



Repetitive negative thinking predicts depression and anxiety symptom improvement during brief cognitive behavioral therapy



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ABSTRACT

Repetitive negative thinking (RNT) is a common symptom across depression and anxiety disorders and preliminary evidence suggests that decreases in rumination and worry are related to improvement in depression and anxiety symptoms. However, despite its prevalence, relatively little is known about transdiagnostic RNT and its temporal associations with symptom improvement during treatment. The current study was designed to examine the influence of RNT on subsequent depression and anxiety symptoms during treatment. Participants ($n = 131$; 52% female; 93% White; $M = 34.76$ years) were patients presenting for treatment in a brief, cognitive behavior therapy based, partial hospitalization program. Participants completed multiple assessments of depression (Center for the Epidemiological Studies of Depression-10 scale), anxiety (the 7-item Generalized Anxiety Disorder Scale), and repetitive negative thinking (Perseverative Thinking Questionnaire) over the course of treatment. Results indicated statistically significant between and within person effects of RNT on depression and anxiety, even after controlling for the effect of time, previous symptom levels, referral source, and treatment length. RNT explained 22% of the unexplained variability in depression scores and 15% of the unexplained variability in anxiety scores beyond that explained by the control variables. RNT may be an important transdiagnostic treatment target for anxiety and depression.

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Repetitive negative thinking (RNT) is a common symptom of depression and anxiety disorders and has been linked with deficits in cognitive, behavioral, and affective functioning (see [Ehring & Watkins, 2008](#); [Mennin & Fresco, 2014](#) for reviews). RNT is defined as repetitive, passive/uncontrollable, negatively valenced, and relatively abstract thought ([Ehring & Watkins, 2008](#)). To date, RNT has been primarily studied in disorder specific expressions (e.g., worry in generalized anxiety or rumination in depression). However, these content specific forms of RNT appear to share considerable variance and a number of process characteristics ([Segerstrom, Tsao, Alden, & Craske, 2000](#); [Watkins, Moulds, & Mackintosh, 2005](#)), suggesting that it may be beneficial to study RNT from a content independent perspective. By focusing more on shared process characteristics and less on specific content, findings may generalize across a wider range of disorders. Notably, some

studies have suggested that changes in RNT are associated with treatment outcome for anxiety and depression (e.g., [Hawley et al., 2014](#); [Newby, Williams, & Andrews, 2014](#); [Van Aalderen et al., 2012](#)). Despite these promising findings, studies to date have failed to establish the temporal precedence of change in RNT before symptom improvement and have relied on the use of unreliable change scores. Further, studies have focused primarily on specific expressions of RNT (e.g., worry or rumination) potentially limiting the generalizability of findings. In order to address these limitations, the current study was designed to examine the effects of content-independent RNT on subsequent depression and anxiety symptom improvement.

RNT has been primarily studied in content specific expressions that are characteristic of particular disorders (e.g., symptom-focused rumination in depression, future oriented worry in generalized anxiety disorder). However, various forms of RNT present transdiagnostically and may have more shared than unique characteristics ([Watkins et al., 2005](#)). For example, rumination and worry are highly correlated, load on a common higher-order factor, and are similarly related to anxiety and depression symptoms

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(Fresco, Frankel, Mennin, Turk, & Heimberg, 2002; Segerstrom et al., 2000; Siegle, Moore, & Thase, 2004). In addition, a recent meta-analysis found a moderate effect size for the correlation between rumination and symptoms of both anxiety and depression (Olatunji, Naragon-Gainey, & Wolitzky-Taylor, 2013). Thus, empirical evidence suggests that worry and rumination share a number of characteristics, are highly correlated, and are associated transdiagnostically with both anxiety and depression.

Evidence also suggests that RNT may be a critical factor in the development and maintenance of psychiatric symptoms and disorders (see Ehrling & Watkins, 2008 for a review). In the form of rumination, RNT has been shown to prospectively predict the onset of depressive episodes and interact with negative cognitive styles to predict episode duration (see Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008, for review). Similarly, in healthy adolescents, rumination predicts the onset of a depressive episode and overall symptom levels one year later (Wilkinson, Croudace, & Goodyer, 2013). Additional studies have shown that rumination is associated with a host of other symptoms. For example, rumination has been linked to the maintenance of post-traumatic stress symptoms over time, even after controlling for depression (Zetsche, Ehrling, & Ehlers, 2009), and prospectively predicts poorer sleep quality in undergraduates, after accounting for symptoms of anxiety and depression (Takano, Iijima, & Tanno, 2012). Similarly, worry has also been shown to predict subsequent levels of anxiety (e.g. Segerstrom et al., 2000; Siddique, LaSalle-Ricci, Glass, Arnkoff, & Díaz, 2006).

There is some evidence to suggest that specific expressions of RNT are associated with poorer treatment response, slower recovery, and greater likelihood of relapse following treatment. For example, higher pre-treatment rumination is associated with poorer treatment response for major depressive disorder and dysthymia (Ciesla & Roberts, 2002; Schmaling, Dimidjian, Katon, & Sullivan, 2002). Similarly, worry has been shown to predict poorer treatment response at post-treatment and 1-year follow up in individual and group cognitive behavior therapy (CBT) for social anxiety disorder (Mörtberg & Andersson, 2014). Others have found that rumination is associated with delayed symptom remission in mild-moderately depressed participants (Jones, Siegle, & Thase, 2008) and greater likelihood of relapse following mindfulness based cognitive behavior therapy (Michalak, Hölz, & Teismann, 2011). Such poor treatment response and lack of durable treatment effects associated with RNT have prompted the suggestion that RNT may be an endophenotype of treatment refractory patients who would benefit from personalized treatment (Mennin & Fresco, 2013).

Relatedly, other studies suggest that successful reduction of RNT may mediate treatment outcome in depression and anxiety. For example, Watkins et al. (2011) found that adding rumination focused CBT to treatment as usual (maintenance antidepressant medication) for residual depression improved both rumination and depression; changes in rumination were also significantly associated with decreased depression. Two studies of mindfulness-based treatment for depression also found that decreased levels of worry and rumination (change scores) mediated the effect of treatment on depression outcome (Van Aalderen et al., 2012). Similarly, changes in worry (measured daily) have been shown to partially mediate the effect of time on decreased anxiety in CBT and applied relaxation for GAD (Donegan & Dugas, 2012).

To the authors' knowledge, there is only one study that has examined changes in content independent RNT and treatment outcome. This study compared internet delivered CBT to a waitlist control for a mixed GAD and MDD sample (Newby et al., 2014). A serial mediator model – with beliefs about RNT as the first mediator, predicting RNT as the second mediator – indicated that there

was a significant serial indirect effect (including both mediators) for depression, even when baseline scores were controlled for. However, effects were nonsignificant for anxiety. Taken together, there is preliminary evidence to suggest that RNT may be important for facilitating treatment outcome.

Although a growing literature has documented the relevance of RNT to treatment outcome, several methodological concerns limit the conclusions that can be drawn from these studies. For example, the restricted number of assessment time points (e.g., pre-, mid-, and post-treatment) and use of unreliable change scores (Cronbach & Furby, 1970) do not allow for careful examination of temporal precedence of changes in RNT. Further, most studies have focused on content-specific forms of RNT (e.g., worry or rumination), which may limit generalizability of findings to one disorder or symptom constellation. Thus, additional studies examining the impact of RNT on anxiety and depression symptoms during treatment are needed. To address this gap in the literature, the current study was designed to examine temporal associations between RNT and symptoms of depression and anxiety in a heterogeneous clinical sample over the course of a brief, CBT-based, partial hospitalization program.

1. Method

1.1. Procedure

This study was conducted in compliance with a protocol approved by the hospital's Internal Review Board. All patients admitted to the partial hospital program from June through December 2013 (excluding the month of November due to technical difficulties) were invited to participate in the study. Patients provided written informed consent for their data to be de-identified and analyzed for research purposes. Standard clinical practice at the partial hospital program involves comprehensive pre- and post-treatment assessment (details published elsewhere, see Beard & Björgvinsson, 2013), as well as daily assessment of (1) depression symptoms, (2) anxiety symptoms, and (3) one of three hypothesized mediators of treatment outcome (one of which was a measure of RNT). Assessments of depression and anxiety occurred with every administration, while the assessment of hypothesized mediators occurred at every third administration. Thus, each daily assessment battery included a measure of depression, anxiety, and one of three hypothesized mediators. After three administrations, each battery was repeated in the same order. Assessment batteries were completed by administration iteration, not by treatment day. In other words, if a patient failed to complete the second assessment battery on day two of treatment, that assessment battery would be administered on the third day of treatment.

1.2. Sample selection and characteristics

Considered for this study were 148 patients who provided informed consent and were admitted to the partial hospitalization program during the study period. Participants were included in this study if they had (a) a depression or anxiety measure (e.g., on day two) that was (b) preceded by an RNT measure *as well as* a depression or anxiety measure on consecutive treatment days. Application of this inclusion criterion resulted in 131 participants with valid data points. There were no statistically significant differences between participants and non-participants on biological sex, ethnicity, age, CES-D-10 at admission, or GAD-7 at admission. Non-participants had substantially shorter durations of treatment ($M = 3.65$ days) than participants ($M = 8.55$ days), resulting in fewer potential occasions of measurement to qualify for inclusion in this study, $t(146) = -7.41$, $p < .001$. Non-participants (64.71%) were more likely than participants (38.93%) to have been referred

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