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Research paper

Improvement of mindfulness skills during Mindfulness-Based Cognitive Therapy predicts long-term reductions of neuroticism in persons with recurrent depression in remission

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ABSTRACT

Background: This study examined whether changes in mindfulness skills following **Mindfulness-based Cognitive Therapy** (MBCT) are predictive of long-term changes in personality traits.
Methods: Using data from the MOMENT study, we included 278 participants with recurrent depression in remission allocated to Mindfulness-Based Cognitive Therapy (MBCT). Mindfulness skills were measured with the FFMQ at baseline, after treatment and at 15-month follow-up and personality traits with the NEO-PI-R at baseline and follow-up.
Results: For 138 participants, complete repeated assessments of mindfulness and personality traits were available. Following MBCT participants manifested significant improvement of mindfulness skills. Moreover, at 15-month follow-up participants showed significantly lower levels of neuroticism and higher levels of conscientiousness. Large improvements in mindfulness skills after treatment predicted the long-term changes in neuroticism but not in conscientiousness, while controlling for use of maintenance antidepressant medication, baseline depression severity and change in depression severity during follow-up (IDS-C). In particular improvements in the facets of acting with awareness predicted lower levels of neuroticism. Sensitivity analyses with multiple data imputation yielded similar results.
Limitations: Uncontrolled clinical study with substantial attrition based on data of two randomized controlled trials.
Conclusions: The design of the present study precludes to establish whether there is any causal association between changes in mindfulness and subsequent changes in neuroticism. MBCT could be a viable intervention to directly target one of the most important risk factors for onset and maintenance of recurrent depression and other mental disorders, i.e. neuroticism.

1. Introduction

Mindfulness refers to nonjudgmental, present-moment awareness of internal and external stimuli (Kabat-Zinn, 2013). Kabat-Zinn (1982) developed a standardized format to teach mindfulness skills to patients with chronic pain and other somatic conditions. This program called Mindfulness-Based Stress Reduction (MBSR) was later converted to Mindfulness-Based Cognitive Therapy (MBCT) for the prevention of relapse in recurrent depression (Segal et al., 2002). Since then mindfulness-based interventions have been applied to a growing number of mental and somatic health conditions. The rapidly expanding treatment literature summarized in various meta-analyses suggests that mindfulness-based interventions are helpful in preventing depressive relapses (Kuyken et al., 2016) and reducing emotional problems such as depression, anxiety and stress in adults (e.g., Khoury et al., 2013) and in children and adolescents (e.g., Kallapiran et al., 2015; Zoogman et al., 2015), in somatic diseases (e.g., Bawa et al., 2015; Zhang et al., 2015), in primary care (e.g., Demarzo et al., 2015) and also using an online format (Spijkerman et al., 2016). A recent meta-analysis of 23 meta-analyses summarizes evidence supporting the use of mindfulness-based interventions to alleviate symptoms, both mental and physical, in the adjunct treatment of cancer, cardiovascular disease,

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chronic pain, depression, anxiety disorders and in prevention in healthy adults and children (Gotink et al., 2015). At the same time, a recent critical review of reporting bias in randomized controlled trials of mindfulness-based mental health interventions warned that the proportion of mindfulness-based therapy trials with statistically significant results may overstate what would occur in practice (Coronado-Montoya et al., 2016).

The overall positive results of mindfulness-based treatments for various types of psychopathology suggest that mindfulness training may be targeting broad psychological vulnerability factors underlying psychopathologies and not only the psychopathologies themselves. Given the prospective association of personality domains such as neuroticism, conscientiousness and extraversion with e.g. onset and maintenance of depression, anxiety and substance abuse (Kotov et al., 2010), it seems relevant to examine to what extent mindfulness training directly targets these personality domains. In particular the personality trait of neuroticism, which can be defined as the stable propensity to experience negative emotion, constitutes an efficient marker of non-specified general risk for common mental disorders including depression (Ormel et al., 2013). A few studies in nonclinical adults observed that mindfulness meditation training resulted in small to medium effects on neuroticism compared to an inactive control group (see Erberth and Sedlmeier (2012) for an overview). Moreover, it has been found that mindfulness meditation reduced levels of neuroticism compared to a waiting list in healthy older adults with moderate levels of stress (Oken et al., 2014) and that **Mindfulness-based Cognitive Therapy** (MBCT; Segal et al., 2002) reduced levels of neuroticism compared with an online self-help intervention in healthy students and university staff with high levels of neuroticism (Armstrong and Rimes, 2016). To the best of our knowledge, there have been no clinical studies examining whether similar effects can be achieved in clinical populations, such as in recurrently depressed patients seeking help in preventing relapse/recurrence.

To conclude, the main aim of the present study in patients with recurrent depression in remission was to determine whether, and to what extent, improvement of mindfulness skills following MBCT are predictive of long-term changes in personality traits. It was hypothesized that improvement of mindfulness skills following MBCT would result in long lasting changes in personality, particularly reduction of neuroticism.

2. Methods

2.1. Participants

The study population was derived from two Randomized Clinical Trials (RCTs), together referred to as the 'MOMENT' study, which investigated the effectiveness of MBCT, maintenance antidepressant medication (mADM) and the combination of both to prevent relapse/recurrence in patients with recurrent depression in remission (for study details and outcomes of both RCTs see Huijbers et al. (2012, 2015, 2016)).

In the MOMENT study, 317 participants were recruited in twelve universities and secondary mental health centers across the Netherlands between September 2009 and January 2012. Patients were referred by mental health care professionals or recruited by advertisements in the media (TV, magazines and newspapers). A research interview was conducted to assess whether the patients met the study qualifications. The inclusion criteria at the time of study entry were: (a) history of at least three depressive episodes according to the Diagnostic and Statistical Manual of Mental Disorders –4th edition (DSM-IV) (APA, 1980); (b) in full or partial remission, which was defined as not currently fulfilling the DSM-IV criteria for Major Depressive Disorder (MDD); (c) currently treated with a stable dose of maintenance antidepressant medication (mADM) for at least six months; (d) 18 years or older; (e) appropriate cognitive ability for study participation; and (f) native Dutch speaker. Exclusion criteria were: bipolar disorder, psychotic disorder, neurological disorder, somatic disorder, currently dependent on alcohol and/or drugs, electric convulsive therapy during the past three months, previous MBCT or mindfulness training, and current psychological treatment with a frequency of at least once per three weeks. The study was approved by the Medical Ethics Committee Arnhem-Nijmegen (nr. 2008/242) for all participating sites. After discussing the study, written informed consent was obtained from all participants.

2.2. Design and procedure

The study period was 15 months with assessments at 0 (baseline), 3, 6, 9, 12 and 15 months. The current study used the data from the subset of participants allocated to MBCT in both trials (with or without mADM). Discontinuation or optimization of antidepressant medication was done by study psychiatrists. In the discontinuation condition participants were asked and recommended to withdraw gradually from their antidepressants over a period of 5 weeks, starting after the seventh session of MBCT. In the optimization condition participants were asked and recommended to maintain or reinstate an adequate dose of mADM, and recommendations to manage side effects were provided.

2.3. Measures

2.3.1. The Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I)

The SCID-I is a semi-structured interview for establishing the presence of major DSM-IV Axis I diagnoses, including Major Depressive Disorder (First et al., 1995). The number of previous episodes was counted by trained research assistants on the basis of the SCID-I interview data.

2.3.2. Inventory of Depressive Symptomatology-Clinician Rated (IDS-C)

Depression severity was rated by trained research assistants using the 30-item IDS-C (Rush et al., 1996) at every three-month assessment during the 15-month follow-up period. The IDS-C includes all diagnostic symptoms for major depressive disorder, and each item is equally weighted on a 0–3-point scale. The total score ranges from 0 to 84, and higher scores indicate greater symptom severity (Rush et al., 1996). The internal consistency and inter-rater reliability of the IDS-C were shown to be adequate (Rush et al., 1996; Trivedi et al., 2004).

2.3.3. NEO Personality Inventory – Revised (NEO PI-R)

The 240-item NEO PI-R is a measure of the five major domains of personality, i.e. neuroticism, extraversion, conscientiousness, agreeableness, and openness to experience, which are all comprised of six facets (Costa and McCrae, 1992). See Table 2 for a description of these facets. The NEO PI-R was administered at baseline and 15-month follow-up. Patients answered each question on a 5-point Likert-type scale ranging from 1 to 5 (1=strongly disagree to 5=strongly agree). Domain scores were calculated by summing the six facets in each domain. The psychometric properties of NEO facet scales are robust and seem generalizable across genders, ages, and methods of measurement (McCrae et al., 2011). Moreover, the NEO PI-R also appears to be reliable and valid during acute depressive episodes (Costa et al., 2005).

2.3.4. Five Facet Mindfulness Questionnaire (FFMQ)

To assess mindfulness skills the 39-item, self-report FFMQ was administered at baseline, 3 and 15-month follow-up (Baer et al., 2006). The FFMQ measures five facets of mindfulness skills in daily life: observing (e.g. "I pay attention to sounds, such as clocks ticking, birds chirping, or car passing"), describing (e.g. "I'm good at finding the words to describe my feelings"), acting with awareness (e.g. "I am easily