

The Relationship between Mindfulness and Uncontrollability of Ruminative Thinking

Filip Raes · J. Mark G. Williams

© Springer Science+Business Media, LLC 2010

Abstract Using a cross-sectional design, we examined the relationship between naturally occurring levels of mindfulness and rumination in students ($n=164$). As predicted, we found that, when controlling for current depressive symptoms and prior history of depression, mindfulness was significantly negatively correlated with rumination, but it was only associated with the extent to which rumination was experienced as uncontrollable, not with global levels of rumination. Furthermore, mindfulness moderated the relationship between global levels of rumination and uncontrollability of rumination, consistent with the suggestion that high dispositional mindfulness reduces the extent to which ruminative reactions tend to escalate into self-perpetuating and uncontrollable ruminative cycles.

Keywords Mindfulness · Rumination · Depression

Introduction

Mindfulness-based cognitive therapy (MBCT) for depression (Segal et al. 2002), was developed to prevent relapse of depression in recovered recurrently depressed individuals. It has been found to halve the rates of depressive relapse in patients with three or more previous major depressive episodes (Godfrin & van Heeringen 2010; Ma & Teasdale,

2004; Teasdale et al. 2000) and to be as effective as antidepressants in preventing episodes (Kuyken et al. 2008). MBCT combines techniques of cognitive therapy and mindfulness practices. Mindfulness refers to a non-judgmental and compassionate moment-to-moment awareness of one's experiences.

The theoretical rationale behind MBCT is the differential activation model that people differ, one from another, in the extent to which small downward shifts in mood produce negative thinking patterns (see Raes et al. 2009), and that differences in whether these *persist* and *escalate* depends on whether these thinking patterns include a style of reaction that tends to self-perpetuate, with 'rumination' seen as one of the most maladaptive. Rumination refers to a particular way of responding to low mood in which one ponders about one's sad mood, and about the possible causes and implications of these sad feelings (Nolen-Hoeksema 1991). Research by Nolen-Hoeksema et al. has convincingly shown that such a ruminative response style prolongs and exacerbates depressed mood and dysphoric states, and that it is involved in the onset, maintenance, and recurrence of clinical depression, see Watkins (2008) for a review.

Given the evidence that rumination plays a key role in depressive relapse/recurrence, MBCT precisely aims to address depressotypic reactive thinking processes such as rumination by helping people (a) to recognize when their mood is deteriorating, (b) to observe this mood drop and accompanying reactive ruminative tendencies, and (c) to switch to a non-ruminative mode of mind. The idea is that by becoming aware of this 'ruminative mode' at an early stage, by observing it non-judgmentally and exploring directly the bodily sensations that accompany it, people can learn to decenter from these thought/feeling patterns, so preventing their ruminative thinking from escalating into relapse (Segal et al. 2002). Despite the efficacy of this

F. Raes (✉)
Department of Psychology, University of Leuven,
Tiensestraat 102,
3000 Leuven, Belgium
e-mail: filip.raes@psy.kuleuven.be

J. M. G. Williams
Department of Psychiatry, University of Oxford,
Oxford, UK

approach in prevention of relapse in depression, the model on which it is based has received relatively little attention. Central to the model is a claim about individual differences in reactivity to mood; that people who naturally differ along the dimension of mindfulness (that is, naturally able to decenter) will also differ in the extent to which rumination predominates when sad mood is present.

The aim of the present study was to investigate the relationship between mindfulness and rumination in a student sample.¹ Our *first hypothesis* was that low dispositional mindfulness would be associated with higher levels of rumination; that is, mindfulness scores on the extended version of the Kentucky Inventory of Mindfulness Skills (KIMS-E; Raes et al. 2009; Baer and Smith 2004; also see Dekeyser et al. 2008) would be negatively correlated with rumination scores on the Leuven Adaptation of the Rumination on Sadness Scale (LARSS; Raes et al. 2008). A negative relationship between mindfulness and rumination has been reported previously (Brown & Ryan 2003). However, no study has yet examined to what extent mindfulness relates differently to distinct components of rumination. Given MBCT's rationale, we hypothesized that mindfulness would be particularly associated with the extent to which rumination is uncontrollable, but that it would be less or not associated with rumination itself. Similar to the cognitive process of worry (see McLaughlin et al. 2006), rumination, or the act of analyzing the possible reasons for and meanings of one's sad feelings, can to some extent be seen as a common human experience that only becomes dysfunctional when it is excessive and uncontrollable. However, the extent to which this ruminative thinking persists, and becomes automatic and uncontrollable, depends on the degree to which an individual can notice ruminative thoughts at an early enough stage and subsequently decenter from these. We suggest that those who are higher in dispositional mindfulness are better able to prevent ruminative thinking from escalating into continuous and uncontrollable cyclic rumination.

Therefore, our second hypothesis was that mindfulness would be particularly negatively correlated with the uncontrollability aspect of rumination, whereas it would not (or to a lesser extent) be related to rumination itself (i.e., the causal analytic and understanding aspects of rumination). The use of the LARSS measure allowed us to examine this, as it consists of two subscales that measure the 'analytic' aspect

of rumination (i.e., thinking about possible causes for one's sad feelings, 'Causal Analysis', and thinking about what might be the meaning of one's sadness, 'Understanding') and a third subscale, 'Uncontrollability', measuring the extent to which ruminative thinking is experienced as uncontrollable and difficult to interrupt.

Given that mindfulness is thought to increase the ability to notice and simply observe ruminative thinking when it occurs, and to decenter from such ruminative thinking patterns, we wished to test a third hypothesis that mindfulness would moderate the relationship between analytic rumination (analyzing possible causes and meanings for one's sad feelings, the first two factors of the LARSS) and uncontrollability of such ruminative thinking (the third LARSS factor). That is, we predicted that in those with higher levels of dispositional mindfulness, any particular level of analytic rumination is less likely to be experienced as uncontrollable as they might be better able to decenter from ruminative thoughts when they occur.

Method

Participants and Procedure

Participants were 164 first year psychology students (130 women). Their mean age was 19.21 years ($SD=0.91$, range=18–25 years). All participated in exchange for course credit and completed the included measures (see below) during a group administration.

Measures

Extended version of the Kentucky Inventory of Mindfulness Skills The KIMS-E is a 46-item self-report scale assessing five mindfulness facets. Items are rated on a six-point scale (never or very rarely true to very often or always true). The KIMS-E consists of the original KIMS (39 items divided the following four factors: observing, describing, act with awareness, and accept without judgment, Baer and Smith 2004); and all seven items of the nonreactivity to inner experience factor from the Five Factor Mindfulness Questionnaire (FFMQ; Baer et al. 2006). The KIMS-E has good psychometric properties (Raes et al. 2009).

The Leuven Adaptation of the Rumination on Sadness Scale The LARSS (Raes et al. 2008) is a 17-item self-report questionnaire measuring rumination on sadness. Items are rated on a five-point scale (not at all to very much). The LARSS is an adapted and extended version of the Rumination on Sadness Scale (Conway et al. 2000). The LARSS consists of three subscales: causal analysis (e.g., 'I repeatedly analyze and keep thinking about the

¹ The present results come from a broader study on the relationship between mindfulness and vulnerability for depression. The results with regard to the association between mindfulness and cognitive reactivity are described elsewhere (Raes et al. 2009). This paper focuses on the association between mindfulness and (facets of) rumination. The results concerning the specific research questions described in the current paper are original and have not been published previously.

reasons for my sadness'), understanding (e.g., 'I repeatedly think about what might be the meaning of my sad feelings'), and uncontrollability (e.g., 'If I start thinking about my sad feelings, I have difficulty controlling these thoughts'). Adequate reliability and validity is reported for the LARSS (Raes et al. 2008). Relative to the first two factors, the uncontrollability factor reflects a more maladaptive aspect of rumination, in that its association with, for example, depression symptomatology and thought suppression is more pronounced than is the case for causal analysis and understanding. Also, the association between the latter two factors and a more adaptive form of rumination (i.e., reflective thinking) is higher than for the uncontrollability factor (Raes et al. 2008). Furthermore, using a LARSS variant adapted to rumination on loneliness; it was found that the uncontrollable nature, rather than the content of ruminative thoughts on loneliness (i.e., causal analysis and understanding), was particularly harmful in the development of depressive symptoms in college students (Vanhalst et al., submitted).

Beck Depression Inventory The Beck Depression Inventory (BDI-II; Beck et al. 1996) is a self-rating measure for severity of depressive symptomatology. We used the Dutch version by Van der Does (2002). Cronbach's alpha in the present sample was 0.88.

The Major Depression Questionnaire The Major Depression Questionnaire (MDQ; Van der Does et al. 2003) is self-report questionnaire assessing the presence of current and past major depression (American Psychiatric Association 1994). It has shown high consistency with SCID-based diagnoses (see Williams et al. 2008).

Results

Correlations between Mindfulness and Rumination

Descriptive statistics for the included variables were as follows: LARSS-Total, $M=47.35$ ($SD=10.49$, range=20–74); LARSS-CAU, $M=16.12$ ($SD=3.45$, range=7–24); LARSS-UND, $M=15.08$ ($SD=4.28$, range=6–25); LARSS-uncontrollability subscale scores (UNC), $M=16.16$ ($SD=4.63$, range=6–28); KIMS-E, $M=145.64$ ($SD=14.22$, range=103–192); BDI-II, $M=7.38$ ($SD=6.06$, range=0–36); seven participants or 4% scored above the cut-off of 19, used to indicate the presence of moderate to severe depressive symptomatology; and according to the MDQ, 31 participants or 18.9% had suffered from a major depressive episode in the past.

As predicted, mindfulness is significantly negatively correlated with rumination (LARSS), $r(164)=-0.24$, $p<0.01$.

Interestingly, when we look at the correlations with the scores on the LARSS subscales, we see that, as hypothesized, mindfulness only significantly correlates (negatively) with the uncontrollability subscale scores (LARSS-UNC), $r(164)=-0.44$, $p<0.001$. Mindfulness does not correlate with scores on the analytic aspects of rumination (LARSS-CAU and LARSS-UND subscales, $r(164)=-0.03$, $p=0.73$, and $r(164)=-0.08$, $p=0.30$).

Participants with a history of a major depressive episode ($n=31$ or 18.9%) scored marginally significantly higher on the LARSS-UNC subscale ($M=17.61$, $SD=4.64$) than those without a major depressive episode in their past ($n=133$; $M=15.82$, $SD=4.58$), $t(162)=1.96$, $p<0.06$. Also, BDI-II scores were significantly associated with LARSS-UNC scores, $r(164)=0.51$, $p<0.001$. Given that uncontrollability of rumination was also associated with BDI-II scores and presence/absence of a major depressive episode in the past, the above correlation between mindfulness and uncontrollability LARSS-subscale scores was repeated, with BDI-II scores and prior history of major depression partialled. This did not change the pattern of results: mindfulness remained significantly negatively correlated with the uncontrollability LARSS subscale scores, $r(160)=-0.26$, $p<0.01$.

Mindfulness as a Moderator of the Relationship between Analytic Rumination and Uncontrollability of Rumination

As an index for analytic rumination, we calculated the sum of the LARSS-CAU and LARSS-UND subscale scores divided by two given that both subscales reflect analytic rumination see e.g., (Watkins & Teasdale 2001). This index was labeled 'LARSS-C&U' (or LARSS-causal analysis and understanding). To test the hypothesis that there would be an interaction of mindfulness and analytic rumination in predicting uncontrollability of rumination, we performed a hierarchical regression analysis with LARSS-UNC scores as the criterion variable. In step 1, we included BDI-II scores and presence/absence of a major depressive episode in the past (PAST MDE; dummy coded: 1=no, 2=yes). In step 2, we then simultaneously entered analytic rumination (the centered LARSS-C&U score) and mindfulness (the centered KIMS-E score). LARSS-C&U and KIMS-E scores were centered to eliminate possible multicollinearity effects. (The condition index and variance inflation factors (VIF) indicated that multicollinearity was not a problem.) In step 3, we entered the interaction term (cross-product) of the centered LARSS-C&U and KIMS-E scores.

In the first step, only depressive symptoms (BDI-II) significantly predicted uncontrollability of rumination, $\beta=0.50$, $t(161)=7.44$, $p<0.001$. After the first step, the overall model was significant, $F(2, 161)=30.24$, $p<0.001$. In the second step, the inclusion of analytic rumination and

mindfulness explained significant additional variance, R^2 change=0.22, $F(2, 159)=33.53$, $p<0.001$, with the overall model remaining significant, $F(4, 159)=38.00$, $p<0.001$. Both analytic rumination and mindfulness predicted uncontrollability of rumination, $\beta=0.44$, $t(159)=7.22$, $p<0.001$, and $\beta=-0.31$, $t(159)=-4.70$, $p<0.001$, respectively. Crucially, in the third step, the interaction between analytic rumination and mindfulness explained significant additional variance, R^2 change=0.04, $F(1, 158)=12.18$, $p<0.01$, with the overall model remaining significant, $F(5, 158)=34.97$, $p<0.001$. As hypothesized, the interaction between analytic rumination and mindfulness predicted uncontrollability of rumination, $\beta=-0.20$, $t(158)=-3.49$, $p<0.001$. We can conclude that mindfulness functions as a moderator in the relationship between analytic rumination and the uncontrollability of rumination.

Figure 1 gives a graphical representation of the interaction between analytic rumination and mindfulness, using a median split on mindfulness scores. Simple slopes analyses showed that analytic rumination significantly predicted uncontrollability of rumination at both low levels ($B=1.04$; $t=9.00$; $p<0.001$) and high levels of mindfulness ($B=0.41$; $t=4.11$; $p<0.001$). And the significant interaction shows that such analytic rumination is significantly more closely associated with uncontrollability of rumination when accompanied by lower levels of naturally occurring mindfulness skills.

Discussion

We sought to investigate the relationship between mindfulness and rumination in a student sample. Although there do exist previous reports in the literature on the inverse relationship between rumination and mindfulness, e.g., Brown and Ryan (2003), we are unaware of any study that has examined the differential relationships between mindfulness and different aspects of rumination. The specific hypothesis we examined was based on MBCT's underlying rationale; that rumination occurs to some extent as a common human experience, but becomes particularly dysfunctional when it is excessive and uncontrollable. The idea is that greater skill in mindful awareness, either naturally occurring or cultivated in meditation practices, does not mean that people do not ruminate, but that they are better at noticing it when it occurs, so that they subsequently can disengage from it. In line with this hypothesis, we found that mindfulness only significantly negatively correlated with respondents' scores on the uncontrollability subscale of the rumination measure we used, whereas it was not at all correlated with scores on the causal analysis and understanding subscales, both reflecting what is commonly referred to as analytic rumination (see, e.g., Watkins & Teasdale 2001). Importantly, the correlation for uncontrollability of rumination with mindfulness remained

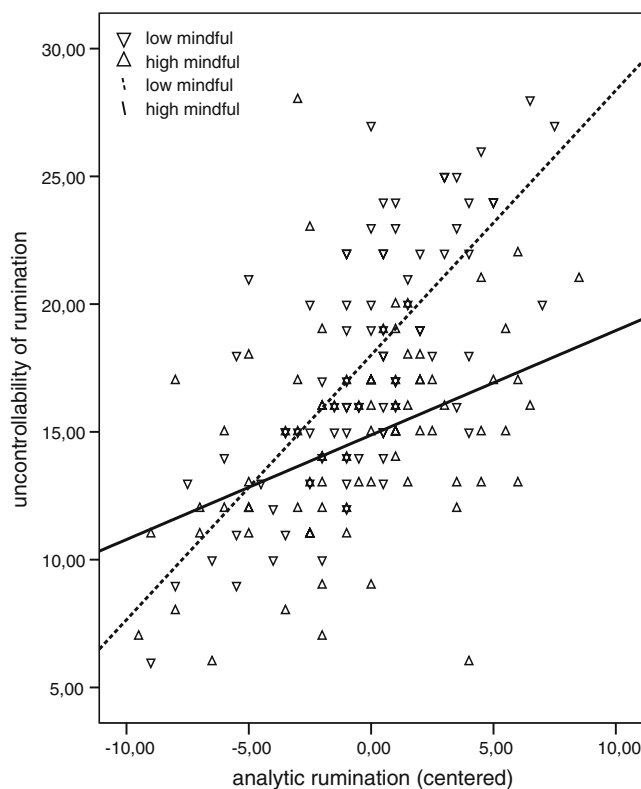


Fig. 1 Scatter plot displaying the relationship between analytic rumination and uncontrollability of rumination with linear fit lines for mindfulness subgroups (high vs. low mindful) illustrating the mindfulness moderating effect.

significant when current depressive symptomatology and prior history of major depression were controlled.

We further predicted that mindfulness would act as a moderator of the relationship between analytic rumination and uncontrollability of ruminative thinking. The underlying idea here was that, under some circumstances, the more one ruminates in an analytic fashion, the more likely it will be that these ruminations are more and more difficult to control. However, with increasing mindfulness skills (enabling people to notice ruminative thoughts at an earlier stage and to subsequently disengage from such thought patterns) this relationship would be 'tempered': analytic ruminative thinking would be less likely to become self-perpetuating and thus uncontrollable. Results supported this hypothesis, showing that mindfulness did indeed moderate the relation between global levels of rumination and the uncontrollable nature of it.

As a whole, the present results offer further indirect evidence for the validity of MBCT's underlying theoretical perspective, namely that MBCT aims to actively address depressotypic reactive ruminative thinking, a key causal mechanism involved in depressive relapse. Mindfulness practices, as a form of attentional control training, are incorporated in MBCT to increase people's awareness. Such awareness is considered key for people to be able to notice when there is a lowering of mood and when

ruminative responses occur. As noted by Segal et al. (2002, p. 51), such “awareness itself would take up (...) scarce processing resources that might have been supporting rumination, thereby weakening it”. Mindful awareness “would have the benefit of ‘taking up capacity’ in the limited information processing channel. This would starve the vicious ruminative cycles of the resources needed to maintain them” Segal et al. (2002, p. 42). By observing such ruminative responses in a non-judgmental way, people can then decenter from these ruminative responses before they may spiral out of control and further worsen mood. Addressing the uncontrollability of rumination with mindfulness is particularly important and is consistent with a recently proposed meta-cognitive model by Papageorgiou and Wells (2004) that states that it is precisely the experiencing of ‘uncontrollable’ ruminative thinking which is most likely to fuel depressive feelings.

Two important limitations of the present research should be noted. First, the use of an undergraduate sample limits to some extent the external validity of the present study’s results. Future studies will need to test the generalizability of these findings to patient samples. A second important limitation of the present study is its correlational nature, which does not allow for the determination of causal relationships. Although supportive of our hypotheses, which were based on the theoretical model underlying MBCT for depressive relapse, the current results await replication, ideally by means of experimental studies investigating the effects of mindfulness-based interventions on different aspects of ruminative thinking. Notwithstanding these limitations, the present results provide first evidence that uncontrollability of ruminative thinking is inversely related to mindfulness, even when taking into account current depressive symptomatology and past depression. As such, our findings further underscore the theoretical model underlying MBCT specifically and mindfulness-based interventions more generally.

References

- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders (4th Ed) (DSM-IV)*. Washington, DC: APA.
- Baer, R. A., & Smith, G. T. (2004). Assessment of mindfulness by self-report: The Kentucky Inventory of Mindfulness Skills. *Assessment, 11*, 191–206.
- Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*, 27–45.
- Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Beck Depression Inventory-2*. San Antonio, TX: The Psychological Corporation.
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*, 822–848.
- Conway, M., Csank, P. A. R., Holm, S. L., & Blake, C. K. (2000). On assessing individual differences in rumination on sadness. *Journal of Personality Assessment, 75*, 404–425.
- Dekeyser, M., Raes, F., Leijssen, M., Leysen, S., & Dewulf, D. (2008). Mindfulness and interpersonal behaviour. *Personality and Individual Differences, 44*, 1235–1245.
- Godfrin, K.A., van Heeringen, C. (2010) The effects of mindfulness-based cognitive therapy on recurrence of depressive episodes, mental health and quality of life: A randomized controlled study. *Behaviour Research and Therapy* doi: 10.1016/j.brat.2010.04.006.
- Kuyken, W., Byford, S., Taylor, R. S., Watkins, E., Holden, E., White, K., et al. (2008). Mindfulness-based cognitive therapy to prevent relapse in recurrent depression. *Journal of Consulting and Clinical Psychology, 76*, 966–978.
- Ma, S. H., & Teasdale, J. D. (2004). Mindfulness-based cognitive therapy for depression: Replication and exploration of differential relapse prevention effects. *Journal of Consulting and Clinical Psychology, 72*, 31–40.
- McLaughlin, K., Sibrava, N., Behar, E., & Borkovec, T. D. (2006). Recurrent negative thinking in emotional disorders: Worry, depressive rumination, and trauma recall. In S. Sassaroli & G. Ruggerio (Eds.), *Worry, need of control, and other core cognitive constructs in anxiety and eating disorders* (pp. 37–67). Milan: Raphael Cortina Publisher.
- Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology, 100*, 569–582.
- Papageorgiou, C., & Wells, A. (2004). Nature, functions, and beliefs about depressive rumination. In C. Papageorgiou & A. Wells (Eds.), *Depressive rumination: Nature, theory, and treatment* (pp. 3–20). Chichester, UK: John Wiley & Sons.
- Raes, F., Dewulf, D., Van Heeringen, C., & Williams, J. M. G. (2009). Mindfulness and reduced cognitive reactivity to sad mood: Evidence from a correlational study and a non-randomized waiting list controlled study. *Behaviour Research and Therapy, 47*, 623–627.
- Raes, F., Hermans, D., Williams, J. M. G., Bijttebier, P., & Eelen, P. (2008). A “triple W”-model of rumination on sadness: Why am I feeling sad, what’s the meaning of my sadness, and wish I could stop thinking about my sadness (but I can’t). *Cognitive Therapy and Research, 32*, 526–541.
- Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression: A new approach for preventing relapse*. New York: Guilford Press.
- Teasdale, J. D., Segal, Z. V., Williams, J. M. G., Ridgeway, V. A., Soulsby, J. M., & Lau, M. A. (2000). Prevention of relapse/recurrence in major depression by mindfulness-based cognitive therapy. *Journal of Consulting and Clinical Psychology, 68*, 615–623.
- Van der Does, A. J. W. (2002). *Handleiding bij de Nederlandse bewerking van de BDI-II* [Manual of the Dutch version of the BDI-II]. San Antonio, TX/Lisse, the Netherlands: The Psychological Corporation/Swets Test Publishers.
- Van der Does, A. J. W., Barnhofer, T., & Williams, J. M. G. (2003). *The Major Depression Questionnaire (MDQ)*. www.dousa.nl/publications.
- Watkins, E. (2008). Constructive and unconstructive repetitive thought. *Psychological Bulletin, 134*, 163–206.
- Watkins, E., & Teasdale, J. D. (2001). Rumination and overgeneral memory in depression: Effects of self-focus and analytic thinking. *Journal of Abnormal Psychology, 110*, 353–357.
- Williams, J. M. G., Van der Does, A. J. W., Barnhofer, T., Crane, C., & Segal, Z. V. (2008). Cognitive reactivity, suicidal ideation and future fluency: Investigating a differential activation theory of suicidality. *Cognitive Therapy and Research, 32*, 83–104.