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Cognitive Therapy Skills Predict Cognitive Reactivity to Sad Mood Following Cognitive Therapy for Depression

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Abstract

Both patients' competence in the coping skills taught in Cognitive Therapy (CT) and patients' endorsement of dysfunctional cognitions following a sad mood induction (i.e., their cognitive reactivity) have been found to predict risk of relapse following a successful course of CT for depression. We examined the relationship between these constructs, specifically whether CT skills would be related to less cognitive reactivity following a mood induction among patients who responded to a course of CT. In a sample of 28 depressed patients, post-treatment CT skills were significantly related to less cognitive reactivity in response to a sad mood induction procedure ($\beta = -.29$). This relation was not accounted for by individual differences in mood reactivity. We discuss these findings as a key step in developing a more complete understanding of the role of CT coping skills and cognitive reactivity as markers of patients' vulnerability to relapse.

Keywords

Cognitive therapy; depression; therapy skills; cognitive reactivity; mood induction

A number of clinical trials have shown that cognitive therapy for depression (CT) is an efficacious treatment, with acute symptom relief that is comparable to that achieved with antidepressant medication (ADM; DeRubeis, Webb, Tang, & Beck, 2010). Beyond its acute effects, CT has been shown to have effects that endure after acute treatment is discontinued (Hollon, Stewart, & Strunk, 2006). In a relatively large study of moderate to severe depression, Hollon and colleagues (2005) found the risk of relapse among patients treated with CT was lower than that observed for patients treated with ADM when medication was discontinued over the follow-up period. Nonetheless, the outcomes achieved with CT are far from universally positive. Not all patients respond to treatment; of those who do respond, approximately half relapse over the following two years (Hollon, Thase, & Markowitz, 2002). Thus, while CT provides a relapse prevention effect, the absolute risk of relapse remains substantial. Because of this ongoing risk of relapse, an understanding of what factors account for patients' ongoing risk is needed.

In an effort to understand individual differences in risk for relapse, a number of investigators have searched for cognitive processes that differentiate formerly depressed patients who subsequently do and do not experience relapse (Miranda & Persons, 1988). In independent studies, cognitive reactivity (CR) to a sad mood induction and CT skills both have been found to predict risk of relapse following a successful course of treatment with CT (Segal et al., 2006; Strunk, DeRubeis, Chui, & Alvarez, 2007). Whereas CT skills involve the active use of coping strategies taught in CT, CR refers to mood-linked changes in the endorsement

of dysfunctional attitudes. In this paper, we focus on the relation of these two variables in an effort to better understand the relationship between two theoretically important predictors of risk for relapse. Because CT skills might be used to ameliorate the cognitive effects of a mood induction, we hypothesized that CT skills would predict less CR to a sad mood induction.

Cognitive Reactivity and Cognitive Therapy Skills

Multiple models have been proposed to understand the vulnerability to relapse of formerly depressed patients following a successful course of CT (Barber & DeRubeis, 1989). One simple model involves the use of self-report questionnaires to measure changes in depressive cognitions. Substantial cognitive changes have been shown in CT patients over the course of CT; however, comparable changes have also been found among patients treated with ADM (Garratt, Ingram, Rand, & Sawalani, 2007). While the comparability of cognitive change across these treatments might be taken to suggest that cognitive variables do not account for the more enduring effects of CT relative to ADM (when discontinued), another possibility is that individual differences in the reactivation of depressive cognitions when experiencing sad moods might still account for the positive long-term results of CT (Scher, Ingram, & Segal, 2005). In line with this possibility, depressive cognitions (specifically dysfunctional attitudes reflecting patients' relatively stable negative beliefs) may persist but only be accessible when patients experience a sad mood.

Consistent with the potential importance of CR, Miranda and Persons (1988) found that formerly depressed women reported more dysfunctional attitudes than women without a history of depression – with this difference only being apparent following a sad mood induction. Segal, Gemar, and Williams (1999) found that among 30 remitted depressed patients, the increase in dysfunctional attitudes following a sad mood induction was related to having relapsed in the 30 month period following treatment. More recently, Segal and colleagues (2006) randomly assigned patients to ADM or CT and then assessed risk of relapse prospectively. After successful treatment (with CT or ADM), patients' endorsement of dysfunctional attitudes following a negative mood induction predicted risk of relapse over the subsequent 18 month period. As one would expect if CR to sad mood explained CT's relapse prevention effect, patients treated with ADM showed greater CR to sad mood than patients treated with CT. These studies suggest that the vulnerability of formerly depressed patients can be at least partly understood by the activation of depressive cognitions when participants are induced into negative mood states, and that this reactivity helps to account for the long-term outcomes following treatment.

Another model explaining the enduring effects of CT focuses on patients' mastery of CT skills (Barber & DeRubeis, 2001; Strunk et al., 2007). Over the course of CT, patients are taught a number of skills to help address their depressive symptoms (e.g., recognizing and reevaluating automatic thoughts). Such coping skills are posited to reduce dysfunctional attitudes and help patients cope with negative moods. Recently, such CT skills have been found to predict less severe exacerbations of depressive symptoms over a series of recurrent stressors (Adler, Conklin & Strunk, 2013). Barber and DeRubeis (1989) suggested patients' mastery of CT skills may serve to protect them from their underlying vulnerability to depression. Several groups have shown that greater symptom relief is associated with higher levels of CT skills post-treatment or greater improvements in CT skills over the course of treatment (Barber & DeRubeis, 2001; Connolly Gibbons et al., 2009; Jarrett, Vittengl, Clark, & Thase, 2011). Furthermore, CT skills have been found to predict risk for relapse following successful treatment with CT (Strunk et al., 2007). Thus, available evidence suggests mastery of CT skills is both associated with concurrent outcomes and predictive of subsequent outcomes.

Given that CR to sad mood and CT skills have each been found to predict risk of relapse following CT, we sought to understand the association between these two constructs. While we are aware of no previous studies which have examined this association, we hypothesized that CT skills would be related to CR. If CR is influenced by deliberate, strategic use of CT skills, a relationship between CT skills and CR would be expected.

Method

Participants

This sample was comprised of 28 depressed patients who responded to CT after participating in 16 weeks of treatment. Patients were recruited for participation as part of a larger study (Adler, Strunk, & Fazio, 2013). There were 67 participants who met the following initial inclusion criteria and entered treatment: (a) primary diagnosis of current Major Depressive Disorder (MDD) according to the Diagnostic and Statistical Manual for Mental Disorders (DSM-IV; American Psychiatric Association, 1994); (b) 18 years or older; (c) agreed to not make changes to the psychiatric medication regimen over the course of the study. Individuals were excluded from the study if they had (d) a history of Bipolar I disorder or psychosis; (e) substance dependence within the past six months; (f) IQ of 80 or below; (g) clear potential for secondary gain (i.e., court ordered treatment); (h) current suicide risk contraindicating treatment on an outpatient basis. Of the patients who entered treatment, 44 completed the 16 weeks of treatment. Among the treatment completers, 29 (66%) met response criteria (i.e., Hamilton Rating Scale for Depression < 12 and not meeting current MDD criteria). One participant declined to participate in the negative mood induction, so 28 previously depressed patients were included in the present analyses. This sample was 54% female, predominately Caucasian (93%), and had a mean age of 38 years ($SD = 14$).

Measures

Structured Clinical Interview for DSM-IV (SCID)—The SCID (First, Spitzer, Miriam, Williams, 2002) was used to assess current MDD status and other Axis I disorders. Based on independent ratings of a subset of 12 video recorded interviews, the κ coefficient for the diagnosis of MDD indicated excellent reliability (1.00).

Hamilton Rating Scale for Depression (HRSD)—We assessed treatment response with the clinician-rated 17- item HRSD (Hamilton, 1960), modified to assess typical and atypical symptoms (i.e., sleep, appetite, and changes in weight; see Reimherr et al., 1998). To be deemed a treatment responder, scores less than 12 were required. Based on independent ratings of a subset of video recorded interviews ($n = 30$) from the full sample, reliability for HRSD total scores in the current sample was excellent ($ICC = .99$).

Cognitive Reactivity assessed by the Dysfunctional Attitudes Scale (DAS)—The DAS (Weissman, 1979) is a self report instrument measuring depression-relevant maladaptive beliefs and underlying assumptions (“I cannot be happy unless most people I know admire me”). The 40- item Form A version was used as it is the version with the most well documented psychometric properties (De Graaf, Roelofs, & Huibers, 2009). Previous research has shown the DAS to be positively correlated with self-reported depressive symptoms ($r = .41$; Oliver & Baumgart, 1985). The DAS has shown adequate test retest reliability over 2 and 3 month follow-up periods (r s of .84 and .74, respectively; Weissman). The DAS was administered before and immediately following a negative mood induction procedure.

Ways of Responding Inventory (WOR)—The WOR (Barber & DeRubeis, 1992) measures CT skills that cognitive therapists seek to foster in their patients. Respondents are provided with 6 hypothetical scenarios (e.g., being turned down for several jobs to which they applied) and corresponding initial thoughts (e.g., “There just doesn’t seem to be any point in applying”). Respondents are asked to record what they would think and do in each situation. Using guidelines outlined in the *WOR Rater’s Guide*, three coders rate the thoughts and behaviors provided by respondents. Responses are parsed into individual thought units, and two of the raters independently classify each parsing as a specific positive, negative, or neutral response. The third rater judges any disagreements and provides a final consensus rating. A total score is calculated from these ratings by subtracting the number of negative responses from the number of positive responses. Raters also provide an assessment of the quality of each response on a 7-point scale (i.e., the extent to which it would likely improve an individual’s mood). The overall WOR quality score is the average of the quality scores provided by three independent raters across scenarios. All raters were blind to patient identifiers, the timing of the WOR assessment, and outcome (for full details, see Adler et al., 2013). In the current study, the kappa for category agreement between the first and second rater (i.e., concordance between two raters on the specific categories assigned) was substantial ($\kappa = .66$). The intraclass correlation coefficient for WOR quality scores (corrected for three raters) was excellent ($ICC = .98$).

Visual Analogue Scale (VAS)—Participants’ moods were assessed using the VAS before and after a negative mood induction procedure. The VAS is a 143 mm horizontal line anchored with the descriptors sad, placed to the left, and happy, placed to the right. Participants indicate their current mood by placing a dash on the line in the location that best matches how they are feeling right now. VAS scores were calculated by subtracting the mid-point of the line (i.e., 71.5) from the distance measured in mm from the left end of the line to participant’s mark. Scores can range from Sad (−71.5) to Happy (71.5).

Procedure

Study measures (HRSD, SCID, WOR, DAS) were administered to patients prior to treatment and after completing treatment. Following the post-treatment assessment, a final assessment occurred one week later. For patients who met treatment response criteria, this assessment included the sad mood induction. Patients rated their current mood on the VAS and then listened to sad music while being asked to recall a time in their life when they were sad because they felt they were not valued by others.¹ Following the mood induction, participants rerated their mood and completed the DAS again.

Results

To verify the efficacy of the mood induction procedure, we conducted a paired *t*-test comparing VAS scores before and after the sad mood induction. This analysis indicated that patients experienced a moderate, significant change in VAS rated mood between their pre- and post-mood induction ratings ($d = .50$, $t(27) = 2.91$, $p = .007$; pre: $M = 14.6$, $SD = 28.5$; post: $M = 1.8$; $SD = 22.8$). Thus, the mood induction procedure appeared to be successful in creating a negative mood shift. A paired *t*-test comparing DAS scores before and after the mood induction was non-significant, suggesting patients did not endorse more dysfunctional attitudes following the sad mood induction ($d = .1$; $t(27) = .56$, $p = .6$; pre: $M = 116.8$, $SD = 27.4$; post: $M = 115.1$; $SD = 24.8$).

¹The musical selection used was “Russia Under the Mongolian Yoke” recorded at half speed as performed by Prokofiev from the film *Alexander Nevsky* (For mood induction procedures including the use of this musical selection, see Martin, 1990).

Next, we examined our primary test of interest: the association between patients' post-treatment CT skills on the WOR and their change in DAS scores after the sad mood induction (i.e., their CR). In our primary model, we entered pre-mood induction DAS scores and WOR quality scores as predictors of post-mood induction DAS scores. Pre-mood induction DAS scores were included in order to assess DAS change. WOR quality scores were a significant predictor in this model ($\beta = -.29$, $t(27) = -2.45$, $p = .02$). Thus, previously depressed patients who had greater compensatory skills demonstrated less CR in response to the mood induction procedure. To display this relationship, we plotted the relation of WOR quality scores and residualized change in DAS scores from pre- to post-mood induction in Figure 1. When we added pre-treatment WOR quality scores as an additional covariate, the predictive relation of WOR scores and CR remained significant ($\beta = -.29$, $t(25) = -2.44$, $p = .04$). When examining the WOR total score (rather than WOR quality), the pattern of results was similar (though only at the level of a non-significant trend; $\beta = -.22$, $t(27) = -1.98$, $p = .06$).

Next, we considered the possibility that CR might merely reflect individual differences in the extent to which the mood induction procedure produced a sad mood (i.e., mood reactivity). It is possible that changes in DAS scores could simply reflect changes in mood rather than independent differences in dysfunctional attitudes. To address this concern, we reexamined the primary regression model of WOR quality scores predicting change in DAS scores while including an additional covariate: residualized change on the VAS (i.e., residuals from a regression model in which pre-mood induction VAS scores served as a predictor of post-mood induction VAS scores). In this model, post-treatment WOR quality scores remained a significant predictor of change in DAS scores after controlling for residualized change in VAS scores ($\beta = -.29$, $t(27) = -2.41$, $p = .02$). In fact, CR and mood reactivity were remarkably unrelated ($r = .04$, $p = .8$). Therefore, CT skills demonstrated a relationship with CR, and this relation was not simply a function of individual differences in mood reactivity.

In exploratory analyses, we examined the role of gender. We found no differences between men and women in mood reactivity or CR ($ps > .2$). However, women had significantly more adaptive WOR quality scores than men ($d = .8$, $t(26) = 2.20$, $p = .04$; Women: $M = 5.2$, $SD = .7$; Men: $M = 4.5$, $SD = .9$). Of most interest, we found evidence that gender moderated the relations of both: (1) WOR quality and mood reactivity, and (2) WOR quality and CR. In the first of these analyses, we examined the following predictors of post-mood induction VAS scores: pre-mood induction VAS scores, WOR quality scores, gender, and the interaction of WOR quality scores and gender. This interaction term was significant ($\beta = .44$, $t(27) = 2.91$, $p = .008$). The interaction was driven by WOR quality scores being more strongly related to less mood reactivity among men ($\beta = .23$, $t(12) = .98$, $p = .4$) than women ($\beta = .05$, $t(14) = -.19$, $p = .9$). In a similar analysis of CR, we found a significant interaction of WOR quality scores and gender ($\beta = .33$, $t(27) = 2.13$, $p = .04$). However, this interaction was driven by WOR quality scores being more strongly related to less CR among women ($\beta = -.47$, $t(14) = -3.59$, $p = .004$) than men ($\beta = -.12$, $t(12) = -.52$, $p = .6$). While exploratory, these analyses suggest that our primary finding of a relation of CT skills and CR was particularly marked among women. Among men, the relation of CT skills and CR was weak. However, CT skills were more strongly related to lower mood reactivity among men as compared to women.

Discussion

To our knowledge, this investigation is the first to examine and find evidence for a relationship between CT skills and the degree of CR following a sad mood induction among a sample of formerly depressed CT patients. Patients with greater skills demonstrated less

CR when experiencing sad moods. While the effect size was not large, this association remained even after controlling for patients' mood reactivity, suggesting that the relationship between CT skills and CR is not merely a methodological artifact of patients' with greater CT skills also being less susceptible to a sad mood induction. While exploratory, additional analyses suggested the relation of skills and CR was considerably stronger among women than men.

Independent studies have shown that both CT skills and CR to a sad mood induction predict risk of relapse following treatment (Segal et al., 2006; Strunk et al., 2007). By demonstrating a relation of patients' CT skills and CR to sad mood, we provide evidence that these processes are related. As our understanding of multiple predictors of relapse risk improves, knowledge of these predictors may allow the length of treatment to be individualized based on patients' development of protective factors as well as reduction of symptoms.

Given results of additional analyses, we suspect the relation of CT skills and CR is not explained by individual variability in propensity for experiencing sad moods. Specifically, the degree to which patients reported experiencing a worsening of mood following the mood induction failed to account for the relation of CT skills and CR. While additional research is needed, we hypothesize that the relation we observed is due to patients' use of CT skills serving to prevent the endorsement of dysfunctional attitudes when sad moods are provoked.

Some key limitations are worth noting. First, our sample is small. Because we are underpowered to detect effects which may be of interest, caution in interpreting non-significant effects is warranted. Second, we regard our analyses of gender as quite exploratory. Nonetheless, if replicated, gender differences in the relation of CT skills and both CR and mood reactivity could be important. Our findings raise questions about how CT skills might function differently among men and women. Third, the relation we observed between CT skills and CR reflects the concurrent association of these variables. We have suggested that effortful use of CT skills may help patients respond to a negative mood induction without endorsing dysfunctional attitudes. Another possibility is CR interferes with successful use of CT skills. Given the association we observed, we encourage researchers to examine how CT skills and CR might independently or interactively exert an impact on long-term outcome.

In conclusion, our results highlight the role of CT skills in post-treatment CR. The relation of CT skills and CR leads us to consider the possibility that clients were utilizing CT skills to influence their endorsement of dysfunctional attitudes following a mood induction. With this possibility in mind, rather than relying purely on schema change, cognitive therapists might work to enhance patients' CT skills for coping with sad moods in order to protect them from CR following naturally occurring negative moods. We encourage researchers examining CR as a predictor of relapse to consider both CR and CT skills.

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References

- Adler AD, Conklin LR, Strunk DR. Quality of coping skills predicts depressive symptom reactivity over repeated stressors. *Journal of Clinical Psychology*. 2013 Advance online publication.
- Adler AD, Strunk DR, Fazio RH. What Changes in Cognitive Therapy for Depression? An Examination of Compensatory Skills and Maladaptive Beliefs. 2013 Manuscript submitted for publication.
- American Psychiatric Association. Diagnostic and statistical manual of mental disorders. Fourth Edition. Washington, DC: American Psychiatric Association; 1994.
- Barber JP, DeRubeis RJ. On second thought: Where the action is in cognitive therapy for depression. *Cognitive Therapy and Research*. 1989; 13:441–457.
- Barber JP, DeRubeis RJ. The ways of responding: A scale to assess compensatory skills taught in cognitive therapy. *Behavioral Assessment*. 1992; 14:93–115.
- Barber JP, DeRubeis RJ. Change in compensatory skills in cognitive therapy for depression. *Journal of Psychotherapy Practice & Research*. 2001; 10:8–13. [PubMed: 11121002]
- Connolly Gibbons MB, Crits-Christoph P, Barber JP, Stirman SW, Gallop R, Goldstein LA, Temes CM, Ring-Kurtz S. Unique and common mechanisms of change across cognitive and dynamic psychotherapies. *Journal of Consulting and Clinical Psychology*. 2009; 77:801–813. [PubMed: 19803561]
- De Graaf LE, Roelofs J, Huibers MJH. Measuring dysfunctional attitudes in the general population: The Dysfunctional Attitude Scale (form A) revised. *Cognitive Therapy and Research*. 2009; 33:345–355. [PubMed: 19623267]
- DeRubeis, RJ.; Webb, CA.; Tang, TZ.; Beck, AT. Cognitive therapy. In: Dobson, KS., editor. *Handbook of cognitive-behavioral therapies*. 3rd ed. New York, NY: Guilford Press; 2010. p. 277-316.
- First, MB.; Spitzer, RL.; Miriam, G.; Williams, JBW. Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Patient Edition. (SCID-I/P). New York: Biometrics Research, New York State Psychiatric Institute; 2002.
- Garratt G, Ingram RE, Rand KL, Sawalani G. Cognitive processes in cognitive therapy: Evaluation of the mechanisms of change in the treatment of depression. *Clinical Psychology: Science and Practice*. 2007; 14:224–239.
- Hamilton M. A rating scale for depression. *Journal of Neurological Neurosurgical Psychiatry*. 1960; 23:56–62.
- Hollon SD, DeRubeis RJ, Shelton RC, Amsterdam JD, Salomon RM, O'Reardon JP, Gallop R. Prevention of relapse following cognitive therapy vs medications in moderate to severe depression. *Archives of General Psychiatry*. 2005; 62:417–422. [PubMed: 15809409]
- Hollon SD, Stewart MO, Strunk DR. Enduring effects for cognitive behavior therapy in the treatment of depression and anxiety. *Annual Review of Psychology*. 2006; 57:285–315.
- Hollon SD, Thase ME, Markowitz JC. Treatment and Prevention of Depression. *American Psychological Society*. 2002; 3:39–77.
- Jarrett RB, Vittengl JR, Clark LA, Thase ME. Skills of Cognitive Therapy (SoCT): A new measure of patients' comprehension and use. *Psychological Assessment*. 2011; 23:578–586. [PubMed: 21319902]
- Martin M. On the induction of mood. *Clinical Psychology Review*. 1990; 10:669–697.
- Miranda J, Persons JB. Dysfunctional attitudes are mood-state dependent. *Journal of Abnormal Psychology*. 1988; 97:96–99.
- Oliver JM, Baumgart EP. The Dysfunctional Attitude Scale: Psychometric properties and relation to depression in an unselected adult population. *Cognitive Therapy and Research*. 1985; 9:161–167.
- Reimherr FW, Amsterdam JD, Quitkin FM, Rosenbaum JF, Fava M, Zajecka J, Sundell K. Optimal length of continuation therapy in depression: a prospective assessment during long-term fluoxetine treatment. *American Journal of Psychiatry*. 1998; 155:1247–1253. [PubMed: 9734550]
- Scher CD, Ingram RE, Segal ZV. CR and vulnerability: Empirical evaluation of construct activation and cognitive diatheses in unipolar depression. *Clinical Psychology Review*. 2005; 25(4):487–510. [PubMed: 15914266]

- Segal ZV, Gemar M, Williams S. Differential cognitive response to a mood challenge following successful cognitive therapy or pharmacotherapy for unipolar depression. *Journal Of Abnormal Psychology*. 1999; 108(1):3–10. [PubMed: 10066988]
- Segal ZV, Kennedy S, Gemar M, Hood K, Pedersen R, Buis T. CR to sad mood provocation and the prediction of depression relapse. *Archives of General Psychiatry*. 2006; 63:749–755. [PubMed: 16818864]
- Strunk DR, DeRubeis RJ, Chiu AW, Alvarez J. Patients' competence in and performance of cognitive therapy skills: Relation to the reduction of relapse risk following treatment for depression. *Journal of Consulting and Clinical Psychology*. 2007; 75:523–530. [PubMed: 17663607]
- Weissman AN. The Dysfunctional Attitude Scale: A validation study. *Dissertation Abstracts International*. 1979; 40:1389B–1390B.

Figure 1.

Correlation of Cognitive Reactivity and Cognitive Therapy Skills at Post-Treatment

Note. Residualized change scores for the Dysfunctional Attitudes Scale (DAS) are residuals from a regression model in which pre-mood induction DAS scores served as a predictor of post-mood induction scores. These residuals were standardized to the M and SD of post mood induction DAS scores. Relation displayed is $r = -.29$.

WOR = Ways of Responding Inventory.

N = 28.