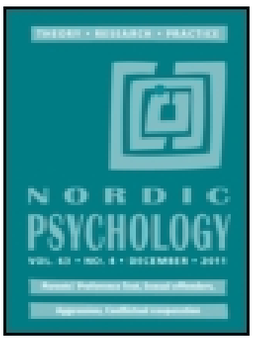

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Mechanisms of mindfulness: Rumination and self-compassion

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Abstract

Why do more mindful individuals tend to be less depressed? We hypothesized (1) that mindfulness is associated with depressive symptoms both via the path of lower levels of rumination and higher levels of self-compassion and (2) that the path via self-compassion would explain variance beyond that which could be explained by rumination. Undergraduate students (N = 277) completed the Five Facet Mindfulness Questionnaire, the Rumination subscale of the Rumination-Reflection Questionnaire, the Self-Compassion Scale, and the depression subscale of the symptom checklist-90 revised (SCL-90-R-dep). Results showed that mindfulness was associated with depressive symptoms both via the pathway of lower levels of rumination and via the pathway of higher levels of self-compassion. Both pathways were found to predict unique variance in depressive symptoms beyond that which could be explained by the other pathway. This suggests that one needs to consider the influence of mindfulness on both rumination and on self-compassion in order to fully understand why mindful individuals tend to be less depressed.

Keywords: mindfulness, self-compassion, rumination, depression, mediation

A large body of research shows that mindfulness is inversely related to depressive symptoms (e.g, Brown & Ryan, 2003; Barnes & Lynn, 2010), and positively related to well-being and quality of life (e.g, Brown & Ryan, 2003; Carlson et al., 2003; Roth & Robbins, 2004; Carmody & Baer, 2008). Several researchers have noted the need to explore the mechanisms explaining the salutary effects of mindfulness (Baer et al., 2006; Shapiro et al., 2006), but little is still known about how mindfulness exerts its effects. A range of potential mediators have been studied, including decentering (i.e, increased ability to observe thoughts and feelings as transitory events; e.g, Carmody et al., 2009), emotion regulation skills (i.e, more adaptive ways of responding to emotional distress; e.g, Velotti, Garofalo, & Bizzi, 2015), having more specific life goals (in contrast to having diffuse goals; Crane et al., 2012), lessened self-discrepancy (i.e, smaller perceived distance between current self and idealized self; Crane et al., 2008), and better attention regulation (i.e, improved ability to consciously control attentional focus; van den Hurk et al., 2012). However, rumination and self-compassion are the two variables that seem to have received the most attention, and the evidence supporting other potential mediators is still preliminary (van der Velden et al., 2015).

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Rumination can be defined as a specific way of responding to low mood in which one ponders about possible causes and implications of the sad feelings (Nolen-Hoeksema, 1991). Self-compassion may be understood as being caring and kind toward oneself when one suffers (Neff, 2003a). In the context of depressive symptoms in particular, rumination seems to play a key role (Desrosiers et al., 2012). Indeed, a recent review of mindfulness mediators on depression (van der Velden et al., 2015) found that rumination along with self-compassion are the variables which have the most evidence in the existing literature, although there are a few contradictory findings (Kerns et al., 2016). In addition, rumination and self-compassion are clinically relevant constructs that have been shown to change positively as a result of clinical interventions (Segal, Williams, & Teasdale, 2002; Gilbert & Procter, 2006; Neff & Germer, 2013). Our main purpose of the present study was to examine if both these variables would mediate between mindfulness and depression, when studied in the same model.

The path via rumination

Several studies have found high levels of rumination to be correlated with onset, duration, and severity of depressive symptoms (Kenny & Williams, 2007; Watkins, 2008) As mindfulness is centered on concrete experience in the present moment, it is thought to counteract rumination which typically is focused on the past and often more abstract in nature (e.g., Bishop et al., 2004). The idea that rumination serves as a mediator between mindfulness and depressive symptoms is in line with the theoretical rationale for Mindfulness-Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2002), in which decreased rumination is identified as the key mechanism of change in mindfulness. Segal, Williams, & Teasdale, 2002 theorize that a depressive episode leads to the establishment of associations between low mood, self-critical thoughts, negative memories, and body tension. If one of these symptoms reoccurs, for example, low mood, it may reactivate the full depressive pattern.

Several studies (e.g., Jain et al., 2007; Coffey & Hartman, 2008; Labelle, Campbell, & Carlson, 2010; Heeren & Philippot, 2011; van Aalderen et al., 2012) have found rumination to be a mediator of the relation between mindfulness and depression. Coffey and Hartman (2008) found rumination (Rumination Reflection Questionnaire; RRQ) to be a mediator of the relation between mindfulness (Mindful Attention Awareness Scale) and psychological distress (Brief Symptom Inventory; BSI) in two different student samples. Two additional cross-sectional studies found that rumination (RRQ and the rumination subscale of the Daily Emotion Report, respectively) was a mediator of the effects of the mindfulness-based stress reduction program on depressive symptoms as measured by the Center for Epidemiological Studies Short Depression Scale (CES-D 10) in cancer patients (Labelle et al., 2010) and depressive symptoms as measured by BSI in a student sample (Jain et al., 2007). Heeren and Philippot (2011) found maladaptive rumination (Cambridge-Exeter repetitive thought scale; Mini-CERTS) to be a partial mediator of the effects of MBCT on depressive symptoms (SCL-90-R). Similarly, van Aalderen et al. (2012) found that rumination (Rumination on the Sadness Scale) was a mediator to the effects of MBCT on depressive symptoms (BDI-II). However, one recent study (Kerns et al., 2016) found contradictory results, reporting that rumination did not mediate the relation between MBCT and depression. Thus, although there is thorough evidence that rumination plays a role in explaining the association between mindfulness and depression, more research is needed in order to conclude.

The path via self-compassion

Self-compassion is a relatively new construct in Western psychology, and like mindfulness, it has its origins in Buddhist philosophy. Being high on self-compassion implies wanting to alleviate one's suffering and extending kindness toward oneself, without suppressing or avoiding the pain. According to Neff (2003a), self-compassion comprises three interacting components: self-kindness (being kind and understanding toward oneself, instead of blaming or criticizing oneself), common humanity (recognizing that painful experiences are part of being human, rather than feeling isolated and disconnected from other people), and mindfulness (holding painful emotions and thoughts in balanced awareness, rather than avoiding, suppressing, or becoming emotionally overwhelmed by them). Thus, self-compassion is thought to entail mindfulness, but this form of mindfulness differs from the general concept of mindfulness (Neff & Germer, 2013). It is more narrowly focused on suffering and negative experiences, and refers more to a balanced perspective on experience, in contrast to the general concept of mindfulness which is more focused on and nonjudgmental awareness of any experiences. Indeed, these two forms of mindfulness have been shown to reflect different phenomena (Van Dam et al., 2011).

The role of self-compassion as a mechanism of mindfulness is in line with Buddhist thought, where compassion for oneself and others is thought to arise with mindfulness (Radhakrishnan & Moore, 1957; Hollis-Walker & Colosimo, 2011). When having made a mistake or feeling hurt, it is common for depressed individuals to react with self-criticism and blame, or an immediate attempt to solve the problem. In contrast, the nonjudgmental awareness involved in mindfulness increases the chances that feelings of hurt may be allowed to enter awareness, enabling individuals to respond with self-compassion. This involves attending to the pain with an active wish to relieve the suffering (self-kindness), acknowledging that everyone experiences suffering from time to time (common humanity), and recognizing that suffering or failing does not mean that one is a bad person (low over-identification).

Self-compassion has been found to be positively correlated with mindfulness (Hollis-Walker & Colosimo, 2011; Van Dam et al., 2011; , Lykins, & Peters, 2012; Keng et al., 2012) and negatively correlated with depressive symptoms (Neff, 2003b; Neff, Rude, & Kirkpatrick, 2007; Neff, Pisitsungkagarn, & Hsieh, 2008; Raes, 2011; Van Dam et al., 2011; MacBeth & Gumley, 2012). Kuyken et al. (2010)examined the role of self-compassion as a mediator between MBCT and depressive symptoms. They found that MBCT participation resulted in a decoupling of the relationship between reactivity of depressive thinking and depressive relapse, and that this decoupling was due to the cultivation of self-compassion. Based on this finding, Kuyken et al. (2010) suggest that self-compassion has a key role in modulating the reactivity often seen in depressed patients. These findings support the hypothesis that mindfulness may increase self-compassion, and that self-compassion may be a mediator in the relation between mindfulness and depressive symptoms.

Hypotheses of the present study

Based on the above-mentioned theory and research, we hypothesized that rumination and self-compassion would be mediators of the association between mindfulness and depressive symptoms, in a non-clinical sample. In addition, we hypothesized that self-compassion would explain variance beyond that which can be explained by rumination. While a reduction in

rumination may go a long way to help individuals cope with depressogenic thinking, the additional active stance of self-compassion may soothe the emotional turmoil that may accompany such thinking. To our knowledge, no study has examined self-compassion as a mediator between dispositional mindfulness and depressive symptoms. Furthermore, we are not aware of any studies that have examined both rumination and self-compassion as mediators between mindfulness and depression in the same model.

Method

Participants

The sample consisted of 116 men and 155 women ($N = 277$, mean age = 22.9 years, SD = 3.55). Of these, 53% ($N = 149$) were psychology undergraduate students, 25% ($N = 68$) were engineering undergraduate students, and 22% ($N = 60$) were medical undergraduate students. Reasons for choosing several fields of study were (1) to secure a greater heterogeneity in order to improve the generalizability of the findings and (2) to increase the likelihood of a more even gender distribution in the sample as a whole. Most (71.8%; $N = 107$) of the psychology undergraduates were women, and most (73.5%; $N = 50$) of the engineering undergraduates were men.

Procedure

As a part of a larger study, we administered the Five Facet Mindfulness Questionnaire (FFMQ), the Reflection-Rumination Questionnaire- Rumination, rumination subscale (RRQ-Rum), the Self-Compassion Scale (SCS), and the depression subscale of the symptom checklist-90 revised (SCL-90-R) to undergraduate psychology and medical students at the University of Bergen, and engineering students at Bergen University College. The questionnaires were administered at the beginning of the lecture, and students used the 15-min break to complete the questionnaires. The participants were informed that participation was voluntary and anonymous, and informed consent was obtained from all individual participants included in the study.

Instruments

Five Facet Mindfulness Questionnaire

The FFMQ (Baer et al., 2006) is a self-report measure of mindfulness, consisting of five factors comprising a total of 39 items. The five factors measure five fundamental skills of mindfulness: observing (for example: "I notice the smells and aromas of things"), describing (for example: "I am good at finding words to describe my feelings"), acting with awareness (for example: "I find myself doing things without paying attention"; reverse scored item), non-judging of inner experience (for example: "I think some of my emotions are bad or inappropriate and I should not feel them"; reverse scored item), and non-reactivity to inner experience (for example: "I perceive my feelings and emotions without having to react to them"). Each item is a statement that respondents rate on a five-point likert-type scale ranging from one ("never or very rarely true") to five ("very often or always true").

The present study used a Norwegian translation of the FFMQ (Dundas et al., 2013). The five translated subscales have shown good construct and convergent validities and are internally consistent, with α coefficients ranging from .69 to .95. In the present study, Chronbach's α of this scale was .82.

Rumination-Reflection Questionnaire

The rumination subscale of the RRQ (Trapnell & Campbell, 1999) consists of 12 items. Examples of items are "long after an argument or disagreement is over with, my thoughts keep going back to what happened" and "it is easy for me to put unwanted thoughts out of my mind." Agreement with items is rated on a five-point likert-type scale ranging from one ("strongly disagree") to five ("strongly agree").

In the present study, we used a Norwegian translation of the RRQ-Rum which has been reported to have a high internal reliability (Cronbach's $\alpha = .91$) and to correlate negatively with self-esteem, habitual negative thinking, and mindfulness (Verplanken et al., 2007). In the present study, the rumination subscale had a Chronbach's α of .90.

Self-Compassion Scale

The SCS (Neff, 2003b) consists of 26 items loading on six subscales, three positive and three negative. The positive subscales are: self-kindness (for example: "I'm tolerant of my own flaws and inadequacies"), common humanity (for example: "I try to see failings as part of the human condition"), and mindfulness (for example: "When something upsets me I try to keep my emotions in balance"). The negative subscales are: self-judgment (for example: "When I see aspects of myself that I don't like, I get down on myself"), isolation (for example: "When I fail at something that is important to me I tend to feel alone in my failure"), and over-identification (for example: "When something painful happens I tend to blow the incident out of proportions"). Agreement is rated on a five-point likert-type scale, from "almost always" to "almost never." High scores on the positive subscales and low scores on the negative subscales result in an overall high level of self-compassion.

The SCS has shown good cross-cultural validity and reliability (Neff et al., 2008). In the present study, we used a Norwegian translation of the SCS (Dundas et al., 2015). Chronbach's α for the total SCS in the present study was .91.

Symptom checklist revised (SCL-90-R), depression subscale

The SCL-90-R (Derogatis, Lipman, & Covi, 1973) is a 90-item self-report inventory that measures psychiatric problems, and consists of eight subscales. The 13-item depression subscale aims to reflect several core symptoms of depression, e.g., low affect and lack of interest. Respondents indicate how often each symptom has occurred during the last seven days, by ranging each item on a five-point likert-type scale, where 0 indicates "not at all" and 4 indicates "very much." In the present study, we used a Norwegian translation of the depression subscale, which has shown good psychometric properties, and correlated satisfactorily with two related scales: the Neuroticism scale in the personality inventory NEO-PI ($r = .65$, $p < .001$); and the Giessen Subjective Complaints List (GSCL; $r = .64$, $p < .001$; Vassend, Lian, & Andersen, 1992). Chronbach's α for the SCL90-R was .91.

Analyses

Statistical analyses were conducted using Statistica version 12 and Statistical Package for the Social Sciences (SPSS; IMB, 2011) version 20.0. All variables had a skewness within plus/minus

Table 1. Demographic variables.

	Psychology undergraduates (N = 149)	Medical undergraduates (N = 60)	Engineering undergraduates (N = 68)	Total (N = 277)	Missing
Mean age (SD)	21.6 (2.2)	25. 4 (4.3)	23.5 (4.1)	22.9 (3.6)	3.6%
Gender (female	72.3%	56.9%	23.1%	56.0%	2.2%
Knowledge of mindfulness					3.2%
None	73.7%	80.4%	92.2%	77.0%	
Knows concept, no practice	10.1%	7.1%	0.0%	6.9%	
Practices monthly or more	16.2%	12.5%	7.8%	13.0%	

Table 2. Pearson product-moment correlations between the variables in the model.

	Depression (SCL-90)	Mindfulness (FFMQ)	Self-compassion (SCS)
Mindfulness (FFMQ)	–.43**		
Self-compassion (SCS)	–.59**	.64**	
Rumination (RRQ-Rum)	.55**	–.49**	–.61**

**p < .001.

1, except SCL-90 which had a skewness of 1.3, indicating a majority of low scores. This is to be expected in a non-clinical sample and no transformations were performed.

A bootstrapping procedure was used to test the significance of the indirect path between the independent and the dependent variables (Preacher & Hayes, 2004; 2008). The bootstrapping procedure produces a confidence interval based on an empirically derived sampling distribution. In this way, no assumption about the shape of the distribution is made (Preacher & Hayes, 2004). We used a macro for SPSS called Indirect, which is developed by Preacher and Hayes (2008). The macro Indirect also tests whether one of the mediation paths are stronger than the other. This "contrast effect" is defined as the cross-product of one path minus the cross-product of the other path.

Results

Demographics

Table 1 shows demographics. Women reported more depressive symptoms than men (r = .24, p < .001), but did not differ from men in mindfulness (r = .02). Age was unrelated to depression (r = .04), rumination (r = –.11), self-compassion (r = .02), and mindfulness (r = .04). Most participants (77%) were not familiar with mindfulness.

Correlations between variables in the study

Table 2 shows Pearson's product–moment correlations between the variables in the study. FFMQ correlated significantly with SCL-90 (p < .001), and with each of the proposed mediators:

Table 3. Self-compassion (SCS) and rumination (RRQ-Rum) as mediators between mindfulness (FFMQ) and depressive symptoms (SCL-90-R; ***N*** = 268).

Independent variable (IV)	Mediator	Path *a* (IV to mediator)	Path *b* (mediator to dependent variable; DV)	Path *c* (total effect of IV on DV)	C-prime (direct effect of IV on DV)	Cross-product	CI lower	CI upper
FFMQ	SCS	.64*	−.37*	−.43*	−.047 (p = .45)	−.24	−.35	−.15
	RRQ-Rum	−.48*	.30*			−.15	−.22	−.08

*p < .001.
Note: FFMQ = Five Facet Mindfulness Questionnaire, SCS = Self-Compassion Scale, RRQ-Rum = Rumination-Reflection Scale Rumination subscale, dependent variable (DV) = symptom checklist revised, depression subscale (SCL-90-r).

RRQ-Rum (p < .001) and SCS (p < .001). The proposed mediators correlated significantly with SCL-90 (RRQ-Rum: p < .001, SCS: p < .001). There was a strong negative correlation between SCS and RRQ-Rum (, p < .001).

Mediation

Table 3 shows the results of a mediation analysis using a bootstrapping procedure with two mediators in the model (SCS and RRQ-Rum). Results showed that both the path via RRQ-Rum (ß = −.2 [−.2, −.1]) and the path via SCS (ß = −.2 [−.4, −.2]) were significant and unique mediators of the association between FFMQ and SCL-90-r. None of the paths via the mediators were stronger than the other (contrast effect = .1, p = .2).

Missing data

Five cases were excluded because they did not reach the criteria of having more than 80% of the items completed on *all* questionnaires. The remaining missing data were few and scattered. In instances where more than 80% of a scale had been completed, missing data were imputed by a k-nearest neighbor procedure. In instances where less than 80% of a scale had been completed (14 cases, that is 5% of the total sample), these data were not imputed, and the cases were excluded listwise in the analyses. The scales at the end of the package of questionnaires had a greater chance of being left uncompleted. Other than this, we could not see any clear patterns in missing scales.

Discussion

The aim of the present study was to examine the roles of rumination and self-compassion as mediators of the association between mindfulness and depressive symptoms. We found support for our first hypothesis that both rumination and self-compassion were mediators of the relationship. This is in accordance with prior findings that rumination (e.g., Jain et al., 2007; Coffey & Hartman, 2008; Labelle et al., 2010; Heeren & Philippot, 2011) and self-compassion (Kuyken et al., 2010) may be mediators of the association between mindfulness and depressive symptoms.

We also found support for our second hypothesis that the path via self-compassion explained variance in depression beyond that which could be explained by the path via rumination.

However, the path via rumination in turn explained variance beyond that which could be explained by the path via self-compassion. None of the proposed mediators were more important than the other. Thus, the results indicate that both self-compassion and rumination contribute in explaining the effect of mindfulness on depressive symptoms. This implies that understanding both the process of rumination and self-compassion is important in order to understand how mindfulness may work in reducing depressive symptoms.

What are the implications of the present results for our understanding of the relationship between mindfulness, rumination, self-compassion, and depressive symptoms? Perhaps mindfulness may be a first step in responding to depressive thoughts and feelings in a way that enables self-compassion to take the place of destructive rumination. Neff (2011) suggested that in order for individuals to give compassion to themselves, they first need to recognize that they are suffering. She noted that "we can't heal what we can't feel" (p. 80). As mindfulness may help individuals notice and accept the present as it is, mindful individuals are more likely to be aware of the moments in which they need self-compassion and the moments in which they ruminate. In contrast, individuals who tend to ignore or repress present moment experiences may not be consciously aware of their automatic rumination or of their need for self-compassion. Whereas rumination seems to be a habitual and automatic pattern, self-compassion implies an intentional act of kindness toward the self. Moreover, rumination is focused on cognitive aspects of pain, for example, thinking "why was I so stupid?". Self-compassion, on the other hand, broadens awareness to emotional and bodily aspects, such as feeling the hurt of having failed, and trying to soothe oneself. In this way, self-compassion may be a mindful alternative to rumination, and the two may represent opposite response styles. This assumption is supported by the high negative correlation between self-compassion and rumination found in the present study. It is also in line with previous findings that greater self-compassion was related to less rumination (Neff, 2003a; Neff, Kirkpatrick, & Rude, 2007; Neff & Vonk, 2009). A mindful attitude may help individuals avoid getting caught up in ruminative thoughts about negative events or one's failures, and instead respond in a more self-compassionate manner by directing attention and kindness toward the *feelings* of being hurt. This shift from rumination to self-compassion may in turn make depressive symptoms less likely to occur.

When learning to cope with depression through mindfulness, one does not, however, aim for an absolute absence of rumination. Instead, a mindful and healthy stance includes a *recognition* of one's rumination as "events in the mind," which can be approached with a self-compassionate attitude. Over time, this may reduce any tendencies to mistake ruminative thoughts as direct reflections of reality. In the long run, the frequency of such thoughts may then diminish.

In the present study, the focus was on rumination and self-compassion. Although both seem to be central mechanisms of change in mindfulness, the relationship between these variables and other proposed mediators is not known. For example, rumination and self- compassion may theoretically represent two types of emotion regulation efforts (where self-compassion is presumed to be more conducive to mental health than rumination). Also, a higher capacity for attention regulation, or meta-cognitive skills, may explain how mindfulness reduces rumination and depression. In order to obtain a broader picture of potential mediators of mindfulness and their relationship to each other, future research should take more potential mediators into consideration in the same model, preferably using longitudinal designs. This might reveal any shared variance between potential mediators and contribute to a better understanding of

possible causal relationships in the processes that mediate between mindfulness and depression (van der Velden et al., 2015).

The results of the present study may have some implications for clinicians who wish to incorporate mindfulness in their work. The finding that mindfulness may work both via the pathway of lower levels of rumination and the pathway of higher levers of self-compassion is probably well-known to many mindfulness teachers and therapists. However, mindfulness teachers or therapists may vary in how explicitly they address self-compassion. Neff and Germer (2013) are proponents of addressing self-compassion directly. Others may place a greater emphasis on addressing rumination. Patients may differ in which pathway to reduced depression works best for them. For some, directly cultivating a self-compassionate attitude may be preferable. For others, cognitively oriented techniques directed toward ruminative tendencies may be more useful. Segal, Williams, and Teasdale (2002) have demonstrated how mindfulness suits the cognitive therapy tradition, and the MBCT program incorporates a focus on the negative consequences of rumination. Self-compassion training (e.g., Mindful Self-Compassion; Neff & Germer, 2013) may represent a more emotion-focused approach to depressive tendencies than the MBCT tradition. Familiarity with both cognitive approaches to reduce rumination and knowledge of approaches to cultivate self-compassion may increase therapists' opportunities to tailor mindfulness approaches to the individual needs and characteristics of each patient.

The present study has several limitations. First, it uses a cross-sectional design, which does not permit conclusions with regard to causality (Mathieu & Taylor, 2006; Kazdin, 2007). Second, it relies on self-report measures only. Third, the current sample consists of students enrolled in higher education, with low average age and a small age range, reducing generalizability to other age populations and other age ranges.

Conclusion

In the present study, rumination and self-compassion were found to be mediators of the association between mindfulness and depressive symptoms. Both rumination and self-compassion explained independent variance in the association between mindfulness and depressive symptoms, indicating that both concepts are important in order to understand how mindfulness works to reduce depressive symptoms.

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.

Disclosure statement

No potential conflict of interest was reported by the authors.

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