). It is also interesting to note that although bipolar-manic patients reported the highest expectations of treatment benefit across all diagnostic groups (see Table 1), higher expectancies did not predict better treatment outcomes for manic patients. These elevated expectancy scores may reflect, on average, excessively optimistic (and perhaps counter-therapeutic) treatment outcome expectancies among these patients.

In an effort to probe what may mediate the relationship between pretreatment expectations of symptom improvement and actual symptom change, the present study assessed the extent to which patients acquire and use the CBT skills encouraged in our treatment program. Bootstrap mediation analyses indicated that patient acquisition and use of CBT skills mediated the expectancy–outcome relationship in the major depression diagnostic group.

The same pattern of findings emerged for both outcome variables (BASIS and CES-D-10; see Tables 4 and 5). Interestingly, when the CBT skills measure was separated into its constituent cognitive and behavioral subscales, and a multiple mediation model was tested including both subscales, both cognitive and behavioral skills emerged as significant mediators of the expectancy–outcome relationship.

CBT skills did not emerge as a significant mediator in the psychosis, bipolar-depressed, or bipolar-manic groups. Even when combining the samples from these three groups, coupled with the use of a relatively powerful bootstrapping approach to testing mediation (MacKinnon et al., 2004; Preacher and Hayes, 2008), CBT skills did not emerge as a significant mediator. There was no significant relationship between outcome expectancies and symptom change (i.e., nonsignificant *total effect*; see path *c*; Tables 4 and 5) to mediate in the bipolar or psychosis groups. Even so, a nonsignificant total effect does not preclude the possibility of mediation (e.g., Collins et al., 1998; MacKinnon, 2000; MacKinnon et al., 2000; Shrout and Bolger, 2002). It may be that bipolar and psychotic patients with greater treatment outcome expectancies are less likely to acquire and utilize CBT skills and/or that these skills are less therapeutically beneficial to these patients, at least in the context of a short-term partial hospital program. It should be noted, however, that there is increasing evidence of the efficacy of CBT for psychosis in the context of relatively longer-term treatments (Grant et al., 2012; Turkington et al., 2008). Moreover, CBT skills were significantly associated with symptom improvement in the bipolar-depressed group.

There remains substantial debate in the psychotherapy literature regarding the relative importance of “common factors” (i.e., those elements of treatment that are shared across most, if not all, treatment modalities) versus “specific factors” (i.e., the core, theory-specified techniques of a given treatment) in contributing to symptom improvement (Imel and Wampold, 2008; Siev et al., 2009; Wampold, 2001; Webb et al., 2010). Expectancy represents one of the most frequently discussed common factors in the psychotherapy literature; whereas cognitive and behavioral techniques represent the core, theory-specified specific factors of CBT. The findings from the current study may reflect a way in which a theoretically important specific factor (i.e., patient acquisition and use of CBT skills) and a common factor (treatment outcome expectancies) interact in predicting symptom improvement. That is, CBT skills mediated the expectancy–outcome relationship within our major depression sample. With regards to clinical implications, it may be especially important for therapists to assess patient treatment expectancies, and to work to foster optimistic – yet realistic – expectations of improvement among their depressed clients.

Several limitations of the present study should be noted. First, and similar to Jacob et al. (2011), the cognitive and behavioral subscales of the CBTSQ were generally highly correlated causing problems for interpretations of findings when both variables were simultaneously included in our multiple mediator model. Second, although temporal confounds were statistically controlled in the analyses predicting symptom change and CBT skills change from pretreatment outcome expectancies, they were not controlled in our analyses correlating change in CBT skills and symptom improvement (i.e., both variables were assessed concurrently, at pretreatment and posttreatment). Thus, the significant association between CBT skills and symptom improvement in the major depression may be

due, at least in part, to the influence of symptom improvement on self-reported CBT skills, rather than the reverse relationship. Although this is an important limitation, it should be highlighted that this represents only one of the four paths comprising the mediation analyses reported in Tables 4 and 5 (i.e., path *b*). That is, there were no temporal confounds in the analyses predicting symptom improvement or CBT skill acquisition from pretreatment expectancies (paths *a*, *c*, and *c'*). Third, sample sizes were small in the psychosis, and especially in the bipolar-manic, subgroup, which may help account for nonsignificant findings within these groups. In addition, our findings emerged within a specific context (i.e., an observational study within a short-term partial hospital program). It is unclear to what extent our findings would replicate in other treatment settings (e.g., longer-term outpatient care).

The current study raises issues that should be addressed in future research. One of the strengths of the current study is the inclusion of a large sample of patients from a naturalistic clinical setting within a psychiatric hospital. In order to limit patient burden in our clinical sample we were not permitted to include more than two waves of data collection (i.e., pretreatment and posttreatment). A more comprehensive examination of CBT skill use, patient expectancies and symptoms across additional time points would provide for a more in-depth picture of how these constructs change and interact with one another over time. In addition, the current study focused on the role of pretreatment *expectancies* in predicting symptom change, which may be an important psychological mediator of placebo response (Price et al., 2008). However, there are likely other processes that were not assessed in the current study, and which play important roles in contributing to placebo responses, such as classical conditioning (see Finniss et al., 2010; Price et al., 2008 for a review). Moreover, although we examined a possibly important treatment-specific factor mediating the expectancy–outcome relationship (i.e., CBT skills; Constantino, 2012), there are likely other important mediators that were not assessed in the current study (e.g., the therapeutic alliance). The results of such future investigations could help researchers identify variables that play important roles in contributing to symptom improvement. Such findings could ultimately yield important clinical implications for the delivery of optimal treatment for these debilitating disorders.

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## References

- Andresen EM, Malmgren JA, Carter WB, Patrick DL. Screening for depression in well older adults: evaluation of a short form of the CES-D. *American Journal of Preventative Medicine*. 1994; 10:77–84.
- Andridge RR, Little RJA. A review of hot deck imputation for survey non-response. *International Statistical Review*. 2010; 78:40–64. [PubMed: 21743766]

- Austin JT, Vancouver JB. Goal constructs in psychology: structure, process, and content. *Psychological Bulletin*. 1996; 120 (3):338–375. <http://dx.doi.org/10.1037/0033-2909.120.3.338>.
- Baron RM, Kenny DA. The moderator–mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*. 1986; 51 (6):1173–1182. <http://dx.doi.org/10.1037/0022-3514.51.6.1173>. [PubMed: 3806354]
- Beck, AT.; Emery, G.; Greenberg, RL. *Anxiety Disorders and Phobias: A Cognitive Perspective*. Basic Books; New York, NY: 1985.
- Beck, AT.; Rush, AJ.; Shaw, BF.; Emery, G. *Cognitive Therapy of Depression*. Guilford; New York, NY: 1979.
- Björgvinsson, T.; Kertz, S.; Bigda-Peyton, J.; Rosmarin, D.; Aderka, I.; Neuhaus, E. Effectiveness of Cognitive Behavioral Therapy for Severe Mood Disorders in an Acute Naturalistic Setting: A Benchmarking Study. (submitted manuscript)
- Borkovec TD, Newman MG, Pincus AL, Lytle R. A component analysis of cognitive–behavioral therapy for generalized anxiety disorder and the role of interpersonal problems. *Journal of Consulting and Clinical Psychology*. 2002; 70 (2):288. [PubMed: 11952187]
- Chambless DL, Tran GQ, Glass CR. Predictors of response to cognitive–behavioral group therapy for social phobia. *Journal of Anxiety Disorders*. 1997; 11 (3):221–240. [http://dx.doi.org/10.1016/S0887-6185\(97\)00008-X](http://dx.doi.org/10.1016/S0887-6185(97)00008-X). [PubMed: 9220298]
- Cohen D, Consoli A, Bodeau N, Purper-Ouakil D, Deniau E, Guile J, Donnelly C. Predictors of placebo response in randomized controlled trials of psychotropic drugs for children and adolescents with internalizing disorders. *Journal of Child and Adolescent Psychopharmacology*. 2010; 20 (1):39–47. <http://dx.doi.org/10.1089/cap.2009.0047>. [PubMed: 20166795]
- Collins LM, Graham JW, Flaherty BP. An alternative framework for defining mediation. *Multivariate Behavioral Research*. 1998; 33 (2):295–312. [http://dx.doi.org/10.1207/s15327906mbr3302\\_5](http://dx.doi.org/10.1207/s15327906mbr3302_5).
- Constantino MJ. Believing is seeing: an evolving research program on patients’ psychotherapy expectations. *Psychotherapy Research*. 2012; 22 (2):127–138. <http://dx.doi.org/10.1080/10503307.2012.663512>. [PubMed: 22469008]
- Constantino MJ, Arnkoff DB, Glass CR, Ametrano RM, Smith JZ. Expectations. *Journal of Clinical Psychology*. 2011; 67 (2):184–192. <http://dx.doi.org/10.1002/jclp.20754>. [PubMed: 21128304]
- de la Fuente-Fernández R, Ruth TJ, Sossi V, Schulzer M, Calne DB, Stoessl A. Expectation and dopamine release: mechanism of the placebo effect in Parkinson’s disease. *Science*. 2001; 293 (5532):1164–1166. <http://dx.doi.org/10.1126/science.1060937>. [PubMed: 11498597]
- DeRubeis, RJ.; Webb, CA.; Tang, TZ.; Beck, AT. Cognitive therapy. In: Dobson, KS., editor. *Handbook of Cognitive–Behavioral Therapies*. 3. Guilford; New York: 2010.
- Devilley GJ, Borkovec TD. Psychometric properties of the credibility/expectancy questionnaire. *Journal of Behavior Therapy and Experimental Psychiatry*. 2000; 31 (2):73–86. [http://dx.doi.org/10.1016/S0005-7916\(00\)00012-4](http://dx.doi.org/10.1016/S0005-7916(00)00012-4). [PubMed: 11132119]
- Eccles JS, Wigfield A. Motivational beliefs, values, and goals. *Annual Review of Psychology*. 2002; 53(1):109–132. <http://dx.doi.org/10.1146/annurev.psych.53.100901.135153>.
- Eisen SV, Gerena M, Ranganathan G, Esch D, Idiculla T. Reliability and validity of the BASIS-24© mental health survey for whites, African–Americans, and Latinos. *The Journal of Behavioral Health Services & Research*. 2006; 33 (3):304–323. <http://dx.doi.org/10.1007/s11414-006-9025-3>. [PubMed: 16752108]
- Eisen SV, Normand SLT, Belanger AJ, Spiro A, Esch D. The revised behavior and symptom identification scale BASIS-R. *Medical Care*. 2004; 42 (12):1230–1241. <http://dx.doi.org/10.1097/00005650-200412000-00010>. [PubMed: 15550803]
- Finniss DG, Kaptchuk TJ, Miller F, Benedetti F. Biological, clinical, and ethical advances of placebo effects. *The Lancet*. 2010; 375 (9715):686–695. [http://dx.doi.org/10.1016/S0140-6736\(09\)61706-2](http://dx.doi.org/10.1016/S0140-6736(09)61706-2).
- Fournier JC, DeRubeis RJ, Hollon SD, Dimidjian S, Amsterdam JD, Shelton RC, Fawcett J. Antidepressant drug effects and depression severity: a patient-level meta-analysis. *Journal of the American Medical Association*. 2010; 303 (1):47–53. <http://dx.doi.org/10.1001/jama.2009.1943>. [PubMed: 20051569]

- Frank, JD.; Frank, JB. *Persuasion and Healing: A Comparative Study of Psychotherapy*, third ed. The Johns Hopkins University Press; Baltimore, MD: 1993.
- Fritz MS, MacKinnon DP. Required sample size to detect the mediated effect. *Psychological Science*. 2007; 18 (3):233–239. <http://dx.doi.org/10.1111/j.1467-9280.2007.01882.x>. [PubMed: 17444920]
- Gaudiano BA, Miller IW. Patients' expectancies, the alliance in pharmacotherapy, and treatment outcomes in bipolar disorder. *Journal of Consulting and Clinical Psychology*. 2006; 74 (4):671–676. <http://dx.doi.org/10.1037/0022-006X.74.4.671>. [PubMed: 16881774]
- Grant PM, Huh GA, Perivoliotis D, Stolar NM, Beck AT. Randomized trial to evaluate the efficacy of cognitive therapy for low-functioning patients with schizophrenia. *Archives of General Psychiatry*. 2012; 69 (2):121–127. <http://dx.doi.org/10.1001/archgenpsychiatry.2011.129>. [PubMed: 21969420]
- Greenberg RP, Constantino MJ, Bruce N. Are patient expectations still relevant for psychotherapy process and outcome? *Clinical Psychology Review*. 2006; 26(6):657–678. <http://dx.doi.org/10.1016/j.cpr.2005.03.002>. [PubMed: 15908088]
- Hollon SD, Thase ME, Markowitz JC. Treatment and prevention of depression. *Psychological Science in the Public Interest*. 2002; 3:39–77. <http://dx.doi.org/10.1111/1529-1006.00008>.
- Imel, ZE.; Wampold, BE. The importance of treatment and the science of common factors in psychotherapy. In: Brown, SD.; Lent, RW., editors. *Handbook of Counseling Psychology*. 4. John Wiley & Sons Inc; Hoboken, NJ US: 2008. p. 249-266.
- Jacob KL, Christopher MS, Neuhaus EC. Development and validation of the cognitive-behavioral therapy skills questionnaire. *Behavior Modification*. 2011; 35 (6):595–618. <http://dx.doi.org/10.1177/0145445511419254>. [PubMed: 21893554]
- Joyce AS, Ogrodniczuk JS, Piper WE, McCallum M. The alliance as mediator of expectancy effects in short-term individual therapy. *Journal of Consulting and Clinical Psychology*. 2003; 71(4):672–679. <http://dx.doi.org/10.1037/0022-006X.71.4.672>. [PubMed: 12924672]
- Keck PE, Welge JA, McElroy SL, Arnold LM, Strakowski SM. Placebo effect in randomized, controlled studies of acute bipolar mania and depression. *Biological Psychiatry*. 2000; 47 (8):748–755. [http://dx.doi.org/10.1016/S0006-3223\(99\)00311-X](http://dx.doi.org/10.1016/S0006-3223(99)00311-X). [PubMed: 10773184]
- Khan A, Kolts RL, Rapaport MH, Rama Krishnan KR, Brodhead AE, Brown WA. Magnitude of placebo response and drug-placebo differences across psychiatric disorders. *Psychological Medicine*. 2005; 35 (5):743–749. <http://dx.doi.org/10.1017/S0033291704003873>. [PubMed: 15918351]
- Kirsch I, Deacon BJ, Huedo-Medina TB, Scoboria A, Moore TJ, Johnson BT. Initial severity and antidepressant benefits: a meta-analysis of data submitted to the food and drug administration. *Plos Medicine*. 2008; 5:260–268. <http://dx.doi.org/10.1371/journal.pmed.0050045>.
- Kraemer HC, Wilson T, Fairburn CG, Agras S. Mediators and moderators of treatment effects in randomized clinical trials. *Archives of General Psychiatry*. 2002; 59:877–883. [PubMed: 12365874]
- Kuptniratsaikul V, Chulakadabba S, Ratanavijitrasil S. An instrument for assessment of depression among spinal cord injury patients: comparison between the CES-D and the TDI. *Journal of the Medical Association of Thailand*. 2002; 85:978–982. [PubMed: 12450075]
- Linehan, MM. *Cognitive-behavioral Treatment of Borderline Personality Disorder*. Guilford Press; New York, NY: 1993.
- MacKinnon, DP. *Introduction to Statistical Mediation Analysis*. Erlbaum; New York, NY: 2008.
- MacKinnon, DP. Contrasts in multiple mediator models. In: Rose, JS.; Chassin, L.; Presson, CC.; Sherman, SJ., editors. *Multivariate Applications in Substance Use Research: New Methods for New Questions*. Erlbaum; Mahwah, NJ: 2000. p. 141-160.
- MacKinnon DP, Krull JL, Lockwood CM. Equivalence of the mediation, confounding and suppression effect. *Prevention Science*. 2000; 1 (4):173–181. <http://dx.doi.org/10.1023/A:1026595011371>. [PubMed: 11523746]
- MacKinnon DP, Lockwood CM, Hoffman JM, West SG, Sheets V. A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods*. 2002; 7 (1):83–104. <http://dx.doi.org/10.1037/1082-989X.7.1.83>. [PubMed: 11928892]

- MacKinnon DP, Lockwood CM, Williams J. Confidence limits for the indirect effect: distribution of the product and resampling methods. *Multivariate Behavioral Research*. 2004; 39 (1):99–128. [http://dx.doi.org/10.1207/s15327906mbr3901\\_4](http://dx.doi.org/10.1207/s15327906mbr3901_4). [PubMed: 20157642]
- Martell, CR.; Dimidjian, S.; Herman-Dunn, R. *Behavioral Activation for Depression: A Clinician's Guide*. Guilford Press; New York, NY: 2010.
- Meyer B, Pilkonis PA, Krupnick JL, Egan MK, Simmens SJ, Sotsky SM. Treatment expectancies, patient alliance and outcome: further analyses from the National Institute of Mental Health Treatment of Depression Collaborative Research Program. *Journal of Consulting and Clinical Psychology*. 2002; 70 (4):1051–1055. <http://dx.doi.org/10.1037/0022-006X.70.4.1051>. [PubMed: 12182269]
- Myers TA. Goodbye, listwise deletion: presenting hot deck imputation as an easy and effective tool for handling missing data. *Communication Methods and Measures*. 2011; 5:297–310.
- Neuhaus EC. Fixed values and a flexible partial hospital program model. *Harvard Review of Psychiatry*. 2006; 14 (1):1–14. <http://dx.doi.org/10.1080/10673220500519706>. [PubMed: 16513586]
- Preacher KJ, Hayes AF. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*. 2008; 40 (3):879–891. <http://dx.doi.org/10.3758/BRM.40.3.879>. [PubMed: 18697684]
- Price DD, Finnis DG, Benedetti F. A comprehensive review of the placebo effect: recent advances and current thought. *Annual Review of Psychology*. 2008; 59:565–590. <http://dx.doi.org/10.1146/annurev.psych.59.113006.095941>.
- Sheehan DV, Lecrubier Y, Sheehan HK, Amorim P, Janavs J, Weiller E, Dunbar GC. The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic interview for DSM-IV and ICD-10. *Journal of Clinical Psychiatry*. 1998; 59 (suppl 20): 22–33. [PubMed: 9881538]
- Shrout PE, Bolger N. Mediation in experimental and non-experimental studies: new procedures and recommendations. *Psychological Methods*. 2002; 7(4):422–445. <http://dx.doi.org/10.1037/1082-989X.7.4.422>. [PubMed: 12530702]
- Siev J, Huppert JD, Chambless DL. The Dodo bird, treatment technique, and disseminating empirically supported treatments. *The Behavior Therapist*. 2009; 32:69–76.
- Steketee G, Siev J, Fama JM, Keshaviah A, Chosak A, Wilhelm S. Predictors of treatment outcome in modular cognitive therapy for obsessive–compulsive disorder. *Depression & Anxiety*. 2011; 28:333–341. [PubMed: 21308884]
- Turkington D, Sensky T, Scott J, Barnes TRE, Nur U, Siddle R, Hammond K, Samarasekera N, Kingdon D. A randomized controlled trial of cognitive–behavior therapy for persistent symptoms in schizophrenia: a five-year follow-up. *Schizophrenia Research*. 2008; 98:1–7. [PubMed: 17936590]
- Walsh BT, Seidman SN, Sysko R, Gould M. Placebo response in studies of major depression. *JAMA: The Journal of the American Medical Association*. 2002; 287 (14):1840–1847. <http://dx.doi.org/10.1001/jama.287.14.1840>.
- Wampold, BE. *The Great Psychotherapy Debate: Models, Methods, and Findings*. 1. Routledge; New York, NY: 2001.
- Webb CA, DeRubeis RJ, Barber JP. Therapist adherence/competence and treatment outcome: a meta-analytic review. *Journal of Consulting and Clinical Psychology*. 2010; 78:200–211. <http://dx.doi.org/10.1037/a0018912>. [PubMed: 20350031]
- Westra HA, Dozois DJA, Marcus M. Expectancy, homework compliance, and initial change in cognitive–behavioral therapy for anxiety. *Journal of Consulting and Clinical Psychology*. 2007; 75 (3):363–373. <http://dx.doi.org/10.1037/0022-006X.75.3.363>. [PubMed: 17563153]
- Westbrook D, Kirk J. The clinical effectiveness of cognitive behaviour therapy: outcome for a large sample of adults treated in routine practice. *Behaviour Research and Therapy*. 2005; 43 (10):1243–1261. <http://dx.doi.org/10.1016/j.brat.2004.09.006>. [PubMed: 16086979]
- Zhang B, Li J. Reliability and validity of a short version of center for epidemiologic studies depression scale in national adult population. *Chinese Mental Health Journal*. 2011; 25 (7):506–511.

**Table 1**

Means (standard deviations) of measures by diagnostic groups.

Measure	Major depression	Bipolar depressed	Bipolar manic	Psychosis
1. BASIS_T1	1.86 (.52)	1.92 (.58)	1.79 (.77)	1.45 (.72)
2. BASIS_T2	1.20 (.48)	1.30 (.54)	1.15 (.51)	1.13 (.64)
3. CES-D_T1	19.53 (5.83)	18.73 (5.61)	15.92 (9.20)	13.17 (7.23)
4. CES-D_T2	11.86 (6.10)	11.83 (6.18)	9.58 (6.53)	9.58 (6.95)
5. CEQ-Expect_T1	15.45 (5.36)	16.10 (5.09)	16.41 (5.85)	15.55 (5.24)
6. CBT-Total_T1	39.95 (10.41)	39.61 (11.22)	45.92 (10.23)	45.97 (9.51)
7. CBT-Total_T2	49.24 (10.88)	48.08 (11.40)	54.36 (9.37)	49.47 (10.33)
8. CBT-COG_T1	23.02 (6.36)	23.01 (7.53)	26.36 (5.74)	26.00 (5.93)
9. CBT-COG_T2	27.82 (6.45)	27.40 (7.18)	30.91 (5.13)	28.00 (6.81)
10. CBT-BA_T1	16.93 (5.12)	16.60 (4.94)	19.56 (5.38)	19.97 (5.82)
11. CBT-BA_T2	21.43 (5.26)	20.68 (5.28)	23.45 (5.08)	21.47 (5.12)

*Note:* BASIS=Behavior and symptom identification scale—total score; CES-D=Center for the epidemiologic studies of depression scale—short form; CEQ-Expect=credibility/expectancy questionnaire; CBT-Total=cognitive behavior therapy skills questionnaire (Total=total score; COG=cognitive restructuring subscale; BA=behavioral activation subscale); T1=time 1 (admission); T2=time 2 (discharge).

**Table 2**

Diagnostic comorbidity by group.

	Major depressed % ( <i>n</i> )	Bipolar depressed % ( <i>n</i> )	Bipolar manic % ( <i>n</i> )	Psychotic % ( <i>n</i> )
Panic disorder	14.5 (61)	12.8 (12)	11.5 (3)	5.6 (2)
Social anxiety disorder	21.9 (92)	24.5 (23)	26.9 (7)	22.2 (8)
Obsessive–compulsive disorder	10.0 (42)	8.5 (8)	15.4 (4)	16.7 (6)
Post-traumatic stress disorder	10.0 (42)	12.8 (12)	23.1 (6)	9.8 (4)
Generalized anxiety disorder	41.0 (172)	34.0 (32)	30.8 (8)	8.3 (3)
Alcohol abuse/dependence	12.1 (51)	21.2 (20)	30.8 (8)	22.2 (8)
Psychotic features	3.6 (15)	18.1 (17)	3.8 (1)	–
Total diagnoses (M, <i>SD</i> )	3.1 (1.2)	4.3 (1.2)	4.3 (1.4)	3.9 (1.4)

*Note:* Cells do not add to the total number of participants as multiple comorbid diagnoses are represented.



**Table 3**

Correlations of measures at admission (TI) by diagnostic group.

	1.	2.	3.	4.	5.
Major depressed (n=363-408)					
1. BASIS	-				
2. CES-D	.78**	-			
3. CEQ-Expectancy	-.16**	-.23**	-		
4. CBT-BA	-.29***	-.24**	.16**	-	
5. CBT-COG	-.20**	-.14**	.08	.64**	-
Bipolar depressed (n=79-90)					
1. BASIS	-				
2. CES-D	.74**	-			
3. CEQ-Expectancy	-.28**	-.32**	-		
4. CBT-BA	-.30**	-.36**	.28*	-	
5. CBT-COG	-.22	-.36**	.20	.60**	-
Bipolar manic (n=25-26)					
1. BASIS	-				
2. CES-D	.89**	-			
3. CEQ-Expectancy	-.61**	-.62**	-		
4. CBT-BA	-.68**	-.73**	.45*	-	
5. CBT-COG	-.34	-.36	.09	.69**	-
Psychotic (n=41)					
1. BASIS	-				
2. CES-D	.92**	-			
3. CEQ-Expectancy	-.12	-.10	-		
4. CBT-BA	-.46*	-.47**	.05	-	
5. CBT-COG	-.08	-.07	-.20	.42*	-

Note: BASIS=Behavior and symptom identification scale—total score; CES-D= Center for the epidemiological studies of depression—short form; CEQ-Expect= credibility/expectancy questionnaire; CBT-Total=cognitive behavior therapy skills questionnaire (COG=Cognitive restructuring subscale; BA=Behavioral activation subscale).

\*  $p < .05$ .  
\*\*  $p < .01$ .

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Mediation effects: CBT skills as a mediator of the effect of treatment outcome expectancies on basis symptom improvement.

**Table 4**

Diagnosis	Mediator	c	a	b	c'	95% CI for indirect effect	
						Lower	Upper
Major depression	CBT-Total	-.18**	.23**	-.41**	-.08 <sup>a</sup>	-.15	-.05
Major depression	CBT cognitive	-.18**	.17**	-.21**	-.08 <sup>a</sup>	-.08	-.01
	CBT behavioral	-.18**	.27**	-.23**	-.08 <sup>a</sup>	-.10	-.03
Bipolar depressed	CBT-Total	-.16	.16	-.33**	-.11	-.17	.03
Bipolar manic	CBT-Total	-.06	-.04	.09	-.06	-.18	.05
Psychosis	CBT-Total	.00	.14	-.13	.02	-.14	.02

Note: c=Total effect of CEQ-Expectancy on posttreatment outcome (adjusting for pretreatment values); a=effect of CEQ-Expectancy on mediator; b=relationship between mediator and posttreatment outcome (adjusting for pretreatment values); c' =direct effect of CEQ-Expectancy on posttreatment outcome (adjusting for pretreatment values); CI=95% bootstrap confidence interval for the indirect effect (3000 resamples); variables are standardized.

\*  $p < .05$ .

<sup>a</sup>  $p < .10$ .

\*\*\*  $p < .01$ .

Mediation effects: CBT skills as a mediator of the effect of treatment outcome expectancies on CES-D-10 symptom improvement.

**Table 5**

Diagnosis	Mediator	c	a	b	c'	95% CI for indirect effect	
						Lower	Upper
Major depression	CBT-Total	-.16**	.23**	-.42**	-.06	-.15	-.05
Major depression	CBT cognitive	-.16**	.19**	-.16**	-.06	-.07	-.01
	CBT behavioral	-.16**	.25**	-.30**	-.06	-.13	-.03
Bipolar depressed	CBT-Total	-.10	.22 <sup>a</sup>	-.36**	-.02	-.21	.01
Bipolar manic	CBT-Total	-.10	-.08	-.10	-.11	-.07	.15
Psychosis	CBT-Total	-.09	.19	-.20	-.05	-.16	.02

Note: c=Total effect of CEQ-Expectancy on posttreatment outcome (adjusting for pretreatment values); a=effect of CEQ-Expectancy on mediator; b=relationship between mediator and posttreatment outcome (adjusting for pretreatment values); c' =direct effect of CEQ-Expectancy on posttreatment outcome (adjusting for pretreatment values); CI=95% bootstrap confidence interval for the indirect effect (3000 resamples); variables are standardized.

\*  $p < .05$ .

<sup>a</sup>  $p < .10$ .

\*\*\*  $p < .01$ .