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Treatment-Specific Changes in Decentering Following Mindfulness-Based Cognitive Therapy Versus Antidepressant Medication or Placebo for Prevention of Depressive Relapse

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Objective: To examine whether metacognitive psychological skills, acquired in mindfulness-based cognitive therapy (MBCT), are also present in patients receiving medication treatments for prevention of depressive relapse and whether these skills mediate MBCT's effectiveness. ***Method:*** This study, embedded within a randomized efficacy trial of MBCT, was the first to examine changes in mindfulness and decentering during 6–8 months of antidepressant treatment and then during an 18-month maintenance phase in which patients discontinued medication and received MBCT, continued on antidepressants, or were switched to a placebo. In total, 84 patients (mean age = 44 years, 58% female) were randomized to 1 of these 3 prevention conditions. In addition to symptom variables, changes in mindfulness, rumination, and decentering were assessed during the phases of the study. ***Results:*** Pharmacological treatment of acute depression was associated with reductions in scores for rumination and increased wider experiences. During the maintenance phase, only patients receiving MBCT showed significant increases in the ability to monitor and observe thoughts and feelings as measured by the Wider Experiences ($p < .01$) and Decentering ($p < .01$) subscales of the Experiences Questionnaire and by the Toronto Mindfulness Scale. In addition, changes in Wider Experiences ($p < .05$) and Curiosity ($p < .01$) predicted lower Hamilton Rating Scale for Depression scores at 6-month follow-up. ***Conclusions:*** An increased capacity for decentering and curiosity may be fostered during MBCT and may underlie its effectiveness. With practice, patients can learn to counter habitual avoidance tendencies and to regulate dysphoric affect in ways that support recovery.

Keywords: MBCT, meditation, relapse prevention, depression, maintenance pharmacotherapy

Mindfulness-based cognitive therapy (MBCT) is an 8-week group treatment for prevention of relapse in unipolar depression that integrates elements of cognitive therapy for depression with the clinical application of mindfulness meditation (Segal, Williams, & Teasdale, 2002). Randomized trials of MBCT have reported consistent reductions in relapse rates on the order of 50% compared to usual care in remitted, nonmedicated depressed patients with multiple previous episodes of depression (Teasdale et al., 2000), or equivalent protection when compared to maintenance antidepressant treatment (Kuyken et al., 2010). The development of MBCT was informed by empirical studies showing that relapse was strongly associated with the reinstatement of automatic modes

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of cognitive processing, such as rumination and avoidance, that are characteristic of the depressed state. Following this account, patients in MBCT are taught to become more aware of and to relate differently to potentially depressogenic thoughts, feelings, and bodily sensations.

Qualitative analyses of MBCT suggest that one characteristic of this new relationship to mental contents is the development of skills in decentering, which allow patients to observe their thoughts and feelings as temporary, objective events in the mind instead of reflections that are true or descriptive of self (Allen, Bromley, Kuyken, & Sonnenberg, 2009). Furthermore, although MBCT was designed to train these specific attentional skills as a response to mood-linked processing biases, it is not at all clear whether these types of changes would be present with other treatments, such as antidepressant medication. It may be that medication prevents relapse solely by altering somatic illness markers, but it is equally possible that reductions in depression resulting from any effective treatment would increase scores on metacognitive variables. To date, the question of treatment specificity remains unaddressed.

Although the related literature on treatment mediation in MBCT indicates that changes in decentering, rumination, mindfulness, and compassion are important aspects of the process by which depression is prevented, it is unclear whether the changes are unique to MBCT. For example, Michalak, Heidenreich, Meibert, and Schulte (2008) reported that higher post-treatment levels of mindfulness were associated with lower rates of relapse/recurrence over a 12-month follow-up. Shahar, Britton, Sbarra, Figueredo, and Bootzin (2010) studied partially remitted depressed patients who were randomly assigned to MBCT or a wait list control and found that the use of informal mindfulness practices and reductions in brooding independently accounted for the effects of MBCT on reducing depressive symptoms. These studies are less informative regarding treatment specificity, because the former lacked a control group and the latter did not examine prophylaxis. In a more comprehensive study, Kuyken et al. (2010) reported treatment-specific increases in mindfulness and self-compassion for patients receiving MBCT compared to antidepressant medication (ADM).

Most recently, Segal et al. (2010) studied patients who were initially treated with an antidepressant and were then randomized to discontinue their medication in order to receive MBCT, to continue taking their medication for 18 months, or to switch to placebo (PLA). Segal et al. found that, compared to those who received PLA, patients who received MBCT or ADM were characterized by an unstable pattern of remission and showed a 73% reduction in relapse risk.[1] Moreover, ADM and MBCT performed equivalently in the study (Segal et al., 2010).

The present study was embedded within this larger efficacy trial and took advantage of its three-arm design to examine treatment-specific changes in mindfulness and decentering, while considering their relation to symptom return. This was the first study to examine changes in these constructs during 6–8 months of ADM for acute depression and then during the maintenance phase, in MBCT, maintenance ADM, and PLA conditions. This made it possible to examine changes in decentering and mindfulness in treatments that rely on markedly different modes of action and over two distinct treatment phases. Kraemer's conceptual model for the analysis of treatment mediation in randomized trials was used to further examine these variables (Kraemer, Kiernan, Essex, & Kupfer, 2008). As this was the first study to examine changes in decentering and mindfulness during pharmacotherapy for acute depression, we made no specific prediction about whether these variables would change during this study phase. We did predict, however, that MBCT would lead to more decentering and mindfulness than would maintenance ADM or PLA and that these changes would be related to depression outcomes following treatment.

Method

The study protocol was approved by internal review boards at the Centre for Addiction and Mental Health, Toronto, and St. Joseph's Healthcare, Hamilton, and was reviewed by a data and safety monitoring board. All participants provided written consent prior to any research activity. In total, 84 out of 160 (52.5%) participants who were treated with ADM achieved clinical remission and were assigned to one of the three study conditions (see Figures 1 and 2).

Participants and Study Flow

Inclusion criteria were a *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM–IV*; American Psychiatric Association, 1994) diagnosis of major depressive disorder (MDD), a score of ≥16 on the Hamilton Depression Rating Scale (HRSD-17), two or more previous depressive episodes, and age of between 18 and 65 years.[2] All patients were treated with a two-step, standardized monotherapy algorithm designed to maximize the likelihood of treatment response; patients who failed to respond to initial treatment with an SSRI (citalopram or sertraline) were given the option of receiving an SNRI (venlafaxine or mirtazapine; Segal et al., 2010). All measures described in this study were administered at study enrollment (Time 1). Acute phase treatment was continued until the patient achieved clinical remission (defined as a 50% reduction in HRSD and HRSD ≤7 for 8 weeks) and was then extended for 5 months to ensure remission was sustained. Patients were then randomly assigned to one of the three study arms: maintenance ADM, medication taper plus MBCT, or medication taper plus PLA. At randomization, the symptom, decentering, and mind-

[1] In the parent trial, participants who remitted were classified as having had either an unstable or a stable remission, based on the presence or absence of "symptom flurries" during the approximately five months between initial remission and randomization. Patients who had a stable remission were those who maintained an HRSD score of ≤7 across this interval; unstable remitters achieved the same HRSD threshold but had occasional elevated scores across this interval that were not sufficient to qualify for relapse. These patients were considered in remission if (a) their score subsequent to an elevation was ≤7 and (b) the range of elevated scores fell between 8 and 14. This classification divided the sample in half (49% stable remitters and 51% unstable remitters).

[2] Patients were excluded if they had a current diagnosis of bipolar disorder, substance abuse disorder, schizophrenia, or borderline personality disorder or a trial of electroconvulsive therapy within the past 6 months or if they currently practiced meditation more than once per week or yoga more than twice per week. A full description of inclusion and exclusion criteria and treatment fidelity can be found in Segal et al. (2010).

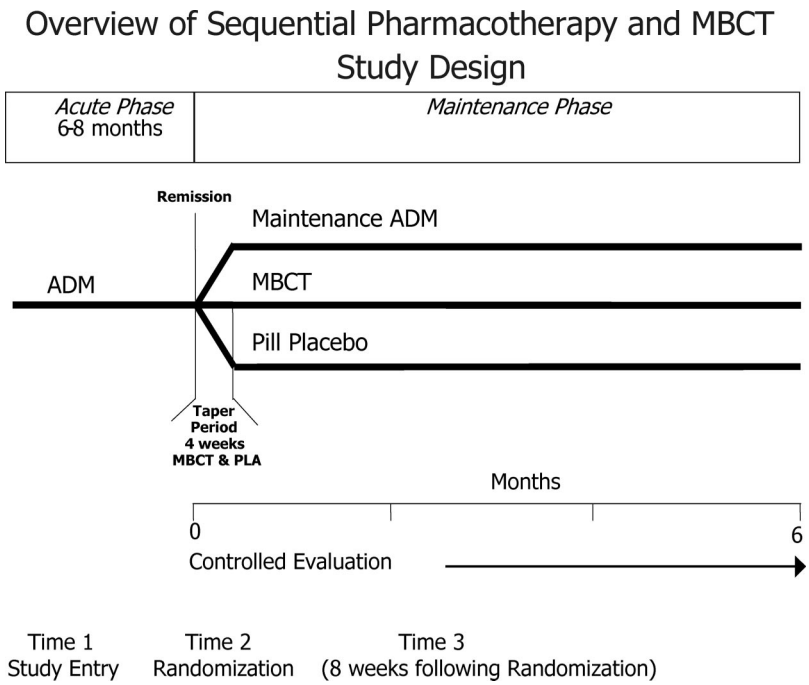

Figure 1. Overall study design schematic and participant flow. ADM = antidepressant medication; MBCT = maintenance mindfulness-based cognitive therapy; PLA = placebo.

fulness measures were repeated to assess change from entry (Time 2). Patients in MBCT attended eight weekly 2-hr groups and a 6-hr retreat day in Week 6. Details of the treatment protocol and fidelity are provided in Segal et al. (2010). All measures were repeated at 8 weeks in all arms of the study (Time 3) to coincide with the end of treatment for the eight-session MBCT. Symptom and relapse status were then assessed for a maximum of 18 months during the follow-up phase, and data collection ceased when participants relapsed because they were re-treated. Depressive symptoms were assessed with the HRSD score at 6 months after Time 3, as this provided a sufficient number of observations for analysis.

Outcome Measures

HRSD. (Hamilton, 1960). Patients were assessed on the 17-item HRSD by clinical evaluators blind to treatment allocation over the 6–8 month acute treatment and 18-month maintenance phase. The HRSD demonstrates high reliability and validity coefficients.

Mindfulness Skills: Toronto Mindfulness Scale. (TMS; Lau et al., 2006). This 10-item measure is completed after an instructional prime that asks respondents to engage in experiential awareness for 15 min. Participants are asked to indicate their level of agreement with items reflecting curiosity and decentering—the two TMS subscales. The Curiosity scale (TMS-C) contains items that reflect an attitude of approaching and investigating one's experience without judgment. The Decentering scale (TMS-D) contains items that reflect a shift away from identifying personally with thoughts and feelings to observing their movement in a wider field of awareness and accepting the experience as it is. The TMS has adequate internal consistency and validity; in our sample, alpha was .89 for decentering and .83 for curiosity at Time 1.

Experiences Questionnaire. (EQ; Fresco et al. (2007). The EQ is a 20-item self-report scale designed to measure wider experiences and rumination. The Wider Experiences scale (EQ-W) is defined as the ability to observe one's thoughts and feelings as temporary, objective events in the mind, as opposed to true reflections of the self. Items with a negative valence were included on the scale to form a Rumination scale (EQ-R), which is reverse scored. Fresco et al. (2007) have reported acceptable reliability and convergent and discriminant validity coefficients; in our sample, the alpha coefficient was .86 for EQ-R and .85 for EQ-W at Time 1.

Results

Participant Characteristics

Information on patient demographics is presented in Table 1. Patients had a mean age of 44 years (SD = 11.49) at study entry; 58% of those sampled were female, with 20% self-identified as a member of an ethnic/racial minority group. At study randomization (Time 2), 84 remitted patients were assigned to the three treatment groups, 28 in ADM, 26 in MBCT, and 30 in PLA. At the 6-month time point, data for 48 patients—17 in ADM, 14 in MBCT, and 17 in PLA—were available on all measures. There were no differences in baseline characteristics between the three prevention arms, the only exception being a greater percentage of Axis II comorbidity in MBCT ($p < .05$). Demographic and symptoms variables were also compared between participants who

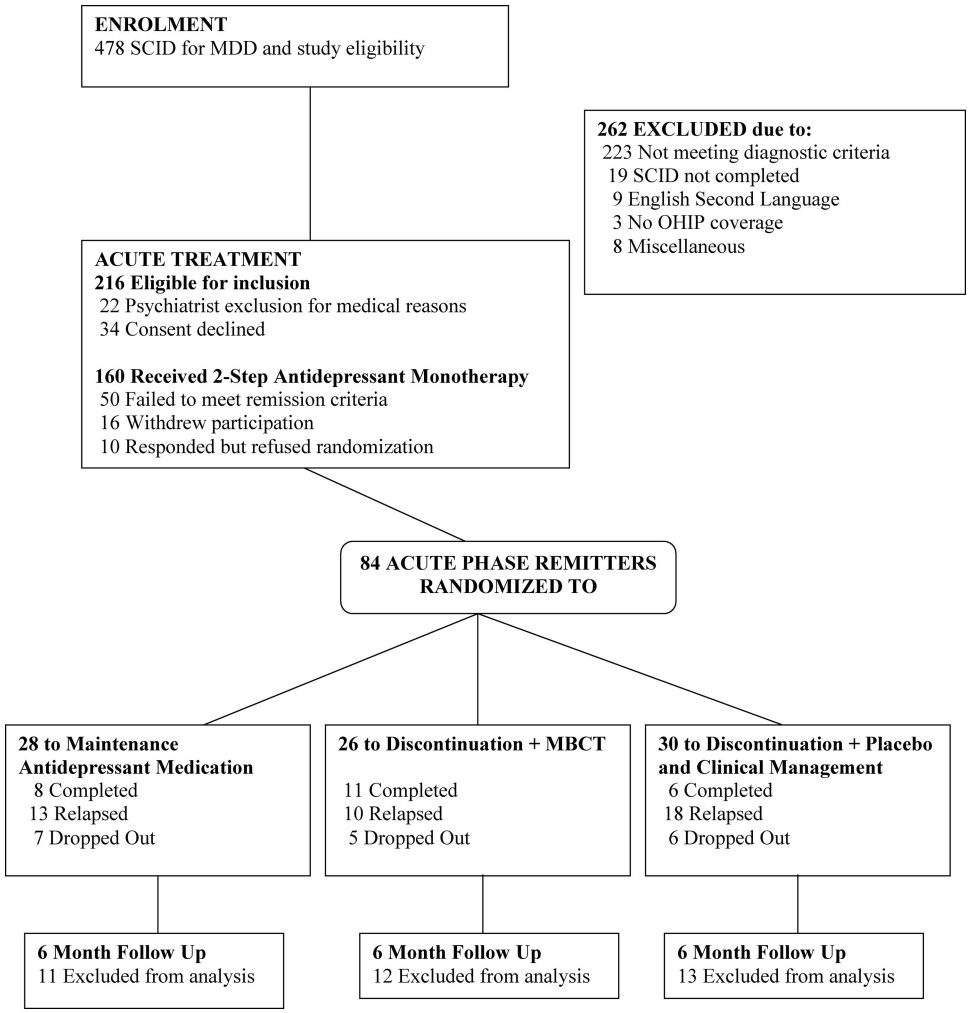

Figure 2. Study flow of participants from screening to analysis. SCID = Structured Clinical Interview for *DSM–III–R*; MDD = major depressive disorder; OHIP = Ontario Health Insurance Plan; MCBT = maintenance mindfulness-based cognitive therapy.

completed all follow-up assessments and those who did not; there were no significant differences between groups or in the proportion of missing data in each study arm.

Descriptive Data

Table 2 displays the intercorrelations, means, and standard deviations for all measures.[3] Generally, these correlations suggested that the EQ and TMS subscales correlated within themselves over the different time points and with one another, suggesting some overlap in these measures and consistency over time in these metacognitive variables. Participants with missing T3 data, including those who dropped out of the study or relapsed before 6 months, were removed from this analysis. For three individuals, missing EQ data were estimated; data from Week 6 of the maintenance phase were used to estimate the Week 8 observation.

Changes in EQ and TMS During Antidepressant Acute Treatment Phase (Time 1 to Time 2)

To examine change in the subscales of the EQ and TMS from Time 1 (study enrollment) to Time 2 (randomization), we compared the scores on the EQ, TMS, and HRSD during the acute antidepressant treatment (see Table 3). Paired sample *t* tests were used to examine whether these mean scores were significantly different. As expected, there were significant differences between the HRSD scores, $t(80) = 39.91$, $p < .001$, $d = 6.40$, between study entry ($M = 19.1$, $SD = 3.1$) and randomization ($M = 2.8$, $SD = 1.8$). Similarly, significant differences were demonstrated for the EQ-R scores, $t(66) =$

[3] Given the nature of this study, the range of T2 HRSD and T3 HRSD would be restricted because only participants who fully remitted were retained in this study. The correlations displayed may underestimate the relation between the other variables.

Table 1
Baseline Characteristics of the Three Prevention Conditions

Variable	M-ADM (n = 28)	MBCT (n = 26)	PLA + clin (n = 30)
Gender: Female, %	71.4	50.0	66.7
White, %	85.7	73.1	76.7
Age, yrs	45.8 ± 11.4	44.8 ± 9.4	41.9 ± 11.6
Married/cohabitating, %	36	39	40
Employed, %	79	77	62
Age of first onset, years	34.6 ± 12.7	28.78 ± 10	29.9 ± 11.3
No. prior episodes	4.9 ± 2.6	4.5 ± 2.2	4.8 ± 2.1
Duration of current episode in weeks	80.7 ± 111.6	102.6 ± 92.2	67.8 ± 101.1
Days in acute phase	231.4 ± 59.7	228 ± 52.6	239.7 ± 34.2
Days to reach remission	80.1 ± 60	68.1 ± 51.9	90 ± 57.8
Days in remission	151.3 ± 31.7	160 ± 34.2	149.7 ± 44.5
Hx of prior antidepressant, %	61	54	52
Hx psychiatric hospitalization, %	7	4	10
Any Axis I comorbidity, %	39	35	27
Hx substance abuse/dependence, %	4	4	10
Any Axis II comorbidity, %	18	58	37*

Note. M-ADM = maintenance antidepressant medication; MBCT = maintenance mindfulness-based cognitive therapy; PLA + clin = placebo plus clinical management; Hx = history.
* $p < .05$.

-6.58, $p < .001$, $d = -0.26$, and EQ-W scores, $t(66) = -8.68$, $p < .001$, $d = -1.34$. However, significant differences were not found for the TMS-C and TMS-D subscales. To examine whether the changes in EQ-R and EQ-W were attributable to change in depression, we conducted a hierarchical regression; the dependent variable used was the T2 HRSD (randomization). Predictors were entered in two blocks, T1 HRSD (intake) in the first block and residualized change in the EQ subscales (calculated from Time 1 [intake] to Time 2 [randomization]) in the second block. After controlling for change in depression scores, changes in the EQ subscales were no longer significant.

Changes in EQ and TMS During Maintenance Treatment (Time 2 to Time 3)

Treatment-specific changes in EQ and TMS were examined across the three prevention conditions. Table 4 displays the means for each measure from randomization to 8 weeks post randomization (corresponding with the end of MBCT treatment). A one-way analysis of variance examined standardized residualized change scores for the four subscales of the TMS and EQ, by treatment group. Results indicated that changes in TMS-D, $F(2, 46) = 10.31$, $p < .01$, and EQ-W, $F(2, 55) = 6.67$,

Table 2
Descriptive Statistics and Correlations Between Measures

Variable	T1 HRSD	T2 HRSD	T3 HRSD	T1 EQ-R	T2 EQ-R	T3 EQ-R	T1 EQ-W	T2 EQ-W	T3 EQ-W	T1 TMS-C	T2 TMS-C	T3 TMS-C	T1 TMS-D	T2 TMS-D	T3 TMS-D
T2 HRSD	.20														
T3 HRSD	−.07	.02													
T1 EQ-R	−.18	−.04	−.09												
T2 EQ-R	−.03	−.18	−.18	.44*											
T3 EQ-R	−.08	−.06	−.20	.60*	.70*										
T1 EQ-W	.01	.07	−.20	.20	.23	.42*									
T2 EQ-W	.07	−.25	−.07	.23	.36*	.30	.20								
T3 EQ-W	.12	−.01	.15	.03	.20	.21	.27	.40*							
T1 TMS-C	.29	−.16	.24	−.20	.24	.09	.26	.48*	.21						
T2 TMS-C	.17	−.02	−.23	−.08	.03	−.03	.19	.30	.02	.58*					
T3 TMS-C	.02	.30	.19	−.19	−.16	−.23	.08	.01	.23	.01	.44*				
T1 TMS-D	.27	−.10	.34*	.09	.29	.28	.26	.28	.15	.73*	.54*	−.24			
T2 TMS-D	.08	−.15	−.10	−.03	−.08	−.05	.12	.22	.21	.45*	.58*	.13	.52*		
T3 TMS-D	.07	.14	−.13	−.14	−.10	−.19	−.12	.04	.31	−.17	.29	.51*	.07	.44*	
M	19.10	2.79	4.29	16.05	18.61	18.64	25.53	34.10	33.57	9.97	11.18	11.30	11.18	13.79	14.84
SD	3.06	1.84	3.64	2.96	3.28	3.46	5.64	6.92	8.42	6.63	5.92	6.13	5.18	6.67	6.54

Note. T1 = Time 1 (study entry); T2 = Time 2 (randomization); T3 = Time 3 (for HRSD, 6 months following treatment; for EQ or TMS, 8 weeks following randomization); HRSD = Hamilton Rating Scale for Depression; EQ-R = Experiences Questionnaire, Rumination; EQ-W = Experiences Questionnaire, Wider Experiences; TMS-C = Toronto Mindfulness Scale, Curiosity; TMS-D = Toronto Mindfulness Scale, Decentering.
* $p < .01$.

Table 3
*Means (and Standard Deviations) of EQ, TMS, and HRSD During Acute Phase Antidepressant Treatment (*N = *84)*

Variable	Time 1 (Study Entry) *M* (*SD*)	Time 2 (Randomization) *M* (*SD*)	Paired *t* test	Cohen's *d*
EQ-R	16.05 (2.96)	18.61 (3.28)	$t_{66} = -6.58^{***}$	−0.26
EQ-W	25.53 (5.64)	34.10 (6.92)	$t_{66} = -8.68^{***}$	−1.34
TMS-C	9.97 (6.63)	11.18 (5.92)	$t_{33} = -1.42$	−0.19
TMS-D	11.18 (5.18)	13.79 (6.67)	$t_{33} = -1.17$	−0.21
HRSD	19.1 (3.1)	2.8 (1.8)	$t_{80} = 39.91^{***}$	6.40

Note. Effect sizes calculated using the following formula: Cohen's $d = M_{pre}–M_{post}/SD_{pooled}$; large effect size equals >0.8; medium effect size equals >0.5; small effect size equals >0.2. EQ-R = Experiences Questionnaire, Rumination; EQ-W = Experiences Questionnaire, Wider Experiences; TMS-C = Toronto Mindfulness Scale, Curiosity; TMS-D = Toronto Mindfulness Scale, Decentering; HRSD = Hamilton Rating Scale for Depression.
*** $p < .001$.

$p < .01$, differed significantly based on treatment group. Post hoc Tukey's honestly significant difference tests indicated a significant increase in TMS-D and EQ-W for participants in the MBCT condition at the .05 level of significance.

Treatment-Specific Changes in EQ and TMS and Prediction of Depressive Symptoms

Kraemer et al. (2008) proposed a regression approach to mediation in which the treatment group, the candidate mediator, and the group by mediator interaction term are independent variables. In the current study, we examined treatment outcome by examining the change in depressive symptoms between the pretreatment randomization session (T2 HRSD) and the 6-month follow-up (T3 HRSD) using hierarchical linear regression.[4]

To ensure that any mediation effects were present over and above the influence of depression severity, our regression models included T2 HRSD depression severity in the first step. Kraemer et al. (2008) emphasized the need for a treatment group variable to be coded as deviations from a central value (i.e., zero) and for the mediator (i.e., zero) to be centered in order to reduce collinearity in interaction terms and to aid with interpretation; therefore, in our current analyses, the treatment group variable was recoded (−1, 0, 1) and potential mediators were computed as standardized residualized change scores, centered at zero.[5]

To determine whether changes in the mediator variables predicted depression symptom change, when controlling for known predictors, we constructed a series of regression equations (see Table 5).[6] The

Table 4
Means (and Standard Deviations) of EQ and TMS in the Three Prevention Conditions at Randomization and 8 Weeks Later

Measure	Time 2 (randomization)	Time 3 (8 weeks post randomization)
EQ-R		
Medication ($n = 17$)	19.12 (2.83)	19.05 (3.36)
Placebo ($n = 15$)	19.53 (2.20)	19.33 (2.66)
MBCT ($n = 15$)	17.40 (4.10)	17.73 (3.91)
EQ-W		
Medication ($n = 17$)	34.82 (6.09)	34.35 (5.80)
Placebo ($n = 15$)	34.92 (7.65)	30.80 (8.86)
MBCT ($n = 15$)	32.25 (6.95)	37.21 (7.83)*
TMS-C		
Medication ($n = 14$)	13.33 (4.3)	11.07 (4.5)
Placebo ($n = 15$)	11.61 (5.5)	10.00 (7.1)
MBCT ($n = 18$)	9.93 (6.8)	13.20 (7.0)
TMS-D		
Medication ($n = 14$)	16.73 (3.8)	14.07 (5.4)
Placebo ($n = 15$)	12.44 (6.1)	12.00 (6.8)
MBCT ($n = 18$)	13.53 (8.2)	19.67 (5.2)*

Note. * $p < .05$, one-way analysis of variance on standardized residualized change scores for the four subscales of the TMS and EQ by treatment group followed by post hoc Tukey's honestly significant difference tests. EQ-R = Experiences Questionnaire, Rumination; EQ-W = Experiences Questionnaire, Wider Experiences; TMS-C = Toronto Mindfulness Scale, Curiosity; TMS-D = Toronto Mindfulness Scale, Decentering; MBCT = maintenance mindfulness-based cognitive therapy.

[4] In order to demonstrate mediation, the TMS and EQ must be measured during treatment, be significantly altered by treatment, and temporally precede the outcome. Further, the mediator must then show a main and/or interactive effect with treatment on outcome (i.e., the mediator and/or interaction term in the regression should be significant), but treatment need not have a significant overall or main effect on outcome. A *main* effect of mediation is demonstrated when treatment significantly changes the mediator but the effect of the mediator on outcome does not significantly differ across treatment types. In contrast, an *interactive* mediation effect occurs when treatment not only significantly impacts on the mediator but also changes the relationship between the mediator and outcome such that it differs across treatments. In the present study, an interactive effect would demonstrate that treatment significantly affects the development of mindfulness skills and that the relationship between our mediator and symptom change differs across treatments.

[5] Given that there are a limited number of contrasts possible, these analyses compared MBCT to medication, with placebo as the baseline condition (e.g., −1, 1, 0); however, it should be noted that several alternative comparisons that were considered (e.g., ADM compared to PLA, MBCT compared to PLA) were not found to be significant.

[6] In the parent trial, nature of remission (stable vs. unstable) was an important factor in subsequent relapse and efficacy of the three conditions. However, this had no significant impact in any of our analyses related to changes in metacognitive variables and symptom change.

Table 5
Interactive Effects of Potential Mediators in the Prediction of Depressive Symptoms From Randomization to 6-Month Follow-Up

Order of entry	Predictor	*B*	β	*t*	Cumulative R^2	*F* for increment in R^2 for set	*df*	Partial correlation (pr)
1	HRSD T2	0.39	.24	1.34	.06	0.19	1, 34	.23
2	ΔEQ-W	1.29	.27	1.59	.09	1.43	2, 32	.27
	Group	−1.35	−.25	−1.54				−.24
3	ΔEQ-W × Group	2.38	.49	2.11	.21	4.45*	1, 31	.35
1	HRSD T2	0.17	.12	0.70	.01	0.37	1, 31	.13
2	ΔTMS-C	1.38	.37	2.07	.08	1.26	2, 29	.19
	Group	−0.97	−.20	−1.22				−.23
3	ΔTMS-C × Group	2.30	.48	2.70	.19	7.30**	1, 28	.45

Note. HRSD T2 = Hamilton Rating Scale for Depression, randomization session (pretreatment); EQ-W = Experiences Questionnaire, Wider Experiences; TMS-C = Toronto Mindfulness Scale, Curiosity; Group = mindfulness-based cognitive therapy (MBCT), medication, placebo. Δ = standardized residualized change in mediator variable from randomization to post treatment (i.e., 8 weeks). All analyses use depression severity (HRSD T3 6 months) as the outcome. *df* = degrees of freedom.
* $p < .05$. ** $p < .01$.

dependent variable in these analyses was the HRSD score 6 months after randomization. We opted to use this time point because it allowed us to retain sufficient participants (see Figure 2). Our protocol required us to immediately re-treat any participant who relapsed during the maintenance phase, which meant that these data were censored for the purpose of further analyses. Predictors were entered in three blocks. HRSD score at randomization was entered in the first block, and treatment condition (MBCT, ADM, PLA) and residualized change in the mediator (T2 for the mediator was at randomization and T3 for the mediator was always 8 weeks later) were entered in the second block. The third block contained two interaction terms, each involving the residualized change score with the three conditions dummy coded to represent a comparison of (a) MBCT and ADM and (b) active treatment (i.e., MBCT, ADM) versus placebo. Four regression equations for the EQ and TMS subscales were created. There were no significant predictors of 6-month HRSD score in the regression equation for EQ-R. For EQ-W, the interaction term for the standardized residual of MBCT versus ADM was significant, $\beta = .49$, $t(31) = 2.11$, $p < .05$, and there was a trend for the wider experiences standardized residual overall ($p < .10$). There were no significant predictors for TMS-D. For TMS-C, the standardized residual was a significant predictor, $\beta = .41$, $t(28) = 2.70$, $p < .05$, as was the interaction term for the standardized residual of MBCT versus ADM ($\beta = .57$, $t = 3.15$, $p < .01$). Thus, changes in wider experiences and curiosity were associated with lower HRSD scores when comparing MCBT and ADM. In order to be comprehensive, we examined several additional treatment group contrasts (e.g., MBCT vs. PLA, ADM vs. PLA) using this analytical framework; no significant group by mediator interactions emerged.

Discussion

In this study, we examined whether the psychological skills acquired in MBCT are also present in patients receiving somatic treatments for prevention of depressive relapse and whether these skills mediate MBCT's effectiveness. During the acute phase of the study, depressed patients who received ADM experienced decreased rumination and increased wider experiences. Our analysis suggested that these changes were a by-product of overall reductions in depressive symptoms. However, the absence of a control group tempers this interpretation, and because this is the first study to examine metacognitive change during ADM treatment, clarifying the nature of treatment-specific changes warrants further investigation.

During the maintenance phase of the study (when pharmacologically remitted patients were randomized to one of the three prevention conditions), we found that both wider experiences and decentering increased in MBCT but did not change in either ADM or PLA. Finally, examining the relationship between these metacognitive variables and clinical outcomes, we found that changes in wider experiences and curiosity predicted HRSD scores at 6-month follow-up. Although decentering changed in MBCT, this did not predict depressive symptoms at the 6-month follow-up. Also surprising, rumination (which was reduced significantly during acute treatment in the study) did not demonstrate MBCT-specific changes and did not predict subsequent symptoms. This result is not consistent with previous findings regarding rumination and might reflect psychometric issues specific to the EQ measure.

One account of MBCT's effectiveness is that mindfulness training facilitates exposure-based learning and extinction (Treanor, 2011). When patients encounter aversive emotional states, decentering allows them to label and observe the experience, and curiosity maintains the experience in attentional focus on a moment-to-moment basis. Our results also raise some intriguing questions about the EQ and TMS measures of mindfulness. Although scores on both Wider Experiences and Curiosity were associated with outcome, their intercorrelations over the various time points suggest that the items on these scales may be measuring distinct constructs. Perhaps this reflects state (TMS) versus trait (EQ) differences in how these questionnaires were designed, or this may speak to the need to use multidimensional measures to assess a multifaceted construct such as mindfulness. At minimum, identifying which item content is unique to each measure (kindness, compassion in the EQ) and which item content overlaps on the TMS and EQ (nonidentification with thinking) is needed and will help to clarify the link between mindfulness training and depression prognosis.

This study has several limitations. Because the investigation was a secondary analysis from the larger MBCT efficacy trial (Segal et al., 2010), the amount of information we gathered was restricted. For example, the ethical need to quickly re-treat participants who relapsed

reduced both our sample size and statistical power. Additionally, because ADM was tapered during the first four sessions of MBCT, the learning of new skills during this period occurred concurrently with ADM withdrawal. It is possible that preoccupation with discontinuation symptoms, which were noted by the MBCT therapists, affected how the participants in this study responded to the EQ and TMS scales. Finally, the mindfulness measures may have had demand characteristics, given that the content of items does relate to the material discussed and experienced in the MBCT group.

Our findings suggest that an increased capacity for decentering and curiosity may be particularly useful in preventing relapse. As others have found, relationships to negative thoughts may be as, or more, important than belief in thought content (e.g., Teasdale et al., 2002). Future studies would do well to chart the path by which patients utilize these skills to adopt lifestyle and behavioral strategies that support recovery.

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Correction to Bieling et al. (2012)

In the article, "Treatment-Specific Changes in Decentering Following Mindfulness-Based Cognitive Therapy Versus Antidepressant Medication or Placebo for Prevention of Depressive Relapse," by Peter J. Bieling, Lance L. Hawley, Richard T. Bloch, Kathleen M. Corcoran, Robert D. Levitan, L. Trevor Young, Glenda M. MacQueen, and Zindel V. Segal (*Journal of Consulting and Clinical Psychology*, 2012, Advance online publication. March 12, 2012. doi: 10.1037/a0027483), there is an error in the sentence beginning "For TMS-C . . ." in the paragraph below Table 5. It should read "For TMS-C, the standardized residual was a significant predictor, $\beta = .37$, $t(28) = 2.07$, $p < .05$, as was the interaction term for the standardized residual of MBCT versus ADM ($\beta = .48$, $t = 2.70$, $p < .01$)."

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