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ORIGINAL ARTICLE

Examining the Role of Repetitive Negative Thinking in Relations Between Positive and Negative Aspects of Self-compassion and Symptom Improvement During Intensive Treatment

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Abstract
Positive aspects of self-compassion (i.e., self-kindness and nonjudgmental acceptance of personal experiences) as well as negative aspects (i.e., high self-criticism and self-coldness) are strong predictors of anxiety, depression, worry, and quality of life. To date, however, relatively little is known about (a) how both aspects of self-compassion change during naturalistic treatment, (b) whether and how such changes relate to symptom improvement, and (c) which processes might explain the potential benefits of self-compassion. To address these gaps, the present study examined whether relations between changes in both aspects of self-compassion and treatment outcomes in a brief partial hospital setting for acute psychology could be explained by associated changes in repetitive negative thinking (RNT), an established maladaptive cognitive process involved in anxiety and depressive disorders. In a sample of 582 people receiving cognitive-behavioral (CBT) and dialectical behavior therapy over the course of 1–2 weeks, increases in positive aspects of self-compassion and decreases in negative aspects related to improvements in depression and anxiety. RNT mediated the relationship between decreases in negative aspects of self-compassion and improvements in anxiety and depression. However, a reverse model also showed that decreases in negative aspects of self-compassion could also explain relations between RNT and depressive symptom improvement only. These findings suggest that negative aspects of self-compassion and RNT may constitute important targets for treatment in acute settings. Future studies should investigate the impact of greater focus on self-compassion on RNT and symptom improvement using longitudinal experimental designs with multiple assessment points, examining causality and directionality.

Keywords Self-compassion · Depression · Anxiety · Rumination · Repetitive negative thinking · Treatment outcomes

Introduction

Internalizing disorders are both widespread and costly in the United States, with lifetime prevalence rates of mood disorders estimated at 20.8% and anxiety disorders at 28.8% (Kessler et al. 2005). Empirically supported treatments (ESTs) such as cognitive-behavioral therapy (CBT; Hofmann et al. 2012) and dialectical behavior therapy (DBT; Linehan 1993; Lynch et al. 2003) have exhibited efficacy for mood disorders. However, the specific processes that may account for treatment gains remain understudied (Kazdin 2007). Further understanding of these processes may help improve ESTs by more directly and efficiently targeting these changes processes during treatment. Existing cognitive-behavioral models of anxiety and depression suggest that cognitive processes may play an especially important role in the development and maintenance (i.e., exacerbatory processes) or remission (i.e., ameliorative processes) of depression and

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anxiety (Barlow 2002). The present study examined the role of two such processes, self-compassion and repetitive negative thinking (RNT), in explaining treatment gains during brief CBT and DBT treatment delivered in a naturalistic clinical setting.

Self-compassion and RNT appear relevant across diagnostic categories (self-compassion: Diedrich et al. 2014; Neff et al. 2007; Van Dam et al. 2011; RNT: Ehring and Watkins 2008; McEvoy et al. 2013). Past research suggests self-compassion and RNT are both associated with response to psychotherapeutic intervention (e.g., Kertz et al. 2015; Neff et al. 2007). Further, self-compassion and RNT are negatively associated with each other (e.g., Mantzios 2014) and theoretical models of self-compassion have suggested that self-compassion's relationship with depression and anxiety may be due to its impact upon RNT (e.g., Allen and Knight 2005; Leary et al. 2007).

Self-compassion

Defining self-compassion is a complex task given the multidimensional nature of this construct (i.e., self-compassion refers to multiple ways of thinking, feeling, and behaving in the world), and (relatedly) the fact that self-compassion has been operationalized and described in a multitude of ways across studies and time (Gilbert 2017). In a recent comprehensive review, Strauss et al. (2016) proposed that compassion consists of five ways of responding to suffering (which can be applied to the self): recognizing suffering, understanding the universality of suffering in human experience, feeling empathy for those who suffer, tolerating and accepting uncomfortable feelings associated with suffering, and being motivated to act to alleviate suffering. Not all measures of self-compassion assess these five elements, and results must therefore be interpreted in light of what is actually measured by different instruments.

For the present study, we were interested in examining how participants relate to themselves (and cope) in the midst of acute psychological difficulties. Due to concerns about participant burden in our partial hospital setting, we had to limit our assessment of self-compassion to one short questionnaire. Thus, we chose the Self-compassion Scale Short Form (SCS-SF; Raes et al. 2011), a 12-item measure which specifically asks participants how they act towards themselves during difficult times. The SCS was developed using Neff's definition of self-compassion which conceptualizes self-compassion as including self-kindness, common humanity, and mindfulness (2003). The SCS therefore does not measure all possible aspects of self-compassion, but instead focuses on aspects that are most relevant to the coping process. Because these aspects may overlap with other cognitive-behavioral processes examined in this study, we made sure to examine whether this conception of self-compassion is distinct from other constructs we investigated.

When using the SCS-SF, measurement of self-compassion can be broken down into positive and negative aspects. Positive aspects of self-compassion (PA-SC) include self-kindness (e.g., being gentle toward oneself), common humanity (e.g., understanding that one's pain is a shared human experience), or mindfulness (e.g., observing and acknowledging one's experience without judgment). Negative aspects (NA-SC) include endorsing negative judgments about one's experiences, and having difficulty with the positive processes described above. Previous studies elected to refer to these two aspects as "self-compassion" versus "self-criticism" or "self-coldness" (e.g., Brenner et al. 2017; López et al. 2015). We describe here our overall construct of interest as "self-compassion" although (as stated above), we acknowledge that the SCS-SF mainly assesses coping-related aspect of self-compassion. We further distinguish between PA-SC and NA-SC given that the measure we used examines both respondents' ability and difficulty in using self-compassion. Related to these points, an important task for researchers interested in investigating the link between self-compassion and repetitive thinking (as further described below) is to make sure that these two constructs are defined and measured in a way that clearly distinguishes them. For example, previous studies have found PA-SC and NA-SC of the Self-compassion Scale (SCS; Neff 2003) are likely very closely related to psychopathological processes such as RNT (Brenner et al. 2017; Körne et al. 2015; López et al. 2015; Muris and Petrocchi 2017). In the present study, we conducted preliminary psychometric analyses to examine the potential overlap between both constructs.

Higher levels of self-compassion have been linked with indices of stronger psychological health and functioning such as emotional resilience, well-being, optimism, motivation for self-improvement, positive affect, social connectedness, life satisfaction, and emotional intelligence (Barnard and Curry 2011; Breines and Chen 2012; Neff 2009, 2012; Neff et al. 2007). Moreover, greater self-compassion is associated with less psychopathology and may account for as much, or more, variance in depression and anxiety symptoms than related constructs of mindfulness (Van Dam et al. 2011; but see Baer et al. 2006; Raes et al. 2011; Soysa and Wilcomb 2015). Importantly, self-compassion might serve as a protective factor against psychological distress. For example, experimentally-induced self-compassion has been shown to increase individuals' emotional resilience in response to acute stressors (Neff et al. 2007). Increases in self-compassion (as measured by participants' and clinicians' reports) have also been associated with a decrease in depressive symptoms during the month following a one-time clinical intervention (a Gestalt two-chair exercise) hypothesized to foster self-compassion

(Neff et al. 2007). Though most of these findings are limited by their reliance on self-report measures, they nonetheless suggest that self-compassion may be an important ameliorative factor that could be harnessed as a potential treatment target.

As a consequence of these findings, awareness of the benefits of promoting self-compassion has increased quickly (for a review see Barnard and Curry 2011). Many treatments for psychological disorders are increasingly incorporating an explicit focus on self-compassion. These include acceptance based behavioral therapy (Roemer and Orsillo 2009), acceptance and commitment therapy (Hayes et al. 1999), compassion focused therapy (Gilbert 2010a), compassionate mind training (Gilbert 2010b), DBT (Linehan 1993), mindfulness based stress reduction (MBSR; Kabat-Zinn 1990), or the mindful self-compassion program (Neff and Germer 2013). In a study investigating the benefits of MBSR for healthcare professionals, changes in self-compassion mediated the effects of participating in MBSR on decreased psychological distress (Shapiro et al. 2005). Additionally, despite its conceptual overlap with mindfulness, self-compassion is a stronger predictor of anxiety, depression, worry, and quality of life than mindfulness in community adults (Van Dam et al. 2011). These results suggest that self-compassion may be an important therapeutic process.

There are also reasons to believe that changes in self-compassion may help explain the effects of other treatments that do not specifically target self-compassion, though little research to date has examined this issue. For example, CBT may foster self-compassion without providing explicit training around this construct. Psychoeducation about symptoms of depression and anxiety may facilitate nonjudgmental acceptance and self-validation of one's difficulties. While learning to identify, challenge, and restructure unhelpful cognitions, patients may often develop kinder, less self-critical, interpretations for painful experiences (Mennin et al. 2013). By increasing their engagement in meaningful activities, patients may notice that setting up small realistic goals and learning to reframe "failures" as learning opportunities lead to higher levels of motivation and effectiveness, reinforcing the use of a gentle and self-compassionate approach. In keeping with the hypothesis that general ESTs may positively impact self-compassion, a study of intensive group-based cognitive-behavioral treatment for eating disorders (that did not explicitly target self-compassion) found that gains in self-compassion early in treatment were associated with reductions in shame over a 12 week-course of treatment (and reductions in shame were associated with decreases in eating disorder symptoms). This finding was in spite of the fact that self-compassion was not a specific treatment target in this intervention (Kelly et al. 2014).

Repetitive Negative Thinking

The process(es) by which self-compassion decreases or buffers against depression and anxiety are not well understood (Raes 2010). In addition to potentially decreasing feelings of shame (Kelly et al. 2014), one theoretical model has proposed that self-compassion may decrease symptoms of anxiety and depression by interfering with maladaptive cognitive processes like RNT (Leary et al. 2007; see also; Allen and Knight 2005). RNT is a transdiagnostic process that characterizes and exacerbates both anxiety (in the form of worry) and depressive disorders (in the form of rumination; Ehring and Watkins 2008; Harvey et al. 2004). Research has indicated that decreases in RNT can predict depression and anxiety symptom improvement across brief evidence-based treatment (Kertz et al. 2015). Additionally, interventions, such as Metacognitive Therapy., have been designed to target RNT directly by helping individuals become more aware of their own thinking processes (Wells 2009).

Interaction of Self-compassion and RNT

Self-compassion (as measured by high levels of self-kindness and low levels of self-criticism in the present study) might act as an adaptive strategy to address RNT. For example, after a negative event, RNT may encourage self-criticism (related to NA-SC in the present study), resistance to discomfort, and judgment. Alternatively, after a positive or distracting event, decreases in RNT may facilitate mindful acceptance and self-kindness, decreasing the potential negative effects of the event (Leary et al. 2007). In one study, trait self-compassion predicted lower negative emotional responses and more adaptive cognitive attributions in reaction to experimentally-administered ambivalent feedback on one's performance in a video introduction, especially in participants with low self-esteem (Leary et al. 2007). Thus, self-compassion might decrease maladaptive cognitive processes following a stressor by preventing cognitive elaboration and maladaptive thinking, as well as associated prolonged negative affect.

Additional findings have supported the hypothesis that RNT is negatively associated with self-compassion and may thus constitute opposing transdiagnostic processes during treatment. A number of studies have shown that self-compassion and RNT are significantly and negatively related and both are associated with better and worse psychological functioning, respectively (Mantzios 2014; Neff 2003; Neff and Vonk 2009; Williams et al. 2008). In a cross-sectional study of undergraduates, Raes (2010) also found that different forms of RNT partially explained the relationship between self-compassion and mental health: rumination explained the relationship between self-compassion and depression; rumination and worrying explained the

relationship between self-compassion and anxiety. These findings suggest that increasing self-compassion may act as a protective buffer on anxiety and depression symptoms by reducing RNT.

Studies conducted in clinical samples have shown that self-compassion is moderately negatively associated with frequency of rumination (Barnard and Curry 2011; Bergen-Cico and Cheon 2014; Neff 2012). An 8-week uncontrolled mindfulness-based intervention for perinatal anxiety (which included an explicit focus on self-compassion) led to significant improvements in self-compassion, worry, and anxiety (Goodman et al. 2014; for similar results in a controlled study using a non-clinical sample see; Robins et al. 2012). In another cross-sectional study, rumination explained the relationship between self-compassion and depressive symptoms in a sample of clinical depressed individuals (Krieger et al. 2013). These findings again suggest that one pathway by which changes in self-compassion may result in changes in depression and anxiety symptoms during treatment might be through changes in repetitive negative thinking.

The Present Study

Findings on relations between self-compassion, RNT, depression and anxiety are limited by a number of factors that the present study sought to address. Although promising evidence suggests that self-compassion is associated with better psychological health via decreased RNT, few studies to date have examined these constructs in treatment-seeking populations. To date, no known study has examined whether changes in RNT specifically might explain positive associations between changes in self-compassion and symptom improvement over the course of naturalistic treatment, as proposed by the current study.

This study therefore examined associations between changes in PA-SC and NA-SC, RNT, and anxiety and depression symptoms pre- to post-treatment across mixed diagnoses over a brief course of evidence-based treatment in a partial hospital program. First, we hypothesized that pre- to post-treatment changes in PA-SC and NA-SC would correlate with pre to post-treatment decreases in depression and anxiety symptoms, even when controlling for gains in psychotherapeutic skills (operationalized in this study as changes in CBT and DBT skill usage). We expected that self-compassion would change and relate to symptom improvement during brief CBT and DBT based treatment. Thus, this study did not examine the effects of a self-compassion intervention, but rather, changes in self-compassion during treatment as it occurred in this real-world, largely group-based, clinical setting. Second, we hypothesized that changes in RNT would mediate the relationship between changes in PA-SC and NA-SC and symptom improvement based on the evidence reviewed above.

Method

Participants and Treatment Setting

The present study investigated 582 adults presenting to the partial hospital for acute symptoms of psychopathology between July 2013 and April 2014. The study was conducted with approval from the hospital's Institutional Review Board. All participants provided written informed consent for their clinical data to be used for research studies. Eligibility criteria for the study required participants to be stable enough to complete a research protocol (i.e., not acutely psychotic).

The partial hospital program in this study delivers short-term therapy based on ESTs (e.g., CBT, DBT) in both group and individual formats, along with pharmacological treatment and case management, to patients with a wide range of psychiatric disorders (e.g., mood, anxiety, personality, and psychotic disorders; see Björgvinsson et al. (2014) for more detail). The mean length of treatment for participants in this sample was 10.33 days, including weekend days ($SD = 4.64$). Participants met with individual therapists and clinical team managers 2–3 times per week to reinforce and learn psychotherapeutic CBT and DBT skills. Pt also meet with psychiatrists as needed for medication management. Clinical team managers (in charge of treatment planning and case management) assigned participants to groups based on their presenting complaints and clinical history. Participants attended up to five 50-min groups per day, 5 days per week (Monday–Friday). Group content primarily focused on skills from ESTs including CBT and DBT.[1] For example, groups include psychoeducation, skills training, and skill practice with behavioral activation (Martell et al. 2010), cognitive restructuring (Beck et al. 1979), distress tolerance (Linehan 1993), and mindfulness (Hayes and Smith 2005), in addition to other CBT and DBT skills. Additional groups focused on psychoeducation about diagnoses, self-assessment of symptoms and functioning, relapse prevention, and self-care skills. All group treatment protocols were established to ensure treatment fidelity. Trained research assistants rated treatment adherence at least twice per year, finding good adherence to treatment protocols (inter-rater reliability

[1] Most participants also attended a group that provided a brief (45 min), single-session introduction to self-compassion based on the model proposed by Neff (2011). In this group, participants learned Neff's (2011) definition and components of self-compassion (self-kindness, common humanity, mindfulness), reviewed misconceptions and obstacles to self-compassion, and discussed and practiced concrete ways to implement self-compassion (e.g., through a short, guided meditation exercise, or an adapted cognitive restructuring worksheet). For all participants for which group attendance data was available ($n = 480$; data was missing for 102 participants), 74.2% attended.

$r = .99$; see Garner et al. 2014). Participants also attended unstructured process groups focused on building relationships and sharing experiences.

Materials and Procedures

Participants completed daily, computerized questionnaires as part of standard clinical care. All self-report measures included in this study were administered on the days of admission and discharge (except for the structured clinical interview, see below). Data from these measures were collected and managed using Research Electronic Data Capture (REDCap) tools hosted at our site. REDCap is a secure, web-based application designed to support data capture for research studies (Harris et al. 2009).

Mini International Neuropsychiatric Interview (MINI; Sheehan et al. 1998)

The MINI is a structured interview assessing DSM-IV Axis I disorders (e.g., mood, anxiety, substance abuse, psychosis). Therapists were doctoral practicum students and interns in clinical psychology; their training included reviewing administration manuals and completing mock interviews. Each MINI diagnostic module consists of a series of screening items followed by questions about specific symptomatology. The MINI has strong reliability and validity in relation to the Structured Clinical Interview for DSM-IV (SCID-IV), with inter-rater reliabilities ranging from kappas of .89–1.0 (Sheehan et al. 1998). The inter-rater reliability between the MINI and program psychiatrists for this population of partial hospital patients is .69 for MDD and .75 for Bipolar Disorder-Depressed (Björgvinsson et al. 2014).

Center for the Epidemiological Studies of Depression-10 (CESD-10; Andersen et al. 1994)

The CESD-10 is a widely used, brief instrument for measuring symptoms of depression. Response anchors range from 0 (*rarely or none of the time/< 1 day)* to 3 (*most or all of the time/5–7 days)*. The total possible range of scores is from 0 to 30, where higher scores indicate greater severity and/or duration of depressive symptoms. The CESD-10 had good internal consistency in this study ($\alpha = .83$).

The 7-item Generalized Anxiety Disorder Scale (GAD-7; Spitzer et al. 2006)

The GAD-7 is a self-report questionnaire that assesses general symptoms of anxiety (Spitzer et al. 2006). Although originally developed as a screening instrument for GAD, it is now widely used as a measure of global anxiety symptoms. Participants are asked how often in the past 2 weeks they have been bothered by anxiety symptoms (e.g., trouble relaxing). Participants respond according to a 4-point Likert type scale, from 0 (*not at all*) to 3 (*nearly every day*). The total possible range of scores is from 0 to 21, where higher scores indicate greater severity and/or duration of anxiety symptoms. The GAD-7 has demonstrated good reliability and construct validity (Kroenke et al. 2007; Löwe et al. 2008; Spitzer et al. 2006) and is a valid measure of general anxiety in this partial hospital population (Beard and Björgvinsson 2014). The GAD-7 had good internal consistency in this study ($\alpha = .88$).

Self-compassion Scale Short Form (SCS-SF; Raes et al. 2011)

The SCS-SF is a 12-item self-report questionnaire designed to assess self-compassion. Participants rate how they typically act towards themselves during difficult times (e.g., "When something painful happens I try to take a balanced view of the situation" or "I try to see my failing as part of the human condition"). Response anchors range from 1 (*almost never*) to 5 (*almost always*), with 3 positive subscales (PA-SC, self-kindness, common humanity, mindfulness) and 3 negative subscales (NA-SC, self-judgment, isolation, over-identification). The negative subscales are reverse scored when combining with the positive subscales to yield a total score range from 0 to 60, with higher scores reflecting greater self-compassion. The SCS-SF has demonstrated good validity and reliability (Raes et al. 2011). The SCS-SF had good internal consistency in this study ($\alpha = .88$). Nonetheless, we examined the factor structure of the SCS-SF, as well as its relationship with the PTQ, in a preliminary exploratory factor analysis (EFA) to verify that both measures captured distinct constructs.

Perseverative Thinking Questionnaire (PTQ: Ehring et al. 2011)

The PTQ is a 15-item self-report measure for assessing the frequency of dysfunctional, content-independent (i.e., transdiagnostic) repetitive thoughts (e.g., "Thoughts intrude into my mind" or "I get stuck on certain issues and can't move on"). Participants are asked how they typically think about negative experiences or problems, rating each statement on a 5-point Likert-type scale from 0 (*never*) to 4 (*almost always*) for a total summed score from 0 to 60. Higher scores indicate more frequent perseveration of negative thinking. The PTQ has demonstrated good internal consistency, reliability, and validity (Ehring et al. 2011). The PTQ had excellent internal consistency in this study ($\alpha = .95$). The PTQ was used to assess RNT.

Cognitive Behavioral Therapy Skills Questionnaire (CBT-SQ; Jacob et al. 2011)

The CBT-SQ is a 16-item measure developed to assess the frequency with which an individual has utilized skills from the CBT psychotherapeutic framework over the past 2 weeks (e.g., "challenge my thoughts" or "purposefully do fun things that I like when I am feeling badly"). Participants rate each skill statement on a 5-point Likert-type scale of 0 (*I don't do this*) to 4 (*I always do this*). Scores can range from 0 to 64, with higher scores indicating more frequent skill usage. The CBT-SQ has demonstrated good reliability and validity (Jacob et al. 2011). The CBT-SQ had good internal consistency in this study ($\alpha = .89$).

Dialectical Behavior Therapy Skills Subscale (DSS) of the Dialectical Behavior Therapy Ways of Coping Checklist (DBT-WCCL; Neacsiu et al. 2010b)

The DSS is a 38-item subscale measuring self-reported use of DBT skill usage over the month in the face of stressors (e.g., "did something to feel a totally different emotion" or "made sure I respond in a way so that I could still respect myself afterwards"). Participants rate each skill on a 4-point Likert-type scale, from 0 (*never used*) to 3 (*regularly used*). Scores ranged from 0 to 114, with higher scores indicating greater DBT skill usage. The reliability and validity of this measure have been found to be satisfactory, including the ability to discriminate from treatment conditions providing DBT skills versus those that do not (Neacsiu et al. 2010a, b). The internal consistency of this subscale was excellent ($\alpha = .94$).

Data Analyses

Exploratory Factor Analysis

We ran an EFA using principal axis factoring to ensure that our measure assessing self-compassion (SCS-SF) and our measure assessing RNT (PTQ) captured distinct psychological processes, and to examine the factor structure of the SCS-SF. We used an iterative approach to determine the final factor solution, starting by testing a 1-factor solution, and adding one factor at a time. We judged the quality of all factor solutions by examining the amount of variance explained by each factor, the number of items loading on each factor ($> .40$) (aiming for at least three items per factor), as well as the reliability ($\alpha > .70$) and meaningfulness of each factor.

Changes Over the Course of Treatment and Correlations

First, we conducted a series of paired-samples t-tests to assess whether participants experienced significant changes in self-compassion, RNT, depression, anxiety, CBT and DBT skills over the course of treatment (see Table 2). We also assessed whether attendance to the introductory self-compassion group was associated with changes in self-compassion using a mixed design (time x group) ANOVA. In preparation for further analyses, we then calculated change scores (post-pre) for all measures by subtracting raw scores at pre-treatment from those at post-treatment, so that negative values indicated decreased scores over the course of treatment. All analyses controlled for baseline (pre-treatment) levels of outcomes investigated. Next, we examined correlations between change scores on all measures (Table 2). These correlations determined whether direct associations existed between our independent variable (changes in self-compassion), our mediator (changes in RNT), and our two dependent variables (changes in depression and anxiety symptoms).

Main Path Model

Second, we tested whether RNT would statistically mediate relations between changes in self-compassion and changes in depression and anxiety symptoms (see Fig. 1). Recent methodological recommendations suggest that tests of indirect effects can be conducted in the presence or absence of significant direct effects (i.e., regardless of whether the direct relations between self-compassion and symptoms changes tested above are significant; Hayes 2009; Preacher and Hayes 2008). We employed an ordinary least squares path analysis-based approach to examine direct and indirect (i.e., mediating) effects, implemented in MPlus 7 using full-information maximum likelihood estimation (Muthén and Muthén 2010). In spite of FIML estimation, sample sizes for statistical analyses vary due to the existence of missing data for exogenous variables (which FIML in MPlus does not adjust for); thus, not all potential participants are included in analyses (as specified in the "Results" section) and sample sizes vary slightly. The significance of indirect effects was assessed using bootstrapping (Hayes 2009; MacKinnon 2009) with 95% bias-corrected 5000-bootstrapped sample confidence interval. An indirect effect is considered statistically significant if its 95% bootstrap confidence interval is entirely above or below zero. The path model controlled for psychotherapeutic skill change (i.e., changes in DBT and CBT skill usage) over the course of treatment by adding them as covariates in order to capture the specific effects of self-compassion and RNT on changes in depression and anxiety symptoms.

Competing Path Models

Third, we examined a number of competing path models in order to assess alternate hypotheses. In the first competing

model, we tested whether changes in self-compassion would mediate relations between changes in RNT and changes in symptoms. In the second competing model, we tested whether changes in RNT would mediate relations between changes in symptoms (now the main independent variable) and changes in self-compassion (now the main outcome). Again, models controlled for psychotherapeutic skill change.

Results

Demographic and Diagnostic Characteristics of Sample

Demographic and clinical characteristics for the sample are presented in Table 1. Participants were roughly even between females and males (50.8% female, $n = 294$; 49.2% male, $n = 285$), primarily white (88.3%, $n = 511$), middle-aged (mean age = 33.31, $SD = 13.28$), single (62.8%, $n = 358$), unemployed (53.0%, $n = 302$), with at least some college education (92.4%, $n = 528$) (Insert Table 1). Diagnostic data from the MINI (Sheehan et al. 1998) were available for $n = 485$ participants.[2] The most common primary diagnosis (as designated by the clinician) was Major Depressive Disorder without psychotic features (MDD; $n = 261$, 53.8%), followed by Bipolar Disorder without psychotic features ($n = 42$, 8.7%), and a psychotic disorder ($n = 40$, 8.2%). Comorbidity was common in this sample: only 25.8% of participants met for one current diagnosis; 31.5% met for two current diagnoses; 39.4% met for three or more current diagnoses (3.3% of the sample did not meet for any current diagnoses and received clinical care for either subclinical symptoms, or for recent symptoms not counted as "current" per MINI timeframes). Of note, of the 582 participants who entered the partial hospital program during the time of the study, 146 (25% of sample) did not complete a discharge assessment due to a variety of reasons (54% due to unexpected discharge or discharge from home, 38% due to rehospitalization, 3% due to clinical acuity, and 5% due to other reasons).

Exploratory Factor Analysis

EFA on items from both the SCS-SF and the PTQ yielded a 3-factor solution (see Table 3). The first factor (RNT) explained 46% of variance and consisted of all PTQ items ($\alpha = .96$). The second factor (NA-SC) explained 11% of variance and consisted of the six negatively worded SCS-SF items ($\alpha = .87$). The third factor (PA-SC) explained 5% of the variance and consisted of the six positively worded SCS-SF items ($\alpha = .83$). As expected, all three factors were significantly correlated (all $ps < .05$, see Table 2).[3]

Changes Over the Course of Treatment and Correlations

Results of paired-samples t-test showed that, over the course of treatment, participants experienced significant decreases in depression, anxiety, RNT, NA-SC, and significant increases in PA-SC and CBT as well as DBT skills usage (all $ps < .001$).[4] Bivariate correlations between change scores were all significant (all $ps < .001$). As expected, increases in PA-SC and CBT/DBT skills use, as well as decreases in RNT and NA-SC, were associated with decreases in depression/anxiety symptoms. Relations between changes in NA-SC ($z = .26$, $p > .05$), PA-SC ($z = .03$, $p > .05$), and RNT ($z = -.16$, $p > .05$) and changes in depression versus anxiety did not differ significantly.

Main Path Models

The first path model tested whether changes in RNT mediated relations between changes in PA-SC, NA-SC, and changes in depression and anxiety, controlling for T1 depression and anxiety scores as well as changes in CBT and DBT skills ($n = 309$). This model allowed us to examine whether the significant association found between changes in PA-SC, NA-SC, and symptom improvement (see above) could be explained by concurrent changes in RNT. Results showed that NA-SC only remained significantly associated with changes in depression (but not anxiety) once changes in RNT were taken into account. In contrast, changes in PA-SC were no longer associated with changes in symptoms. Paths from changes in NA-SC and changes in RNT, and from changes in RNT to changes in symptoms, were all significant (all $ps < .05$). Standardized direct path coefficients

[2] Clinicians are asked to perform MINI assessments during the initial program therapy session. A total of 93 MINIs were not administered for clinical reasons (e.g., participant was severely distressed, or there were clinical concerns about participant safety or burden). In addition, four MINIs were excluded because the clinician indicated that results were likely < 50% valid.

[3] When we tested a four-factor solution, a second factor consisting of four PTQ items emerged (items 2, 6, 7, and 12, which appear to more specifically assess the presence of intrusive/obsessive thoughts); however, all four items also loaded on the main PTQ factor. Although items that load on two factors are sometimes deleted from scales, we decided not to do this given that the PTQ has already been validated in its 15-item form, and instead opted to retain the 3-factor solution.

[4] Attendance to the self-compassion group (yes/no) did not relate to changes in self-compassion in this sample ($p > .05$), which was not surprising given the brief nature of this introductory group.

Table 1 Self-reported demographic characteristics and clinician-rated diagnostic characteristics of sample

Demographic characteristics	*n*	(%[a])
Female	294	(50.8%)
Male	285	(49.2%)
Age (*M, SD*)	33.31	(13.28)
Race[b]		
White	511	(88.3%)
Asian	29	(5%)
African American or Black	19	(3.3%)
American Indian or Alaskan Native	7	(1.2%)
Native Hawaiian/Pacific Islander	3	(0.5%)
Caribbean Islander	2	(0.3%)
Choose not to answer	12	(2.1%)
Do not know	8	(1.4%)
Ethnicity		
Non-Latinx	565	(97.6%)
Latinx	14	(2.4%)
Marital status		
Never married	358	(62.8%)
Married/living with partner	140	(24.5%)
Divorced/separated/widowed	72	(12.6%)
Employment status		
Employed	268	(47.00%)
Unemployed	302	(53.00%)
Highest level of education		
< High school/GED	4	(0.7%)
High school/GED	39	(6.8%)
Some college	225	(39.4%)
4-year college graduate	148	(25.9%)
Post-college education	155	(27.1%)
MINI clinician-rated primary diagnosis	*n*	(%)
MDD without psychotic features	261	(53.8)
MDD with psychotic features	12	(2.5)
Bipolar disorder without psychotic features	42	(8.7)
Bipolar disorder with psychotic features	32	(6.6)
Generalized anxiety disorder	27	(5.6)
Psychotic disorder	40	(8.2)
Social anxiety disorder	13	(2.7)
Obsessive–compulsive disorder	11	(2.3)
Posttraumatic stress disorder	15	(3.1)
Panic disorder (with or without agoraphobia)	10	(2.0)
Other	8	(1.6)
Missing	97	(16.7)

MDD major depressive disorder

[a]Percentage of valid data (excluding missing cases)

[b]Participants were allowed to self-report more than one race

Table 2 Correlations (with ns) between change scores, descriptives (M, SD, ns) for all measures, paired-samples t-tests and effect sizes for change (Cohen's d)

Scale (T2–T1)	1	2	3	4	5	6	7	*T1 M (SD)*	*T2 M (SD)*	*T2–T1 t*-test (*p* value)	Cohen's *d*	Valid *ns* T1, T2, T2–T1
1. CESD-10	–							17.18 (6.59)	11.89 (5.69)	18.81***	0.86	563, 433, 426
2. GAD-7	.53***	–						11.42 (5.61)	7.76 (4.69)	16.01***	0.71	567, 435, 429
3. PA-SC	− .22***	− .22***	–					14.89 (4.48)	17.12 (4.65)	− 10.84***	0.49	521, 406, 383
4. NA-SC	.31***	.30***	− .52***	–				24.03 (4.63)	21.56 (5.17)	11.41***	0.50	519, 406, 384
5. PTQ	.41***	.42***	− .38***	.48***	–			38.48 (12.65)	30.07 (12.75)	14.57***	0.66	520, 402, 380
6. CBT-SQ	− .38***	− .21***	.43***	− .39***	− .39***			42.66 (11.08)	52.33 (12.23)	− 15.64***	− 0.83	514, 420, 389
7. DBT-WCCL	− .37***	− .30***	.45***	− .40***	− .40***	.63***	–	1.41 (0.52)	1.69 (0.61)	− 9.75***	− 0.49	491, 391, 349

CESD-10 Center for Epidemiologic Studies of Depression-10, *GAD-7* the 7-item Generalized Anxiety Disorder Scale, *SCS-SF* Self-compassion Scale Short Form, *PTQ* Perseverative Thinking Questionnaire; CBT-SQ Cognitive Behavioral Therapy Skills Questionnaire, *DBT-WCCL* Dialectical Behavior Therapy Ways of Coping Checklist

*$p < .05$; **$p < .01$; ***$p < .001$

Table 3 Results of the exploratory factor analysis on SCS-SF and PTQ items

Items	RNT	NA-SC	PA-SC
SCS-SF 2	.018	− .065	**− .647**
SCS-SF 3	− .047	.127	**− .804**
SCS-SF 5	.127	− .032	**− .652**
SCS-SF 6	.004	− .266	**− .509**
SCS-SF 7	− .100	.152	**− .715**
SCS-SF 10	.023	− .179	**− .505**
SCS-SF 1	.047	**.790**	− .090
SCS-SF 4	.092	**.540**	.025
SCS-SF 8	.002	**.723**	− .022
SCS-SF 9	.304	**.462**	.073
SCS-SF 11	− .084	**.863**	− .003
SCS-SF 12	.004	**.671**	.097
PTQ 1	**.821**	.040	− .086
PTQ 2	**.864**	− .004	− .053
PTQ 3	**.798**	.069	.022
PTQ 4	**.584**	.179	.008
PTQ 5	**.792**	− .061	.045
PTQ 6	**.885**	− .038	− .016
PTQ 7	**.872**	− .044	− .053
PTQ 8	**.770**	.079	− .003
PTQ 9	**.734**	.044	− .037
PTQ 10	**.819**	.035	− .040
PTQ 11	**.857**	− .041	− .006
PTQ 12	**.768**	− .084	.013
PTQ 13	**.728**	− .020	.072
PTQ 14	**.597**	.115	.099
PTQ 15	**.746**	− .049	.076
Factor correlations			
RNT	1		
NA-SC	0.633	1	
PA-SC	0.432	0.612	1

Factor loadings with an absolute value equal or superior to .40 appear in bold

as well as r^2 values are listed in Fig. 1 (see also Table 3). The indirect effects from changes in NA-SC to changes in depression, $\beta = .06$, 95% CI .03–.10, $p = .002$, and anxiety, $\beta = .07$, 95% CI .04–.12, $p = .001$, were both significant. The indirect effects from changes in PA-SC to changes in depression, $\beta = -.03$, 95% CI − .07 to − .004, $p = .08$, and anxiety, $\beta = -.04$, 95% CI − .08 to − .01, $p = .053$, only approached significance.

Competing Path Models

Self-compassion as Mediator

The first competing path model tested whether changes in self-compassion (PA-SC and NA-SC) mediated relations

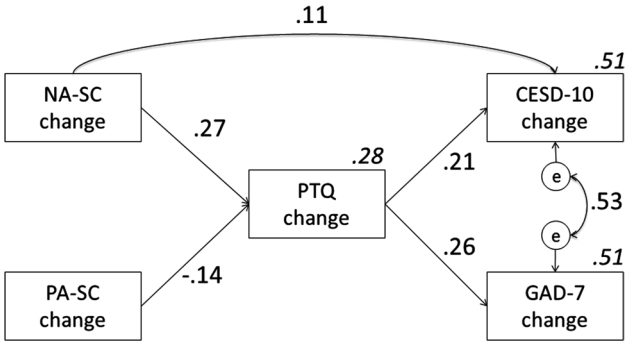

Fig. 1 Main path model testing whether changes in RNT statistically mediate associations between changes in self-compassion and changes in depression and anxiety symptoms (controlling for T1 depression and anxiety symptoms, as well as changes in CBT and DBT skills), including standardized path coefficients and squared multiple correlations. *NA-SC* negative aspects of self-compassion; *PA-SC* positive aspects of self-compassion; *PTQ* perseverative thinking questionnaire; *CESD-10* center for epidemiological studies depression 10 item scale; *GAD-7* generalized anxiety disorder 7 item scale

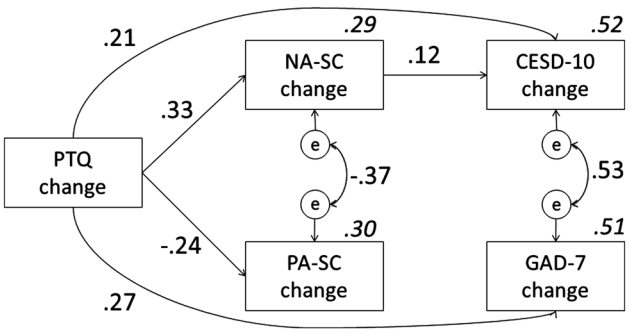

Fig. 2 First competing path model testing whether changes in self-compassion statistically mediate associations between changes in RNT and changes in depression and anxiety symptoms (controlling for T1 depression and anxiety symptoms, as well as changes in CBT and DBT skills), including standardized path coefficients and squared multiple correlations. *NA-SC* negative aspects of self-compassion; *PA-SC* positive aspects of self-compassion; *PTQ* perseverative thinking questionnaire; *CESD-10* center for epidemiological studies depression 10 item scale; *GAD-7* generalized anxiety disorder 7 item scale

between changes in RNT (independent variable) and changes in symptoms, controlling for T1 depression and anxiety scores as well as changes in CBT and DBT skills ($n = 313$). Both direct paths from changes in PA-SC to changes in symptoms were not significant; the direct path from changes in NA-SC to changes in depression, but not anxiety, was significant. All other direct paths were significant (all $ps < .05$); standardized direct path coefficients as well as r^2 values are listed in Fig. 2 (see also Table 3). The indirect effect from changes in RNT, through changes in NA-SC, to changes in depression, was significant, $\beta = -.04$, 95% CI .01–.08, $p = .03$. All other indirect effects were not significant ($ps > .05$).

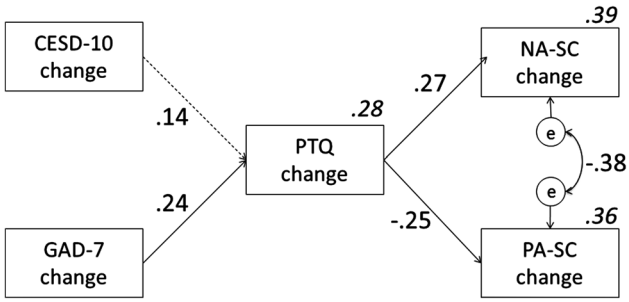

Fig. 3 Second competing path model testing whether changes in RNT statistically mediate associations between changes in depression and anxiety symptoms and changes in self-compassion (controlling for T1 self-compassion scores), including standardized path coefficients and squared multiple correlations. *NASC* negative aspects of self-compassion; *PA-SC* positive aspects of self-compassion; *PTQ* perseverative thinking questionnaire; *CESD-10* center for epidemiological studies depression 10 item scale; *GAD-7* generalized anxiety disorder 7 item scale

Changes in Symptoms as Predictor

The second competing path model tested whether changes in RNT mediated relations between changes in symptoms (independent variables) and changes in NA-SC and PA-SC (outcomes), controlling for self-compassion at T1 ($n = 306$). The direct path from changes in anxiety to changes in RNT was significant ($p < .05$); the direct path from changes in depression to changes in depression only approached significance ($p < .1$). Direct paths between changes in symptoms and changes in NA-SC and PA-SC were not significant ($ps > .05$). Relations between changes in RNT and in NA-SC and PA-SC were significant (both $ps < .05$). Standardized direct path coefficients as well as r^2 values are listed in Fig. 3 (see also Table 3). The indirect effects from changes in anxiety to changes in NA-SC, $\beta = .07$, 95% CI .03–.12, $p = .005$, and in PA-SC, $\beta = -.06$, 95% CI $-.11$ to $-.03$, $p = .003$ were significant. Indirect effects from changes in depression to changes in NA-SC and PA-SC were not significant (both $ps < .05$).

Discussion

This study examined associations between changes in self-compassion (as measured by the SCS-SF), and RNT, as they related to treatment outcomes in a sample of individuals presenting for treatment in an acute, partial hospital setting. The measure of self-compassion used in this study primarily assessed aspects of self-compassion related to coping. Of note, we explored both negative (NA-SC)

and positive (PA-SC) aspects of self-compassion independently. The main objective of this study was to better understand which of these constructs could best explain symptom change, hypothesizing that effects of changes in PA-SC and NA-SC may be mediated by changes in RNT. Examining which potential therapeutic processes most proximally account for treatment outcomes is important in order to accurately describe how individuals recover, and help inform intervention development/implementation to focus on the most promising targets. Testing three competing mediation models, we found that *both* changes in RNT and changes in NA-SC could explain changes in depression. In contrast, changes in RNT only (but not changes in self-compassion) could explain changes in anxiety. PA-SC was not significantly associated with outcomes once RNT and NA-SC were considered. Analyses controlled for baseline and changes in psychotherapeutic skill usage taught from ESTs (i.e., CBT and DBT). The magnitude of change from pre- to post-treatment was similar across depression and anxiety symptoms (i.e., large), with similar strength of correlation between changes in self-compassion and changes in depression and anxiety symptoms. These findings are consistent with cross-sectional research with a non-clinical undergraduate sample indicating that rumination mediated the relationship between self-compassion and depression, as well as self-compassion and anxiety (Raes 2010). These findings are also in line with cross-sectional findings from an outpatient clinical sample of depressed individuals in which higher self-compassion was associated with less depressive symptoms and symptom-focused rumination, and symptom-focused rumination mediated the relationship between self-compassion and depressive symptoms (Krieger et al. 2013).

These results suggest that in an acute setting, negative aspects of self-compassion and RNT may be important transdiagnostic treatment targets. Further research is needed to examine relations between aspects of self-compassion, coping, and symptom improvement in other settings. Targeting self-compassion (especially negative aspects) is likely effective because of the close relationship between self-criticism and RNT. As has been indicated in previous research, decreasing self-criticism can act as a protective buffer between distressing situations/conditions/thoughts and the development/maintenance of anxiety and depressive disorders by reducing repetitive and maladaptive thinking about these events (Cox et al. 2002; Gilbert and Procter 2006; Priel and Shahar 2000; Rector et al. 2000; Sachs-Ericsson et al. 2006). For a detailed review on self-criticism across psychotherapeutic approaches, see Kannan and Levitt (2013). Given that RNT appears to be linked to changes in clinical outcomes, any intervention focused on alleviating RNT may also be effective. Thus, our partial hospital treatment might be improved by adding groups and skills from therapies designed to directly target rumination, attention, and self-criticism, such as Metacognitive therapy (Wells 2009).

The effects of the present study were seen in a partial hospital setting that mostly focuses on DBT and CBT skills. These findings suggest that both positive and negative aspects of self-compassion change during brief intensive treatment in in a partial hospital setting, potentially as a result of group/individual CBT/DBT therapy, therapeutic alliance, or a combination/other factors (we could not assess which aspects of treatment was responsible for changes in this study). As discussed earlier, specific features of CBT/DBT may discourage self-criticism and encourage self-compassion even in the absence of a specific focus on this construct. Future studies should further investigate these relationships. Findings support the possibility that specific aspects of self-compassion (in particular, negative aspects) exerts an effect on RNT, a transdiagnostic maladaptive cognitive process and possible mechanism of change in therapy (Ehring and Watkins 2008; Kertz et al. 2015; Leary et al. 2007; Nolen-Hoeksema et al. 2008; Startup and Erickson 2006).

These findings are especially pertinent as the field of psychology is becoming more interested in transdiagnostic treatment approaches for anxiety and depression (e.g. development of The Unified Protocol; Barlow et al. 2010; the emphasis of Research Domain Criteria (RDoC) by the National Institute of Mental Health (NIMH); Insel et al. 2010). Identifying and implementing methods to augment transdiagnostic treatment approaches are especially of interest in naturalistic settings such as hospital settings, where individuals presenting for treatment with a heterogeneous mixture of diagnoses receive group therapy together. Importantly, the findings suggest that decreasing self-criticism and cultivating self-kindness may benefit patients (independent of psychotherapeutic approach) and complement existing, empirically supported therapies, as the mediation results were significant even when controlling for changes in skill usage over the course of treatment. Future studies should further explore the process by which decreases in negative aspects of self-compassion lead to symptom reduction through RNT to bolster our understanding of transdiagnostic cognitive processes, both maladaptive and adaptive, across psychopathology.

Results should be considered in light of a few limitations. Primarily, treatment response data were calculated using change scores derived from two time points (i.e., pre- and post-treatment). In this naturalistic setting, a number of participants dropped out before the posttreatment data collection point, making missing data unavoidable. We note here that although sample sizes in our models differed slightly due to missing data on exogenous (independent) variables, these variations do not account for the differences in findings between models given that nonsignificant paths did

not approach significance (see Table 3). In addition, as our data could not capture the temporal precedence in our proposed mediator, we could test only associational patterns, not causality. Thus, the time frames under which aspects of self-compassion might impact RNT are unclear. Furthermore, this study was performed in a partial hospital setting, with a mean stay of approximately 11 days and no follow-up assessment, limiting our ability to assess for possible long-term changes from treatment. Also, our study did not include a control group. Further, we only had limited information about the degree to which participants were exposed to information about self-compassion during their individualized course of treatment (i.e., we only know whether or not they attended an introductory psychoeducational group about self-compassion, but not whether their individual treaters also discussed this topic with them, or whether they practiced self-compassion skills during treatment, etc.). As a result, we were not able to measure and control for self-compassion and RNT skills learning/implementation over the course of treatment. Future research could be improved by measuring how well participants were retaining and integrating RNT and self-compassion daily or every other day in the program. Furthermore, given the multidimensional nature of self-compassion, and the fact that it has previously been defined and operationalized in a variety of ways (Gilbert 2017), it would have been preferable to include multiple measures of this construct to better understand how specific aspects of self-compassion operated in our study. For example, it would have been helpful as to include another measure of negative self-evaluation to understand the unique contributions of self-compassion, negative self-evaluation, and RNT. However, to minimize participant burden (an especially important consideration in a clinical setting), we were only able to use one brief measure of self-compassion. As noted above, the SCS-SF primarily emphasizes coping aspects of this construct (which are likely to be most closely related to other cognitive-behavioral skills and processes) and does not comprehensive assess all aspects of self-compassion (Strauss et al. 2016). Also, we did not have data on mindfulness and related constructs as potential control variables to aid in our understanding of how self-compassion works. Previous research has indicated that self-compassion explains the benefits of MBSR (Shapiro et al. 2005), and thus mindfulness data would be a valuable addition for future studies to better understand cognitive changes over the course of treatment. Finally, our sample was limited in terms of racial, ethnic, and socio-economic status diversity. While the sample provides insight into a complex clinical population, the generalizability of the findings to other important dimensions of identity is limited.

This study yielded new insights into the role of (and relations between) self-compassion and RNT during brief intensive treatment. Future research assessing the causal or temporal nature of these associations, as well as their directionality, can further strengthen our understanding of the specific benefits of self-compassion through its potential effects on repetitive negative thinking. Future studies should further investigate the interaction between RNT and self-compassion across longer-term treatment in more diverse samples, and identify potential treatment moderators that might allow clinicians to capitalize on the relations found in the present study.

Compliance with Ethical Standards

Conflict of Interest Lauren P. Wadsworth, Marie Forgeard, Kean Hsu, Sarah Kertz, Michael Treadway and Thröstur Björgvinsson declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Animal Rights No animal studies were carried out by the authors for this article.

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