



# Prediction of pre-exam state anxiety from ruminative disposition: The mediating role of impaired attentional disengagement from negative information



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## ABSTRACT

Rumination is a maladaptive form of repetitive thinking that enhances stress responses, and heightened disposition to engage in rumination may contribute to the onset and persistence of stress-related symptoms. However, the cognitive mechanisms through which ruminative disposition influences stress reactivity are not yet fully understood. This study investigated the hypothesis that the impact of ruminative disposition on stress reactivity is carried by an attentional bias reflecting impaired attentional disengagement from negative information. We examined the capacity of a measure of ruminative disposition to predict both attentional biases to negative exam-related information, and state anxiety, in students approaching a mid-term exam. As expected, ruminative disposition predicted state anxiety, over and above the level predicted by trait anxiety. Ruminative disposition also predicted biased attentional disengagement from, but not biased attentional engagement with, negative information. Importantly, biased attentional disengagement from negative information mediated the relation between ruminative disposition and state anxiety. These findings confirm that dispositional rumination is associated with difficulty disengaging attention from negative information, and suggest that this attentional bias may be one of the mechanisms through which ruminative disposition influences stress reactivity.

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Cognitive theories emphasize the importance of cognitive vulnerabilities in psychological distress (Beck, Rush, Shaw, & Emery, 1979). In recent years, significant attention has been devoted to understanding the independent and combined contributions of various cognitive vulnerability factors to emotional distress, and the relations among these vulnerability factors (Epkins, Gardner, & Scanlon, 2013; Fergus & Wu, 2011; Mathews & MacLeod, 2005; Reardon & Williams, 2007). The current study focused on examining the impact of two such factors, ruminative disposition and attentional bias to negative information, on levels of state anxiety experienced by students prior to a mid-term exam.

Ruminative disposition concerns the habitual tendency to engage in repetitive thinking about one's negative feelings and problems, and their possible causes and consequences (Nolen-Hoeksema, 1991; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). This type of repetitive thinking impairs emotion regulation, prolonging and exacerbating distress (Lyubomirsky & Nolen-Hoeksema, 1993, 1995; Nolen-Hoeksema et al., 2008). Although ruminative disposition has been studied most extensively in relation to depression, it also appears to be a risk factor for anxiety, as shown by both cross-sectional and longitudinal evidence (Alloy et al., 2012; Harrington & Blankenship, 2002; Michl, McLaughlin, Shepherd, & Nolen-Hoeksema, 2013; Nolen-Hoeksema et al., 2008). Several studies have linked elevated ruminative disposition to increased anxiety symptoms in students (Aldao & Nolen-Hoeksema, 2010; Calmes & Roberts, 2007; Nolen-Hoeksema et al., 2008; Segerstrom, Tsao, Alden, & Craske, 2000). Young and

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Dietrich (2015) have recently reported that ruminative disposition is a significant predictor of anxiety symptoms in adolescents over a period of six months, and it has been suggested that individual differences in ruminative disposition may be implicated in the relation between stressful life events and anxiety symptoms (Hankin, 2009; Michl et al., 2013). Rumination related to social evaluation has been associated with increased state anxiety in individuals with heightened vulnerability to social anxiety, suggesting that a heightened tendency to engage in rumination may contribute to state anxiety elevation in contexts of particular personal relevance (McEvoy & Kingsep, 2006).

Given the maladaptive emotional consequences and clinical significance of habitual rumination, investigators have sought to illuminate the cognitive mechanisms that underpin this disposition (Beckwe, Deroost, Koster, De Lissnyder, & De Raedt, 2014). Several theoretical accounts have emphasized the potential importance of attentional processes in rumination (for reviews see: Koster, De Lissnyder, Derakshan, & De Raedt, 2011; Whitmer & Gotlib, 2013), and it has been hypothesized that attentional bias to negative information may be involved in ruminative thinking. Koster and colleagues have argued that heightened ruminative disposition may be specifically associated with difficulty disengaging attention from negative information (Koster et al., 2011).

Using the conventional attentional probe task (MacLeod, Mathews, & Tata, 1986), two studies have confirmed a relation between trait rumination and attentional bias to negative information in depressed patients (Donaldson, Lam, & Mathews, 2007; Joormann, Dkane, & Gotlib, 2006). However, as has been noted elsewhere, this attentional assessment approach does not permit clear differentiation between biased attentional engagement with negative information, and biased attentional disengagement from negative information (Grafton & MacLeod, 2013). Therefore, in a more recent study, Grafton, Southworth, Watkins, and MacLeod (2016) employed an amended attentional assessment procedure designed to dissociate these two facets of attentional bias to negative information. In this version of the attentional probe task, differentially valenced information appears either distally from participants' initial attentional focus, in order to reveal individual differences in the degree to which negative information selectively captures attention (attentional engagement bias), or it appears proximal to participants' initial attentional focus, in order to reveal the degree to which negative information selectively holds attention (attentional disengagement bias). Grafton et al.'s findings supported Koster et al.'s hypothesis that elevated ruminative disposition is associated with impaired attentional disengagement from negative information, rather than facilitated attentional engagement with negative information (Grafton et al., 2016).

It is well established that attentional bias to negative information can serve to increase the intensity of state anxiety responses to stressors (cf. MacLeod & Mathews, 2012). When taken together with the evidence that heightened ruminative disposition is associated both with increased state anxiety symptoms, and impaired attentional disengagement from negative information, this invites the hypothesis that the impact of ruminative disposition on state anxiety responses to stressors may be mediated by the attentional disengagement bias that characterizes this disposition. The present study was designed to empirically evaluate this hypothesis, by first assessing ruminative disposition in a student sample, and then examining both the state anxiety experienced by these students, and their patterns of attentional bias to exam-relevant negative information, immediately prior to an important mid-term exam.

We anticipated that the initial measure of ruminative disposition would predict the later level of state anxiety experienced immediately prior to the subsequent exam, and would do so independently of trait anxiety, and independently of the more

adaptive form of self-attentive thinking known as reflection (Trapnell & Campbell, 1999). We also anticipated that elevated ruminative disposition would be associated with impaired attentional disengagement from exam-relevant negative information immediately prior to the exam, but not with enhanced attentional engagement with such information. Additionally, we anticipated that this pre-exam attentional bias would predict levels of pre-exam state anxiety. Assuming confirmation of these expected effects, it was our intention to directly test, using mediation analysis, the hypothesis that the impact of ruminative disposition on state anxiety experienced during the pre-exam period would be mediated by rumination-linked impairment in attentional disengagement from exam-relevant negative information, demonstrated prior to the exam.

## 1. Method

### 1.1. Participants

Participants were 134 (111 women) first-year psychology students (age  $M = 20.4$ ,  $SD = 3.87$  years) from Babeş-Bolyai University, Cluj-Napoca. The results of two participants were excluded from analysis as they failed to comply with instructions regarding the attentional-probe task (i.e., they completed the task a day before the exam instead of on the day of the exam). Written consent was obtained from all participants prior to the study and they received course credit for taking part in the experiment. The study was approved by the Ethics Committee of Babeş-Bolyai University.

### 1.2. Self-report measures

*State Trait Anxiety Inventory (STAI)*. The STAI (Spielberger, Gorsuch, & Lushene, 1970) comprises two scales designed to measure and differentiate between trait and state anxiety. The STAI-trait (STAI-T) scale consists of 20 statements describing how people generally feel. They are rated on a 4-point frequency scale, ranging from 1 (*almost never*) to 4 (*almost always*). The STAI-state (STAI-S) scale consists of 20 statements that ask people to describe how they feel at a particular moment in time (e.g., tense, nervous, worried). Statements are rated on a 4-point intensity scale, ranging from 1 (*not at all*) to 4 (*very much so*). Both scales have been adapted for the Romanian population and showed good psychometric properties (Pitariu & Peleasa, 2007). Cronbach's alphas in this sample were 0.87 for the trait anxiety scale and 0.96 for the state anxiety scale.

*Rumination/Reflection Questionnaire (RRQ)*. The RRQ (Trapnell & Campbell, 1999) was used to measure rumination and reflection. The rumination subscale consists of 12 items assessing recurrent negative thoughts about the self (e.g., *My attention is often focused on aspects of myself I wish I'd stop thinking about*). The reflection subscale also consists of 12 items assessing self-reflection motivated by intellectual curiosity (e.g., *I often love to look at my life in philosophical ways*). Items are rated on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Trapnell and Campbell (1999) report internal consistency coefficients for the rumination and reflection subscales of 0.90 and 0.91 respectively. Cronbach's alphas in this sample were 0.90 for the rumination and 0.88 for the reflection subscale.

### 1.3. Attentional probe task

Attentional biases to threat were assessed using the attentional probe task employed by Grafton, Watkins, and MacLeod (2012) and Grafton et al. (2016) to differentiate selective attentional engagement with, and disengagement from, negative information. The

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