EVALUATING THE RELATIONSHIP BETWEEN MINDFULNESS AND RESPONSE TO A SINGLE SESSION REPETITIVE NEGATIVE THINKING INTERVENTION

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Abstract

Repetitive negative thinking (RNT) is a transdiagnostic construct defined as cognitive perseveration on negative themes (e.g., worry and rumination), and has been implicated in the etiology and maintenance of various psychological disorders. Studies have shown that reductions in RNT may mediate the initial and sustained reductions in symptoms of anxiety and depression, among other disorders. Mindfulness-based interventions have been shown to effectively reduce RNT, however many existing treatments are time-consuming and resource-intensive. Thus, brief, mindfulness skills video interventions that target the transdiagnostic elements of RNT are a promising new area of exploration. Since research is limited regarding factors that predict response to such interventions, the current study explored the effect of baseline mindfulness skills on participants’ response to a single session, mindfulness video intervention. Data from 76 adult community members high in RNT were collected to measure RNT levels and mindfulness skills prior to watching a one-session mindfulness skills training video, as well as RNT levels five days after watching the video. Results indicated that several facets of mindfulness were negatively correlated with pre-intervention RNT levels. However, only one facet related to taking a non-evaluative stance toward internal thoughts and feelings moderated participants’ response to the intervention; those with lower non-judgmental awareness skills had a significantly greater decrease in PTQ scores following the intervention than those who scored higher on non-judgmental awareness. Results have implications for predicting response to easily accessible mindfulness-based interventions that address the shared, transdiagnostic elements of RNT, which will allow for more targeted treatment recommendations.
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Chapter I

Introduction

Repetitive Negative Thinking

Repetitive negative thinking (RNT) has been defined as a style of thinking about problems or experiences that is 1) repetitive, 2) intrusive, and 3) difficult to disengage from (Ehring & Watkins, 2008). The term RNT encompasses both worry and rumination, which have been shown to be very similar processes except that worry is typically future-oriented whereas rumination is predominantly past-focused (Papageorgiou & Wells, 1999; Watkins, 2004; Watkins et al., 2005; Smith & Alloy, 2010). While RNT often occurs outside of psychological disorders, it has also been proposed as a transdiagnostic process involved in both the development and maintenance of various psychological disorders (Ehring & Watkins, 2008; Harvey et al., 2004).

The content of RNT can vary significantly depending on the disorder. In depression, rumination refers to repetitive thoughts focusing on one’s symptoms, causes, meanings, and consequences of symptoms. The two-factor model of the Ruminative Response Scale (RRS) identified “reflection” and “brooding” as distinct subcomponents of rumination (Treynor et al., 2003). Treynor et al. (2003) defined brooding rumination, the relatively more maladaptive subcomponent of rumination, as a passive comparison of one’s current situation with some unachieved standards (e.g., “Why do I have problems other people don’t have?”). Nolen-Hoeksema’s (1991, 2004) response styles theory suggests that brooding rumination involves repetitive and passive thinking about one’s depressive symptoms and the possible causes and consequences of those symptoms (e.g., “Why can’t I get going? What’s wrong with me? I don’t feel I’ll ever get over this.”). Many experimental studies have shown that the effects of brooding
rumination include negatively biased thinking, decreased instrumental behavior, poor problem solving, and low social support (see Lyubomirsky & Tkach, 2004 for a review). In addition, the cognitive content in brooding rumination often leads to negative self-evaluation and a sense of hopelessness about the future (Abramson et al., 1989; Beck, 1967).

Conversely, content analyses of worry-based RNT suggest that this type of RNT involves uncertainty about whether important situations will be manageable (Lyubomirsky et al., 1999), as well as uncertainty about whether one will be able to control one’s environment (Alloy et al., 1990; Barlow, 1988; Garber et al., 1980). Worry-based RNT also involves fear about future negative outcomes if one is unable to control their environment (Borkovec et al., 1983). Worry-based RNT might include thoughts such as, “What if I can’t pull myself together?” or “What if I can’t get all my work done in time?”

Despite these differences in content, the review by Ehring and Watkins (2008) found that RNT is characterized by the same process across disorders. Most RNT is characterized by having an “abstract, evaluative mindset focused on the causes, meanings, and implications of events,” (Watkins, 2008) and is typically more verbal than image-based (Ehring & Watkins, 2008). Meta-cognitive beliefs about the utility or harm of engaging in RNT are also believed to play a role in the onset and maintenance of RNT cycles (Papageorgiou & Wells, 1999). For example, the meta-cognitive belief that rumination is conducive to problem solving would encourage the cycle of RNT to continue.

Consequences of RNT

Trait rumination is a core psychopathological feature of depression and anxiety and predicts both their onset and maintenance. Several studies have found that individuals who
ruminate are significantly more likely to develop additional episodes of major depression over time, even after statistically controlling for previous levels of depression (Nolen-Hoeksema, 2000). Studies have also found that reductions in RNT may mediate the initial and sustained reduction in symptoms of depression (Alleva et al., 2014; Deyo et al., 2009; Heeren & Philippot, 2011; Kearns et al., 2016; Petrocchi & Ottaviani, 2016; Royuela-Colomar & Calvete, 2016; Ramel et al., 2004) and anxiety (Desrosiers et al., 2013; Kopelman-Rubin et al., 2017; Topper et al., 2017). The far-reaching implications of reducing RNT support the utility of targeting RNT specifically with evidence-based interventions. Accordingly, several established, evidence-based interventions exist to address RNT either as part of a larger treatment, such as in Behavioral Activation for depression (Dimidjian et al., 2006), or as the primary target of treatment, such as in Attention Training Treatment (Wells, 1990).

**Mindfulness as a Treatment for RNT**

Mindfulness has demonstrated efficacy in treating a broad range of psychological disorders (Baer, 2006) by serving as a standalone treatment, such as in Mindfulness Based Stress Reduction (MBSR; Kabat-Zinn, 1990), or as an adjunct to other established therapies, such as in Mindfulness-Based Cognitive Behavioral Therapy (MBCT; Segal et al., 2018). According to Jon Kabat-Zinn (1994, 2003), mindfulness involves paying attention, on purpose, in the present moment in a nonjudgmental, accepting, unattached, and curious manner. This definition suggests that mindfulness is incompatible with all forms of RNT, and research indicates an inverse relationship between mindfulness and rumination (Short & Mazmanian, 2013; de Bruin et al., 2012; Weiner et al., 2016). Therefore, it is not surprising that many studies have revealed strong support for the efficacy of mindfulness-based interventions for the treatment of rumination and
worry in clinical depression and anxiety (Craigie et al., 2008; Evans et al., 2008; Ree, & Craigie, 2007). Further, a growing body of evidence suggests that mindfulness-based interventions can have positive effects in both clinical (Chiesa & Serretti 2011; Hofmann et al., 2010; Strauss et al. 2014; Vøllestad et al., 2012) and non-clinical (Eberth & Sedlmeier 2012; Khoury et al., 2015) populations.

Brief mindfulness-based interventions also appear to have promising results. MBSR and MBCT, two of the most well-established mindfulness-based interventions, have an 8-week intervention period that includes approximately 30 hours of group therapy plus daily home practice. However, two laboratory-based studies have shown that brief, four-to-six-week mindfulness trainings are more effective at reducing RNT and associated distress compared to distraction and problem solving (Hilt & Pollak, 2012) and progressive muscle relaxation and loving-kindness meditation (Feldman et al., 2010). Some studies have also shown that brief mindfulness-based therapies have been found to be more effective than somatic relaxation (Jain et al., 2007) and cognitive reappraisal trainings (Keng et al., 2016) in reducing distress and RNT in individuals with anxiety and depression.

There is also growing evidence that even web-based mindfulness interventions have beneficial effects on psychological health. A recent meta-analysis reviewing the effects of online mindfulness-based interventions on mental health demonstrated that outcomes related to stress, anxiety, depression, and well-being all significantly improved after participants received an online mindfulness-based intervention (Spijkerman et al. 2016). Another systematic review and meta-analysis of mindfulness-based self-help interventions revealed that such interventions were associated with reductions in depression and anxiety, among other positive outcomes (Cavanagh
et al. 2014). These findings suggest that internet-based and/or low-intensity mindfulness trainings may confer similar benefits to in-person mindfulness trainings.

*Limitations of Existing Mindfulness-Based Treatments for RNT*

Though mindfulness and other existing treatments designed to target RNT are promising, these treatments are frequently designed for specific disorders as is the case with Rumination Focused Cognitive Behavioral Therapy for Depression (Watkins, 2018). Additionally, many existing interventions can be complicated, time-consuming, and resource-intensive, and have a requirement to attend in person. These factors serve as barriers to a broad range of individuals, including those with limited financial resources, limited access to transportation, time constraints, disabilities, and those living in rural areas. Further, the focus of targeting RNT in exclusively clinical populations means that these interventions may not reach non-treatment-seekers and/or sub-clinical populations who might still be experiencing negative effects of RNT (Topper et al., 2010). Since all forms of RNT appear to share key common elements (Ehring & Watkins, 2008; Topper et. al., 2010; Watkins, 2008), and many individuals experience multiple forms of RNT, it seems logical and efficient to develop brief, easily accessible interventions that directly target the shared, transdiagnostic elements of RNT.

*Current Study*

The current study is part of a larger study testing the effects of a novel, single session, mindfulness skills training video intervention on RNT, negative affect, and mindfulness skills use (Hughes, 2020). Because of the ubiquity of RNT among psychological disorders, the role RNT plays in maintaining depression and anxiety, and the importance of reducing RNT to
improve clinical outcomes, the ability to develop novel mindfulness-based interventions for RNT is of utmost importance. The mindfulness-based intervention in this study is unique in that it is a 30-minute video that can be easily accessed online, addresses both rumination and worry, and is aimed for clinical samples as well as non-treatment-seekers and/or sub-clinical individuals. As such, this intervention has great potential for improving public health.

Although mindfulness has been shown to effectively reduce RNT, there is a paucity of research on factors that predict an individual’s response to brief, mindfulness interventions. Elucidating the relationship between baseline mindfulness facets and response to brief mindfulness-based interventions for RNT would be useful in anticipating likelihood of treatment response, allowing for more targeted interventions.

Therefore, the current study aims to 1) examine the relationship between five key facets of mindfulness (observe, describe, acting with awareness, non-judging, and non-reactivity) and baseline RNT levels in adults with high trait rumination and/or worry, and 2) determine whether any of the five facets of mindfulness moderate participants’ response to the single session video intervention. It is hypothesized that: 1) all five facets of mindfulness will be negatively correlated with RNT scores at baseline, and 2) all five facets of mindfulness will moderate the effect of the intervention such that those with higher pre-intervention mindfulness skills will have a significantly greater decrease in PTQ scores following the intervention than those with lower pre-intervention mindfulness scores.

Knowing which mindfulness facets moderate response to a mindfulness skills training video in individuals with high levels of RNT would allow: 1) clinicians to identify which clients would benefit from learning specific mindfulness skills before adding adjunct mindfulness interventions to the treatment package; 2) future developers of mindfulness video interventions
to consider teaching skills in a particular order to maximize the video’s effectiveness; and 3) intake clinicians to refer only clients with certain baseline mindfulness skills to brief mindfulness video interventions.
Chapter II

Method

Participants

Participants were 76 adults high in trait rumination and/or worry recruited from the local New Brunswick community between February 2019 and December 2019. Inclusion criteria for participating in the larger study consisted of: 1) being age 18 or older, 2) ability to read and write English fluently, 3) ability to travel to the study center in New Brunswick, NJ, and 4) scoring either more than one standard deviation (3.0) above the norm of random community samples on the Ruminative Responses Scale (9; RRS-B; Treynor et al., 2003) or above the suggested cutoff on the Penn State Worry Questionnaire Short Form (15; PSWQ-SF; Topper et al., 2014).

Exclusion criteria included: 1) significant, uncorrected hearing or vision impairments that would prevent the participant from being able to watch the skills training video required for this study and 2) reported cognitive impairments that impair the participant from fully understanding the consent forms. Participants were not excluded for receiving past or current mental health treatment or for having additional mental or physical health conditions. In addition, participant data was not included in the current study if there was a failure to complete the in-lab portion of the study, the pre-lab survey, or the post-intervention survey. Demographic information for the sample is provided in Table 1.

Recruitment and Screening

Recruitment flyers with basic information about the study and compensation were posted in the local Highland Park, Piscataway, and New Brunswick, NJ areas as well as in various locations on Rutgers’ campuses. Recruitment ads were also posted on local www.yahoo.com
discussion boards and on www.craigslist.com. In order to determine eligibility, interested individuals completed the screening survey by following a link that was provided by the study team (http://bit.ly/ruminationsurvey). The screening survey assessed eligibility through measures of trait rumination (Brooding subscale of the Ruminative Response Scale; RRS-B) and worry (Short Form of the Penn State Worry Questionnaire; PSWQ-SF). It also contained an area for individuals to provide their contact information. Eligibility was confirmed if the interested individual scored a nine or above on the RRS-B (Treynor et al., 2003) or 15 or above on the PSWQ-SF (Topper et al., 2014).

After the screening survey was complete, the study team emailed interested individuals to inform them of their eligibility status. If deemed eligible, the study team emailed participants a link to schedule their initial lab visit and complete the pre-lab visit survey through Qualtrics. The pre-lab survey contained the study consent form, an area to provide contact information, demographic questions, and many of the self-report questionnaires, including the FFMQ and PTQ (detailed in Measures section below). Prior to the participant’s arrival, the study team determined the participant’s identification number so as to ensure their data was de-identified from their personal information and to track their assessments.

Lab Visit Procedures

Upon arrival to the lab visit, participants were asked to provide informed consent again by signing a hard copy of the consent form. They were then randomized into either the active or control condition. During the lab visit, participants randomized into the active condition watched a thirty-minute dialectical behavior therapy-informed mindfulness skills training video. Participants randomized into the control condition did not watch the skills training video. Study
staff explained to individuals in the active condition that they have access to the skills training video through the Ethica Health application (Ethica Data Services, 2016) and can re-watch it anytime for the duration of their participation in the study. They explained to individuals in the control condition that they can return to watch the skills training video after their participation is complete if desired.

After watching the skills video, active participants then began a five minute “skills rehearsal” period, in which they were instructed to practice using the skills taught in the video and to redirect attention away from RNT if it arises. Control participants spent this time engaging in a five minute “rest period,” in which they were asked to sit and wait for five minutes with no specific instructions on what to do during that time except to stay seated and not use anything they brought with them (e.g., book, cell phone, etc.).

Five days after each participant’s lab visit, they were sent a link to complete a post-intervention survey through Qualtrics, which contained self-report questionnaires, including the Perseverative Thinking Questionnaire (detailed in Measures section below). After completing the post-intervention survey, participants were compensated up to $50 in the form of an Amazon gift card sent to their preferred email address. The exact amount participants were paid depended on a primary outcome measure in the parent study.

**Measures**

Measures used in the current study included:

**Demographics and Treatment History.** Participants completed this during the pre-lab survey on Qualtrics. They were asked to report their age, gender, race/ethnicity, education level,
and household income. Participants were also asked to state whether they had ever been involved in mental health treatment (current or past), including therapy and/or medication.

**Five Facet Mindfulness Questionnaire.** Participants completed the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006) during the pre-lab survey. The FFMQ is a 39-item self-report questionnaire designed to reflect the underlying factor structure of mindfulness and commonly used to assess five key facets of mindfulness. The five facets include: 1) observing, or attending to or noticing internal or external experiences (e.g., “When I’m walking, I deliberately notice the sensations of my body moving”); 2) describing, or being able to express one’s thoughts, feelings, beliefs, and other internal experiences in words (e.g., “I’m good at finding words to describe my feelings”); 3) acting with awareness, or attending to and being intimately aware of one’s present activity with great focus and without being distracted (e.g., “When I do things, my mind wanders off and I’m easily distracted”); 4) non-judging of inner experience, or considering one’s thoughts in a non-evaluative, accepting manner (e.g., “I tell myself I shouldn’t be feeling the way I’m feeling”); and 5) non-reacting to inner experience, or permitting thoughts, of varied emotional valence and intensity, to go through one’s mind without getting caught up or reacting to them (e.g., “I watch my feelings without getting lost in them”). Participants will rate what is generally true for them on a five-point Likert-type scale ranging from 1 (never or very rarely true) to 5 (very often or always true). The FFMQ has demonstrated adequate-to-good internal consistency (α = .75-.91) as well as good criterion and convergent validity (Baer et al., 2006; Baer et al., 2008).

**Trait Rumination.** Participants completed the Brooding subscale of the Ruminative Response Scale (RRS; Treynor et al., 2003) during the screening survey and in the post-intervention survey. The RRS is a subscale of the 71-item Response Styles Questionnaire (RSQ;
Nolen-Hoeksema et al. 1993). The RRS Brooding subscale is a five-item self-report measure that specifically assesses respondents’ tendency to brood, which is a particularly maladaptive form of rumination (Treynor et al., 2003). Sample items include “Think ‘Why do I always react this way?’” and “Think about a recent situation, wishing it had gone better.” Participants indicate what they generally think or do in response to feeling upset/distressed and respond on a four-point Likert-type scale ranging from 1 (almost never) to 4 (almost always). The RRS-Brooding subscale has demonstrated good internal consistency (α = .77) and moderate retest reliability (r = .62) as well as convergent and predictive validity (Treynor et al., 2003).

**Trait Worry.** The Short Form of the Penn State Worry Questionnaire (PSQW-SF; Topper et al., 2014) was administered during the screening survey, the pre-lab survey, and the post-intervention survey. The PSQW-SF has five items and has been abbreviated from the original 16-item PSWQ that is considered to be the “gold-standard assessment instrument for worry” (Kertz et al., 2014). Sample items include “Many situations make me worry” and “I know I should not worry about things, but I just cannot help it.” Participants rated each item on a five-point Likert-type scale ranging from 1 (not at all typical of me) to 5 (very typical of me). The PSWQ-SF has demonstrated good internal consistency (α = .91), correlation with the full PSWQ (r = .94), and diagnostic efficiency using a cutoff of 15 (sensitivity = .90 specificity = .89; Topper et al., 2014).

**Repetitive Negative Thinking.** The Perseverative Thinking Questionnaire (PTQ; Ehring et al., 2011) was administered during the screening survey, the pre-lab survey, and the post-intervention survey, as was used as the primary outcome measure in the current study. It is a 15-item self-report questionnaire that aims to assess repetitive negative thinking in both clinical and general populations, regardless of thought content. It does this by assessing five main aspects of
RNT: 1) repetitiveness (e.g., “The same thoughts keep going through my mind again and again”); 2) intrusiveness (e.g., “Thoughts come to my mind without me wanting them to”); 3) difficulty disengaging (e.g., “I can’t stop dwelling on them”); 4) perceived unproductiveness (e.g., “I think about many problems without solving any of them”); and 5) capturing mental resources (e.g., “I can’t do anything else while thinking about my problems”). Items are rated on a five-point Likert-type scale ranging from 0 (never) to 4 (almost always). The instructions to “describe how you typically think about negative experiences or problems” were changed to “describe how you have typically thought about negative experiences or problems the past week,” so as to assess changes in RNT throughout the study. The PTQ has demonstrated excellent internal consistency (α = .95), as well as satisfactory re-test reliability (rtt = .69), convergent, and predictive validity (Ehring et al., 2011).

**Skills Training Video.** Participants in the active condition of the study watched a 30-minute video during the in-lab visit, which was adapted from the DBT-Accepting the Challenges of Exiting the System (DBT-ACES; Comtois et al., 2010) “mindfulness to control attention” skills training. The video consists of psychoeducation, skills training, and skills practice. It begins by defining rumination, explaining the function of rumination, and describing why it is ultimately ineffective. Then, the video teaches two mindfulness-based skills: observing the breath and one-mindful action. Participants were taught to respond to practice mindfully observing the breath when they notice RNT and are not currently engaging in another activity. They were taught to practice one-mindful action when they notice RNT while they are in the middle of doing something else. The video guided participants to practice the skill of observing the breath with guided mindfulness instructions, and the skill of one-mindful action by eating a raisin one-mindfully. At the end, participants were asked to identify and write down “red-flags”
to help them notice when they are engaging in RNT, common situations that prompt RNT, and plan cues to prompt them to check if they are engaging in RNT. The skills training video can be viewed here: https://www.youtube.com/watch?v=g6gZyd3EgsY&feature=youtu.be.

Data Analyses

Data from two participants were discarded, one for missing a pre-lab survey and one for missing a post-lab survey, which left a total of 74 participants included in the current study’s analyses. Of the 74 participants, there were no missing data or outliers found. All analyses were conducted through IBM SPSS Statistics - Version 24.0. Moderation analyses were completed through the Preacher and Hayes (2008) PROCESS - Version 3.4 SPSS add-on.

For the current study, a power analysis was performed for sample size estimation for the moderation analysis. Given an anticipated medium effect size of 0.15 at 80% power, a probability level of 0.05, and two predictor variables, the minimum required sample size was 67. The ultimate sample size (n = 74) exceeded the number of subjects required to have acceptable statistical power. Basic descriptive statistics of participant characteristics were evaluated, such as mean age, gender, highest educational level, race/ethnicity, and income. Descriptive statistics are presented in Table 1.

To test the preliminary hypothesis that mindfulness scores would be negatively correlated with pre-intervention RNT levels, bivariate Pearson correlations were conducted to examine associations between the FFMQ subscales and pre-intervention RNT levels as measured by PTQ scores. To test the primary hypothesis, moderation analyses were conducted using PROCESS (Preacher & Hayes, 2008) to determine whether any of the FFMQ subscales moderated response to the intervention such that those with higher pre-intervention mindfulness skills had a
significantly greater decrease in RNT following the intervention than those with lower pre-intervention mindfulness scores. The outcome variable for the primary hypothesis was the change score for participants’ PTQ scores, which was calculated by subtracting the pre-intervention PTQ from the post-intervention PTQ score.
Chapter III

Results

Descriptive Analyses

Of the 74 participants, 38 were randomized to the active condition and 36 to the control condition. There were no significant group differences between active and control or male and female participants regarding demographic variables, PTQ scores, or FFMQ scores. See Table 1 for details on participant characteristics. Descriptive information for study variables including FFMQ subscales, pre-intervention PTQ scores, and PTQ change scores, is reported in Table 2.

Correlational Analyses

Bivariate correlations were conducted to examine preliminary relationships between the FFMQ subscales and pre-intervention PTQ scores. As shown in Table 3, the results indicated that the act with awareness, non-judging, and non-reactivity subscales of the FFMQ were all negatively correlated with pre-intervention PTQ scores (all \( p < 0.001 \)). Although the correlation between the observe and describe subscales of the FFMQ and PTQ were not significant (\( p = 0.25 \) and \( p = 0.24 \), respectively), they were still used as moderator variables for analysis.

Moderation Analysis

To test the primary hypothesis that all five mindfulness facets would moderate the relationship between condition and change in RNT from pre-to-post intervention, a moderation analysis was conducted using PROCESS. The moderation analysis was significant \( [R^2 = 0.20, F(3,70) = 5.85, p = 0.001] \). The outcomes of all interaction tests are shown in Table 4 with the significant outcomes highlighted in Figure 1. A significant moderation effect existed only in
the non-judging facet [$\Delta R^2 = .06$, $\Delta F(1,70) = 5.47$, $p = .02$, $b = -.74$, $t(70) = -2.34$, $p = .02$]. Examination of the interaction plot showed that, among those who watched the skills video, those who scored lower on non-judgmental awareness experienced greater reduction in RNT following the intervention than those who watched the skills video but had higher levels of non-judgmental awareness. Not surprisingly, non-judging scores did not influence RNT levels for those who did not receive the intervention. A moderation effect was not found for the other four mindfulness facets (observe, describe, acting with awareness, and non-reactivity).
Chapter IV
Discussion

Research has demonstrated that RNT is a transdiagnostic process involved in both the development and maintenance of various psychological disorders, including but not limited to depression and anxiety. The implications of reducing RNT are extensive and support the utility of targeting it directly using evidence-based interventions. There are a number of established mindfulness-based interventions that have been shown to reduce the impact of these unhelpful thinking styles. For example, a systematic review and meta-analysis of two of the most well-established mindfulness-based interventions, MBSR and MBCT, identified RNT as mechanisms underlying their therapeutic effects on psychological outcomes (Gu et al., 2015). Unfortunately, many of these interventions are complex, time-consuming, resource-intensive, and require in-person attendance – all of which limit access to some individuals who could benefit from these interventions. Additionally, there is a dearth of research on factors that influence response to brief, mindfulness-based video interventions.

The current study sought to examine which mindfulness facets moderate response to a single session mindfulness skills training intervention in a sample of adults with high trait rumination and/or worry. The intervention in this study is unique in that it is a 30-minute video that can be easily accessed online, addresses both rumination and worry, and is intended for clinical and non-clinical samples. Seventy-four adults (63.5% female, 43.2% White/Caucasian, M age = 24.9 years) high in rumination and/or worry completed pre-intervention measures of RNT (pre-PTQ) as well as the FFMQ to assess five key facets of mindfulness. The active group then watched the brief mindfulness skills training video and the control group did not. After five days, all participants completed a final measure of RNT (post-PTQ). The PTQ change scores for
time/condition were reported in a dissertation from the same study (Hughes, 2020). Dr. Hughes conducted ANOVAs and found that both conditions improved over the course of the study, however the active condition had a significantly greater decrease in PTQ scores after the intervention compared to the control condition.

The first aim of the current study was to explore the relationship between pre-intervention FFMQ scores and levels of RNT in a sample of high RNT adults. For context, the FFMQ scores in the current study were comparable to other samples of individuals with clinically relevant symptoms of depression and anxiety (Bohlmeijer et al., 2011), but were lower than other non-clinical samples (Aguado et al., 2015). The results partially supported the preliminary hypothesis that all five facets of mindfulness would be inversely correlated with levels of RNT. Bivariate correlations revealed that higher scores in the acting with awareness, non-judging, and non-reactivity facets of mindfulness were associated with lower levels of RNT. The observe and describe facets of mindfulness were not significantly associated with RNT. These findings are consistent with Jury and Jose’s (2019) findings that only the acting with awareness, non-judging, and non-reactivity facets of mindfulness functioned to reduce rumination in a non-clinical adult sample. These three facets have also been shown to be inversely related to symptoms of anxiety and depression, whereas the observe and describe facets were not (Barnes & Lynn, 2010; Fisak & Von Lehe, 2012).

There are a couple potential explanations for these findings. Acting with awareness has been found to be inversely associated with RNT (de Bruin et al., 2012). It involves enhanced attention to one’s current experience and the absence of mind-wandering (Brown & Ryan, 2003), which is incompatible with engaging in repetitive thoughts about past or future events. Items that measure this construct on the FFMQ include “I find it difficult to stay focused on what’s
happening in the present” and “It seems I am ‘running on automatic’ without much awareness of what I’m doing.” Another possible explanation for this finding is that the acting with awareness facet of mindfulness has been shown to lower anxiety and reactivity to stressors (Bullis et al., 2014), which may reduce the urge to engage in RNT in the first place.

Responding nonjudgmentally to one’s inner experience was also inversely correlated with RNT in the current study’s sample. Items on the FFMQ that measure nonjudging of inner experience include “I tell myself that I shouldn’t be thinking the way I’m thinking” and “I think some of my emotions are bad or inappropriate and I shouldn’t feel them” (both are reverse scored). A nonjudgmental approach allows one to experience a range of external events without the need to evaluate them, potentially reducing cues for rumination. Since RNT involves negative thought content that is focused on self-evaluative and self-critical judgment (Treynor et al., 2003), participants who scored higher in nonjudgmental awareness are likely more well-equipped to allow negative thoughts and feelings to enter their awareness without self-judgment and, consequently, RNT. Cultivating a nonjudgmental stance may also increase experiences of positive affect by improving self-compassion and self-acceptance.

Non-reactivity to inner experience, or the tendency to notice thoughts and feelings without getting entangled in them and reacting automatically (Baer et al., 2006), was also significantly and inversely correlated with RNT in our sample. Items measuring this construct on the FFMQ include "I watch my feelings without getting lost in them” and “when I have distressing thoughts or images, I am able just to notice them without reacting.” One possible explanation for this finding is that participants high in non-reactivity have been shown to perform better on cognitive control flexibility tasks (Anicha et al., 2012), and there is research showing that cognitive control of attention can reduce rumination (Teasdale et al., 1995). For
example, someone high in non-reactivity might have the skills necessary to notice a negative thought and let it pass, while reorienting their attention back to the present moment and to other aspects of their experience. This way of responding to negative thoughts likely disrupts negative thinking patterns before activation of RNT occurs, thereby preventing an automatic RNT response.

Finally, the nonsignificant associations between the observe and describe facets and RNT may be due to the fact that some studies have shown these facets of mindfulness to have little or no association with anxiety and depression (Bohlmeijer et al., 2011). Further, previous research has found the observe facet to be positively related to psychological symptoms (e.g., Baer et al., 2006; Leigh et al., 2005; Leigh & Neighbors, 2009). Items measuring observe facet on the FFMQ include “When I take a shower or bath, I stay alert to the sensations of water on my body” and “I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.” The describe facet of mindfulness is measured by items such as “I can usually describe how I feel at the moment in considerable detail.” Perhaps if participants with limited mindfulness experience report a tendency to observe and describe thoughts, feelings, and sensations, the way in which they do so may be inconsistent with mindfulness and therefore ineffective in interrupting or re-directing RNT.

The second aim of the study was to assess which mindfulness facets moderated participants’ response to the brief mindfulness video intervention. The results did not support the primary hypothesis that higher baseline scores in all five facets of mindfulness would moderate the effect of the intervention as measured by change in pre-to-post intervention PTQ scores. Instead, the moderation analysis revealed a significant effect only in the non-judging facet, meaning that those with lower pre-intervention non-judgmental awareness scores experienced
greater reduction in RNT following the intervention than those who watched the skills video but began with higher levels of non-judgmental awareness.

There are several possible explanations for this finding. First, cultivating a non-judgmental approach to the present moment is a key, defining aspect of mindfulness (Bishop et al., 2004). For that reason, the importance of considering one’s behavior in an accepting manner was heavily emphasized and woven throughout the video. For example, psychoeducation was provided regarding why many individuals engage in RNT, such as holding the meta-cognitive belief that it is helpful. Normalizing and validating the perceived function of RNT may have helped to reduce participant self-judgments regarding their own tendency to engage in RNT. Additionally, significant emphasis was placed on normalizing mind-wandering during the practice of mindfulness in the video. Participants were instructed to notice when their mind wandered in a non-judgmental manner and simply bring their attention back to the exercise. In these moments, participants were encouraged to congratulate rather than criticize themselves, as observing that the mind has wandered requires a high level of awareness and indicates that they are, in fact, practicing mindfulness.

It is also possible that those who scored higher in non-judging prior to the intervention had prior mindfulness experience and therefore had less to gain from the intervention. Conversely, the participants who scored lower on the non-judging facet may have been less familiar with the concept of mindfulness prior to watching the video, allowing more room for improvement. For these individuals, the mindfulness skills video may have simply been a more novel and powerful intervention.

*Strengths and Limitations*
This study was one of the first to examine individual facets of mindfulness as potential predictors of response to a brief mindfulness skills video in individuals with high levels of RNT, and to begin building an empirical base for this research question. One key strength of this study is that participants were not excluded for receiving past or current mental health treatment or for having any mental or physical health conditions. This allowed for a diverse sample that included both clinical and sub-clinical individuals, as well as individuals with varied experiences with mental health treatment. As the skills video was designed to be utilized among anyone who experiences RNT, a more varied sample makes the results applicable to a wider range of individuals who experience RNT, including those with clinically significant symptoms and those with sub-clinical presentations. Additionally, because the current study utilized data from a community sample, outcomes may be more likely to reflect the clinical reality of the general population, thus increasing the generalizability of results.

The findings of the current study should be interpreted in the context of several limitations. First, as with all self-report measures, we were limited by participants’ honestly, comprehension of the questions, self-awareness, and biases. Additionally, given that the FFMQ was only administered at baseline, it is difficult to determine whether the primary finding was driven by a genuine decrease in judgmentalness or could be better explained by a third variable. In addition, the sample did not directly assess student status but was skewed towards younger (college-aged) participants. As a result, student status could not be controlled for and the sample may not reflect the general population, limiting the generalizability of the study’s results. Next, it is possible that individuals with previous mindfulness experience may be more aware of the vocabulary associated with mindfulness and therefore may interpret and answer questions on the FFMQ differently than those who did not. Further, as we did not assess for previous mindfulness
training, we cannot exclude the possibility that such experience may have been a factor that moderated response to the intervention. Finally, the decision to focus on a brief intervention period precluded investigation of how the reported effects may change over longer periods of practice. No follow-up data were collected, and the extent to which participants in the active condition continued to engage with mindfulness skills after the 5-day program was not measured. It is also possible that if a follow up survey was given after a longer period of time, this may have allowed for more time for skills acquisition, strengthening, and generalization (Linehan, 1993). However, a recent study using an app-based mindfulness intervention revealed benefits that persisted for at least 3 months (van Emmerik et al., 2017).

**Future Directions**

Several recommendations are offered on ways for future studies to extend the current study. Given the limitations, the current study could be improved with a larger, more representative sample size, which would increase the generalizability of the results. Additionally, future research is needed to replicate the main finding that lower non-judgmental awareness moderated the relationship between watching the single session mindfulness skills training video and reductions in RNT in individuals who report high levels of trait rumination and/or worry. Replication using other brief mindfulness video interventions would give greater validity to the current study’s findings.

It would also be important for future studies to assess and examine other possible moderators that may be related to response to brief mindfulness interventions in high RNT individuals, including prior exposure to the practice of mindfulness. It is possible that lack of prior mindfulness experience is related to increased judging and could therefore help explain the
relationship between watching the mindfulness skills video and subsequent reductions in RNT. Alternatively, perhaps participants in this study who experienced the greatest reductions in RNT used other adaptive coping strategies that influenced whether or not they engaged in RNT. It would be important for future studies to include a variety of factors as possible moderators in order to identify the most significant moderators in the relationship between accessing a mindfulness skills training video and reductions in RNT.

Lastly, more research is needed to further elucidate the implications of these findings. The suggestion for how to organize future mindfulness trainings by teaching the skill of non-judging before other skills is purely speculative and requires more research to test. In order to develop more targeted interventions for individuals with high levels of RNT, future studies should examine whether teaching the nonjudgmentally mindfulness skill before other mindfulness skills in brief, mindfulness video interventions will lead to greater reductions in RNT. This would inform future treatment applications and help individuals develop more targeted and effective brief mindfulness video interventions.

Conclusions

There are significant public health benefits to identifying factors that influence response to brief, mindfulness-based interventions to reduce RNT, as RNT is implicated in the onset and maintenance of various psychological disorders. The current study aimed to identify which baseline mindfulness factors moderate response to a single session mindfulness skills video in a sample of high-RNT individuals, as there is currently a dearth of research on this important question. To conclude, the current study found that 1) individuals who score higher in the acting with awareness, non-judging, and non-reactivity facets of mindfulness will likely have lower
levels of RNT than those who score lower in those facets, and that 2) single session, mindfulness video interventions may be most effective at reducing RNT in individuals who consider their thoughts in an evaluative, judgmental manner.

These findings have broader implications about the importance of assessing baseline mindfulness skills in order to make appropriate treatment recommendations, such as adding adjunct mindfulness video interventions to existing treatment plans or referring clients to brief mindfulness interventions. Ultimately, the current study brings us one step closer to understanding which facets of mindfulness to target in treatment for RNT, and who will benefit most from brief mindfulness video interventions.
References


Mindfulness and Depression? *Mindfulness, 10*, 1091-1104.


King, A. P., Erickson, T. M., Giardino, N. D., Favorite, T., Rauch, S. A., Robinson, E., ... &


Table 1

*Participant Characteristics in Total Sample*

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N = 74</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age (SD)</td>
<td>24.9 (9.9)</td>
<td>---</td>
</tr>
<tr>
<td>Range</td>
<td>18-68</td>
<td>---</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>47</td>
<td>63.5%</td>
</tr>
<tr>
<td>Male</td>
<td>27</td>
<td>36.5%</td>
</tr>
<tr>
<td>Highest Educational Level</td>
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<td></td>
</tr>
<tr>
<td>High school or GED</td>
<td>10</td>
<td>13.5%</td>
</tr>
<tr>
<td>Some college</td>
<td>31</td>
<td>41.9%</td>
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<tr>
<td>4-year degree</td>
<td>20</td>
<td>27%</td>
</tr>
<tr>
<td>Graduate degree</td>
<td>13</td>
<td>17.6%</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
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<td></td>
</tr>
<tr>
<td>White/Caucasian</td>
<td>32</td>
<td>43.2%</td>
</tr>
<tr>
<td>Asian</td>
<td>27</td>
<td>36.5%</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>7</td>
<td>9.5%</td>
</tr>
<tr>
<td>Black/African American</td>
<td>6</td>
<td>8.1%</td>
</tr>
<tr>
<td>Multiracial</td>
<td>2</td>
<td>2.7%</td>
</tr>
<tr>
<td>Income</td>
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<td></td>
</tr>
<tr>
<td>$0-$9,999</td>
<td>13</td>
<td>17.6%</td>
</tr>
<tr>
<td>$10,000-$29,000</td>
<td>9</td>
<td>12.2%</td>
</tr>
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<td>$30,000-$49,999</td>
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<td>6.8%</td>
</tr>
<tr>
<td>$50,000-$69,000</td>
<td>14</td>
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</tr>
<tr>
<td>$70,000-$89,000</td>
<td>9</td>
<td>12.2%</td>
</tr>
<tr>
<td>More than $90,000</td>
<td>23</td>
<td>31.1%</td>
</tr>
</tbody>
</table>
### Table 2

**Descriptive Statistics for Study Variables at Baseline**

<table>
<thead>
<tr>
<th>Variable</th>
<th>$M$</th>
<th>$SD$</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFMQ-Observe</td>
<td>26.51</td>
<td>5.61</td>
<td>12-39</td>
</tr>
<tr>
<td>FFMQ-Describe</td>
<td>24.31</td>
<td>6.33</td>
<td>8-40</td>
</tr>
<tr>
<td>FFMQ-Awareness</td>
<td>22.38</td>
<td>5.61</td>
<td>12-40</td>
</tr>
<tr>
<td>FFMQ-Non-Judge</td>
<td>22.28</td>
<td>6.54</td>
<td>8-38</td>
</tr>
<tr>
<td>FFMQ-Non-React</td>
<td>21.92</td>
<td>5.42</td>
<td>11-35</td>
</tr>
<tr>
<td>PTQ-Pre</td>
<td>39.49</td>
<td>9.66</td>
<td>19-59</td>
</tr>
<tr>
<td>PTQ-Change</td>
<td>6.83</td>
<td>9.51</td>
<td>-16.75-31</td>
</tr>
</tbody>
</table>

**Note.** FFMQ-Observe = Five Facet Mindfulness Questionnaire – Observe Subscale; FFMQ-Describe = Five Facet Mindfulness Questionnaire – Describe Subscale; FFMQ-Awareness = Five Facet Mindfulness Questionnaire – Act with Awareness Subscale; FFMQ-Non-Judge = Five Facet Mindfulness Questionnaire – Non-Judging to Inner Experience Subscale; FFMQ-Non-React = Five Facet Mindfulness Questionnaire – Non-Reactivity to Inner Experience Subscale; PTQ-Pre = Pre-Intervention Perseverative Thinking Questionnaire Scores; PTQ-Change = Post-Intervention Perseverative Thinking Questionnaire score - Pre-Intervention Perseverative Thinking Questionnaire score. For FFMQ subscales, scores range from 8-40, except for nonreactivity to experience scores, which range from 7-35. Total PTQ scores range from 0-60.
Table 3

*Bivariate Correlations Between FFMQ Subscales and Pre-Intervention PTQ Scores*

<table>
<thead>
<tr>
<th>FFMQ Subscales</th>
<th>Pearson’s r</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFMQ-Obs</td>
<td>.14</td>
<td>.25</td>
</tr>
<tr>
<td>FFMQ-Des</td>
<td>-.14</td>
<td>.24</td>
</tr>
<tr>
<td>FFMQ-Aware</td>
<td>-.58**</td>
<td>.00</td>
</tr>
<tr>
<td>FFMQ-Non-J</td>
<td>-.42**</td>
<td>.00</td>
</tr>
<tr>
<td>FFMQ-Non-R</td>
<td>-.40**</td>
<td>.00</td>
</tr>
</tbody>
</table>

Note. FFMQ Subscales = Five Facet Mindfulness Questionnaire Subscales; PTQ = Pre-Intervention Perseverative Thinking Questionnaire Scores.

**Significant at p<.01**

Table 4

*Moderating Effects of FFMQ Subscales on the Relationship Between Condition and PTQ Change Scores*

<table>
<thead>
<tr>
<th>Condition</th>
<th>Low Observe</th>
<th>Average Observe</th>
<th>High Observe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>3.21</td>
<td>3.33</td>
<td>3.42</td>
</tr>
<tr>
<td>Active</td>
<td>7.91</td>
<td>10.72</td>
<td>13.13</td>
</tr>
<tr>
<td>Low Describe</td>
<td>4.26</td>
<td>3.53</td>
<td>2.64</td>
</tr>
<tr>
<td>Active</td>
<td>10.56</td>
<td>10.09</td>
<td>9.53</td>
</tr>
</tbody>
</table>

*Note. *Denotes a significant moderation effect found in the Non-Judging facet (p = .02).
Figure 1

*The Influence of Non-Judging on the Relationship Between Condition and PTQ Change Score*

Note. PTQ = Perseverative Thinking Questionnaire; Non-Judging = Five Facet Mindfulness Questionnaire – Non-Judging to Inner Experience Subscale. PTQ Change Score = pre-PTQ minus post-PTQ; therefore, larger values indicate greater decrease in PTQ scores. Low and High levels of Non-Judging are plotted at one standard deviation below and above the mean, and Average Non-Judging is plotted at the mean.