



## Dispositional mindfulness moderates the relation between neuroticism and depressive symptoms

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### ABSTRACT

Negative emotional reactivity as measured by neuroticism has been shown to be an important risk factor for the development of depressive symptoms. This study investigated whether the ability to be mindful can protect against the negative effects of this temperamental vulnerability. An English community sample of  $N = 144$  individuals who had completed a neuroticism questionnaire six years previously were assessed for current depressive symptoms and dispositional levels of mindfulness at points of assessment approximately one year apart. Dispositional mindfulness moderated the relation between neuroticism and current depressive symptoms: Neuroticism was significantly related to depression in those with low to medium levels of dispositional mindfulness but not in those with relatively high levels of mindfulness. Further analyses focusing on particular mindfulness skills indicated that this effect was carried mostly by the ability to describe inner experience. The results suggest that dispositional mindfulness and particularly the ability to describe inner experience are helpful in dealing with negative emotional reactivity in a way that reduces the likelihood of depressive symptoms to develop.

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### 1. Introduction

Neuroticism, a stable temperament that arises early in life, is one of the best-established vulnerability factors for depression (Kotov, Gamez, Schmidt, & Watson, 2010). High levels of neuroticism are associated with an increased overall risk of depression (e.g. Kendler, Gatz, Gardner, & Pedersen, 2006), an increased likelihood that occurrence of stressful life events will lead into depressive disorder (Ormel, Oldehinkel, & Brilman, 2001), and a more protracted course in those who have become depressed (Hirschfeld, Klerman, & Andreasen, 1986). Neuroticism is a complex construct that includes several different traits and facets (see Eysenck & Eysenck, 1985), including thinking styles such as being “irrational”, and denotes an increased general tendency towards negative emotional reactivity and arousal.

There is evidence that the relation between neuroticism and depressive symptoms is mediated by ruminative tendencies and increased cognitive reactivity, which is defined as the tendency for negative thinking to become triggered through only subtle changes in mood (Barnhofer & Chittka, 2010; Roelofs, Huibers, Peeters, Arntz, & van Os, 2008). Ruminative tendencies and

cognitive reactivity both play an important role in the recurrence and maintenance of depressive symptoms and are therefore important targets for preventative interventions (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008; Scher, Ingram, & Segal, 2005). Recently interest has increased in the use of training in mindfulness meditation as a way of addressing these factors. Mindfulness has been described as the ability to maintain awareness moment by moment in an open and acceptant way (Kabat-Zinn, 2003). Importantly for clinical care, training in mindfulness can help individuals become better able to identify and disengage from maladaptive patterns of responding and thus prevent downward spirals of negative mood and thinking (e.g. Segal, Williams, & Teasdale, 2002). Other research on mindfulness-based interventions lends further support: In those who are at risk for depression, intensive training in mindfulness reduces ruminative tendencies (Ramel, Goldin, Carmona, & McQuaid, 2004) and the negative effects of cognitive reactivity (Kuyken et al., 2010). Rumination and cognitive reactivity are processes that are high in people who are high in neuroticism, so if mindfulness can reduce these processes, it seems plausible that mindfulness is a skill that can help to prevent neuroticism from translating into depressive symptoms. Thus, delineating such effects would be helpful in understanding how the negative emotional outcomes of neuroticism can be prevented. This would be important for the prevention of depression, as well as the broad range of emotional

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disorders given that neuroticism accounts for a significant amount of common variance across the mood and anxiety disorders (Griffith et al., 2010). Mindfulness-based interventions are now increasingly being adapted for the whole spectrum of these disorders (Hofmann, Sawyer, Witt, & Oh, 2010) and demonstrating the effects on global vulnerability factors would be an important step in justifying such broadening of application.

Clinical applications focus on mindfulness as a trainable skill, but it can also be conceptualized as a dispositional variable that can be assessed using self-report questionnaires (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). Although such self-reports are sensitive to changes following intensive training in mindfulness, there is also evidence that without such training levels of mindfulness remain relatively stable over time (Baer, Smith, & Allen, 2004; Brown & Ryan, 2003). That is, individuals seem to differ in their natural tendency to be aware of their moment to moment experience in an open and non-judgmental way. Validation studies have related self-reports of mindfulness to a range of behavioral and cognitive variables reflecting hypothesized consequences of mindfulness. For example, event sampling studies have shown that self-reported mindfulness predicts higher levels of autonomy and lower levels of unpleasant affect in daily functioning (Brown & Ryan, 2003). A recent brain study has demonstrated that self-reported levels of dispositional mindfulness are related to resting activity in brain areas involved in self-referential processing as well as amygdala reactivity when viewing emotional faces (Way, Creswell, Eisenberger, & Lieberman, 2010).

Consistent with the assumption that mindfulness may protect against the negative effects of emotional vulnerabilities, dispositional mindfulness is negatively related to neuroticism (Giluk, 2009). Furthermore, there is some evidence that it may offset its negative effects. Feltman, Robinson, and Ode (2009) assessed dispositional mindfulness, neuroticism and depressive symptoms cross-sectionally in a sample of students and found that dispositional mindfulness moderated the relation between neuroticism and depressive symptoms: Neuroticism was significantly related to depressive symptoms in those with low levels of dispositional mindfulness, but there was no significant relation between neuroticism and depressive symptoms in those with high levels of dispositional mindfulness. The current study was aimed at replicating and extending these findings.

For this study an opportunity had arisen to test the protective effects of dispositional mindfulness in a general population sample that provided information on neuroticism six years before our assessment of depressive symptoms and dispositional mindfulness – also at separate occasions. Investigating relations over relatively remote points in time is consistent with the idea that neuroticism functions as a relatively stable temperamental risk factor and also allowed us to provide stronger control against the effects of general response bias. Previous research on this sample had shown a significant correlation between neuroticism scores assessed six years earlier and current symptoms of depression (Barnhofer & Chittka, 2010). Extending this research in this sample, we hypothesized that when taking into account dispositional mindfulness this relationship would remain significant in those low in dispositional mindfulness but not in those high in dispositional mindfulness.

We had used the Five Factor Mindfulness Questionnaire (FFMQ; Baer et al., 2006) to assess dispositional mindfulness, which describes mindfulness as a global factor that encompasses several distinguishable skills. Subscales of this questionnaire measure an individual's ability to observe internal and external experience, to describe internal experience, to act with awareness, to be non-judgmental, and to be non-reactive to inner experience. Analyses based on these subscales allowed us to explore which mindfulness skills might be most relevant in offsetting the effects of neuroticism.

## 2. Methods

### 2.1. Participants

Participants for this study were recruited from a large randomly-ascertained family cohort in southwest England ( $N = 88,000$ ; Martin et al., 2000) who had given their written permission to be contacted for participation in further research. Participants had provided information on neuroticism 6 years before they were approached for the current study. Data on depression and mindfulness were collected in separate assessments. In an initial step, 707 potential participants received letters about the study. A subset of these (223, 32%) indicated their willingness to take part and were sent a booklet including a questionnaire assessing current symptoms of depression along with an informed consent form and a stamped return envelope. A subset of these participants (182, 81%) returned the questionnaire booklet with their signed consent form. They were then contacted approximately one year later to ask them to complete further questionnaires, including the measure of mindfulness. The final sample is the 144 participants (79% of the previous respondents) who returned this second set of questionnaires together with the consent form. The average age of this final sample was  $M = 43.0$  ( $SD = 6.8$ , age range: 27–59) years. Eighty-seven (60%) of them were women, 57 (40%) of them were men. Six (4%) of the participants reported regularly using a meditation or related technique. However, none of them engaged in mindfulness meditation (3 practised Christian prayer meditation, 1 yogic breathing, 1 creative visualization, and 1 transcendental meditation). The studies had received ethical approval from the Oxfordshire Psychiatric Research Ethics Committee and the University of Oxford Ethics Committee.

### 2.2. Measures

The first questionnaire booklet sent to participants included the Beck Depression Inventory-II (BDI-II). The Five Factor Mindfulness Scale was included in the second questionnaire booklet that was sent one year after the first. Six years before we first re-contacted the sample, neuroticism had been assessed as part of a larger community-based study using commercial mailing in which participants were sent the Eysenck Personality Questionnaire to complete at home and return via mail.

#### 2.2.1. Eysenck Personality Questionnaire (EPQ)

The EPQ (Eysenck & Eysenck, 1975) is a self-report questionnaire consisting of 90 items with a binary response format. The neuroticism scale of the EPQ consists of 23 items. Internal consistencies in the current sample for all questionnaires are listed in Table 1. Eysenck and Eysenck (1975) report a test-retest reliability over one month of  $r = .89$ .

#### 2.2.2. Beck Depression Inventory-II (BDI-II)

The BDI-II (Beck, Steer, & Brown, 1996) contains 21 statements that assess the severity of depressive symptoms such as low mood, anhedonia, changes in sleep, appetite, concentration, etc. over the preceding two weeks. Beck et al. (1996) report good internal consistency in both patient and student samples and one-week retest-reliability of  $r = .93$  suggesting that the test is robust against daily variations in mood in depressed samples.

#### 2.2.3. Five Factor Mindfulness Questionnaire (FFMQ)

The FFMQ (Baer et al., 2006) was developed based on factor analyses of previously published mindfulness questionnaires. It assesses five facets of a general tendency to be mindful in daily life: observing (“I notice the smells and aromas of things”),

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