

Mediation and moderation analysis of a preventive Mindfulness-based Cognitive Therapy intervention

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An experimental study of the effects of MBCT on depressive and anxious symptoms and positive mental health in a mild to moderately depressed adult population

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Abstract

Introduction: Depression is among the most urgent health issues today, causing personal suffering and economical damage. Treatment alone does not appear sufficient to handle the increasing cases of depression. Primary prevention is necessary, and while prevention programs exist, many fall short. Mindfulness-based cognitive therapy is a rather new approach to mental health that is focused on positive mental health (well-being). This paper aims to evaluate Mindfulness-based cognitive therapy as a preventive intervention in terms of mediating and moderating effects. It was predicted that mindfulness and psychological flexibility would mediate mental health changes. Participant gender, educational level, baseline depressive and anxious symptoms were expected to moderate mental health changes.

Method: The study featured 151 participants (mean age=47.9, SD=11.3). Participants were predominantly female (78.1%) and of Dutch nationality (94%). Participants were selected based on elevated, yet non-clinical depressive symptoms. They were randomly assigned to either a 12-week MBCT-based course (experimental condition) or a waiting-list group (control condition). The primary outcome was depressive symptomology (CES-D). Secondary outcomes were anxious symptomology (HADS-A) and positive mental health (MHC-SF). Process measures were mindfulness (FFMQ) and psychological flexibility/experiential avoidance (AAQ-II).

Results: The total FFMQ and three of its facets as well as the AAQ-II mediated the effect the intervention had on post-treatment depression reduction. Similarly post-treatment anxiety reduction was mediated by the FFMQ, three of its facets, and the AAQ-II. Increase in positive mental health was mediated by the FFMQ, all of its subscales and the AAQ-II. No moderating effects were found for participant gender or educational level. Higher base-line depression as well as anxiety led to more pronounced reduction of anxiety in the MBCT group. Reduction of depressive symptoms was not moderated by those base-line measures. Increase in positive mental health was not moderated by base-line depression. Higher base-line anxiety did lead to an increase in positive mental health in the MBCT group, while leading to lower positive mental health scores in the control group.

Discussion: This study supports the role of mindfulness and psychological flexibility in MBCT-based prevention programs for the mildly depressed. The intervention was equally beneficial for men and women, as well as highly vs. moderately educated participants. Lowly educated participants were underrepresented. Higher base-line symptoms did produce more beneficial outcomes for the MBCT group, but only for the secondary outcome measures anxiety and positive mental health.

Preface

The question of “how to live a good life” has been on man’s mind for as long as he can think, and is more important today than it has ever been. In today’s western, industrialized society, survival and fulfilling basic needs are no longer a difficulty for most. Instead, people of today worry about having a ‘good life’, becoming ‘happy’, and ‘surviving’ the daily struggles and stresses of a more and more complex society. One might expect overall life satisfaction to increase, too, as wealth increases. However, data shows that incidence rates of disorders like depression and anxiety disorders rise significantly in a more and more demanding and stressful environment. Dissatisfaction, exaggerated expectations and life stress are among the most common reasons for lack of happiness in general, and depression in severe cases.

It is not a coincidence that figures of a sitting Buddha, available in many different shapes and sizes in souvenir shops all over the world, represent harmony and inner perfection. Philosophy, and the eastern philosophy in particular, has always aimed to answer the fundamental question of a ‘good life’, and over the course of hundreds of years, eastern philosophers have developed and taught many principles supposed to guide one’s way towards enlightenment. This paper aims to deepen our understanding of how such techniques can be applied in an effective and efficient way to improve mental health.

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1 Introduction

1.1 Depression as a major threat to public health

Depression is among the most common mental disorders, and often leads to significant suffering and in severe cases to death by suicide. The European Alliance Against Depression (EAAD), an international network of experts, estimated that at each moment about 18.4 million Europeans are suffering from depression (European Alliance Against Depression, 2012). The NEMESIS-2, a large scale health assessment of the Netherlands, reported a 6.1% incidence and a 20.1% life time prevalence for mood disorders in general. Because many people suffer from these disorders, the amount of damage caused is great when compared to other health problems. The VTV-2010 (Volksgezondheid Toekomst Verkenning 2010; Ministerie voor Volksgezondheid, Welzijn en Sport, 2010) rates depression as the second highest cause for overall disease burden according to the DALY system (Disability-Adjusted Life-Years; a way of computing the loss in life quality in a population based on disability caused, people affected and years lived with the disease), emphasizing the importance – and possible benefits – of appropriate countermeasures.

1.1.1 Damage on the individual level

Depression can be quite devastating on the individual level. It has been associated with significant loss of life quality and can affect many aspects of life, such as work, marital life and divorce, overall functioning and mental health (Skodol, Schwartz, Dohrenwend, Levav, & Shrout, 1994), and social functioning (Judd, Paulus, Wells, & Rapaport, 1996; Judd, Rapaport, Paulus, & Brown, 1994).

Furthermore, just as misfortune seldom comes alone depressive symptoms often are accompanied by anxious symptoms; depression has an especially high rate of comorbidity with anxiety disorders; elevated levels of anxiety are a common epiphenomenon of depression. Between depression and anxiety disorders comorbidity rates of up to 50% at the same time have been reported (American Psychiatric Association [APA], 2000).

The severity of the consequences of depression is further increased by its persistence: residual symptoms often remain over long periods of time and relapse rates are high, and chances of chronic development have been found to increase by 15% with each depressive episode (APA, 2000; Mueller, Leon, & Keller, 1999; Ormel & Systema, 1999). Judd, Akiskal, and Maser (1998) have studied patients who have been treated for a recurring depression over the course of 12 years and reported that these patients were depressed on average 2 months per year, and were showing at least some depressive symptoms 7 months per year. Because of these severe consequences of depression and the large number of depressed individuals, depression causes significant damage on the society level as well.

1.1.2 Damage on society level

Usually depression causes a need for psycho- or pharmacotherapy, and prevents the depressed from functioning at work, both which causes costs to the health care system and monetary damage to companies and eventually society itself. The economic costs caused by depression related medical expenses and work inability are approximately 1.3 billion Euros per year in the Netherlands alone (Land & Ruiters, 2007). The 'Ministerie van Volksgezondheid, Welzijn en Sport' therefore declared depression

“one of the most expensive diseases” (Ministerie van Volksgezondheid, Welzijn, & Sport, 2011).

1.2 Importance of prevention

The general health care saying that “preventing is better than curing” holds true for the field of mental disorders. Simple treatment alone is not as effective as one might hope and the potential benefit of preventing mental disorders seems valuable (Beekmann et al., 2006).

A recent meta-study (Cuijpers, Straten, Bohlmeijer, Hollon, & Andersson, 2010) concluded that the effect size of psychotherapy as a treatment for depression has been overestimated for years. Studies of high scientific quality reported quite low effect sizes (mean=.22), while many studies reporting high effect sizes (mean = .74) were of low quality and therefore of questionable validity. In the case of affective disorders only 60% of the patients received treatment, and only 34% received treatment that is actually considered efficient according to treatment guide lines and standards (Beekman et al., 2006). As a result the number of years lived with disease is reduced by only 15%; these numbers are representative for the Netherlands. Even under ideal circumstances, treatment of depression could reduce the burdens on society due to depression by only 40% (Andrews, Issakadis, & Lapsley, 2004).

Beekman et al. (2006) concluded from a meta-study comparing several prevention program trials that prevention could reduce the incidence rate of a number of psychiatric disorders including depression and anxiety disorders by 27%, a result supporting the clinical relevance of prevention programs. As a conclusion, primary prevention (i.e. prevention that reduces chances of onset of a disorder and reduces incidence rates) can be an important addition to post-onset treatment in reducing disease burden posed by mental disorders like depression and anxiety disorders. The Trimbos institute, too, highlights the importance of developing measures to prevent depression for a number of reasons: preventing mild suffering, preventing development of clinical depression, in turn leading to reduced numbers of suicide and work inability days (Trimbos-Instituut, 2006).

So while the potential benefit of prevention appears to be quite large indeed, the actual effectiveness of existing prevention programs varies greatly. In a recent meta-study (Stice, Shaw, Bohon, Marti, & Rhode, 2009) only 13 out of 32 prevention programs produced a significant reduction of depressive symptoms. Apparently it is not enough to put prevention ‘out there’. One must also make sure the intervention is effective and efficient.

Most interventions aimed at preventing depression that produce good results are based on cognitive behavioural therapy (CBT). CBT, in a nutshell, aims to change harmful cognitions in the subject through use of behavioural processes. The effectiveness of CBT at reducing symptoms of depression (and other disorders not relevant to this paper) in preventive settings is supported by lots of empirical evidence, and successful use in mental health practice (Cuijpers, et al., 2008). While its focus on reduction of psychopathology is a strength of CBT, it is also a one sided perspective on human functioning.

A rather new approach to mental health in general is that it is more than just the absence of psychopathology. This non-pathological part of mental health is also called positive mental health or simply well-being (within this paper ‘positive mental health’ is used in the way it was just described, while ‘mental health’ is used to describe the totality of positive mental health and

psychopathology). Both psychopathology and positive mental health are correlated yet distinct constructs. Keyes (2007) highlights the importance of promoting “flourishing” mental health. He argues that flourishing individuals function “markedly better than all others”, and that absence of positive mental health “is as bad as major depressive episode”. Furthermore low positive mental health has proven to be an important risk factor in developing psychopathology. This makes it an important part of anyone’s life, and a crucial target variable for prevention, beyond the scope of psychopathology.

The emphasis on mental health rather than psychopathology in the context of prevention is also relevant to the stigma associated with psychopathology, i.e. the fear or shame associated with being labelled as having ‘psychological problems’, being ‘mentally ill’ or even ‘crazy’ (Masuda & Latzman, 2011). Stigma is counterproductive for an intervention as it may inhibit people from participating. Therefore high stigma can severely diminish the value of an otherwise good intervention and should therefore be considered and – if possible – minimized during intervention development and implementation. After all, the best prevention program would be of no use when no one participates.

A rather new approach to mental health is given by the so called mindfulness based interventions (MBIs). Rather than just focusing on reducing (stigmatized) psychopathology, MBIs promote mental health and well-being in general, thereby framing such interventions in a positive way.

1.3 Mindfulness-based Cognitive Therapy

Mindfulness is a concept originating from Buddhist philosophy and meditation practices. In western literature it is usually described as a calm, wakeful and conscious state of mind, and involving the cognitive functions *awareness* and *attention*, i.e. being attentive to and aware of stimuli in the here-and-now, be they of external or internal nature (Brown & Ryan 2003; Brown, Ryan, & Creswell, 2007). A most influential definition of mindfulness in scientific research has been given by Kabat-Zinn (1994):

*“paying attention in a particular way,
on purpose, in the present moment in a non-judgmentally”*

Jon Kabat-Zinn (1990) was the first to introduce the concept of mindfulness and meditation-based exercises to increase mindfulness in the field of chronic pain treatment. His program mindfulness-based stress reduction (MBSR) has proven effective in the treatment of chronic pain patients. Later on the principles of MBSR (attention, awareness and acceptance) have been combined with principles of CBT (dealing with negative thoughts and emotions) resulting in the program mindfulness-based cognitive therapy (MBCT), which was developed for treatment of recurring depression (Segal, Williams & Teasdale, 2002).

Usually MBCT is administered in 8 group sessions of 2 hours each. During these sessions participants learn to look at their own emotions and thoughts as appearing and disappearing phenomena, and learn to accept them and not act upon them. Three main meditation techniques are used in MBCT: the body scan, sitting meditation and Hatha Yoga practice. During the body scan, attention is directed through the whole body gradually, while experiencing any occurring sensations in

the different parts of the body in a noncritical way. During sitting meditation participants practice attending to the sensations of their breath, the rising and falling of their abdomen, other occurring sensations, and their cognitions, whatever is present in their mind, again in a noncritical and accepting way. The Hatha Yoga practice includes simple yoga positions which focus on breathing, balance and stretching, and engaging in and holding positions aimed at relaxing and strengthening the musculoskeletal system. Participation also requires daily homework meditation exercises. MBCT also introduces a fourth formal meditation practice, the “three-minute breathing space”, a short meditation that is meant to be applicable in everyday life whenever negative cognitions occur. MBCT also includes instructions on how to handle negative thoughts in particular. Psychoeducative elements where participants learn about depression in terms taken from CBT (e.g. characteristic thought patterns and warning signs) are incorporated into the MBCT course (Segal, Williams, & Teasdale, 2002).

It should at this point be noted that MBCT (as well as MBSR) is based on, but also significantly differ from Buddhist Zen and Vipassana meditation traditions. For example, in those traditions there is a clear distinction between attention (focused attention on a certain experience) and awareness (a more open and receiving state of mind). Also, Buddhist meditation is not primarily aimed at reducing psychopathological symptoms. Rather those teachings aim at higher, spiritual goals that incorporate, but are not limited to overcoming suffering (Chiesa & Malinowski, 2011).

During the last decade, the concept of mindfulness has gained a great deal of popularity in the mental health sector, both based on and leading to 1) development of a number of mindfulness-based interventions (MBIs) and 2) empirical evidence suggesting a positive effect of mindfulness on mental health (Cullen 2011).

MBCT combined with treatment as usual has shown to be more effective than treatment as usual alone at reducing major depression in patients with three or more prior depressive episodes. Similar relapse rates have been found for patients with MBCT vs. antidepressant treatment. MBCT also lead to reduction of residual depressive symptoms in depression patients, and reduced anxiety symptoms in bipolar patients and patients with anxiety disorders (Chiesa & Serretti, 2011). Kuyken et al. (2008) reported that MBCT reduced depressive symptoms even better than antidepressants did over a 15-month follow up period in a sample of patients with three or more prior depressive episodes. MBCT led to significant improvements in depressive patients who resisted the usual antidepressant/cognitive behavioural therapy (Kenny, & Williams, 2007), and it has proven effective as well in reducing anxiety in patients with anxiety disorders (Evans, et al. 2007).

Even though MBCT research has gained a lot of attention over the last decade (Cullen 2011), many questions still remain unanswered. The majority of available mindfulness research has been carried out on clinical populations, or populations with clinical diagnoses. Benefits of MBCT for the “average” healthy population have received far less attention. To the knowledge of the author only one study on this topic has been published. Kaviani, Hatami and Javaheri (2012) compared a MBCT group with a waiting list control group in a randomly controlled trial. Thirty adults with heightened depressive symptoms were randomly distributed over the two conditions. During and past the duration of the intervention, participants in the MBCT group scored lower than their peers in the control group on depression and anxiety self-report scales, and also reported less dysfunctional attitudes and automatic negative thoughts. Kaviani, Hatami and Javaheri concluded that MBCT can increase the quality of life in sub-clinical populations. While these results seem promising, more research is needed about how and

for whom MBCT works.

One recent study has explored the effects of a MBCT based group intervention (“Minder stress door aandacht”) on adults with elevated depressive and anxious symptoms (Pots, Meulenbeek, Veehof, Klungers, & Bohlmeijer, 2013). The study involved 151 Dutch adults, with heightened depressive and anxious symptoms. Participants were randomly assigned to either the experimental group, which followed the MBCT intervention, or a waiting list control group. Participants who completed the MBCT intervention showed decreases in depressive ($d=.50$) and anxious symptoms ($d=.56$) and an increase in emotional well-being ($d=.31$) as well as psychological well-being ($d = .34$) compared to the waiting list group. Results persisted at a three month follow up. Though these results suggest that MBCT is effective in non-clinical populations as well, the question remains what exactly caused these changes. It is also unclear whether the intervention was equally effective for all participants, or if some sub-populations responded better to it than others.

1.4 Mechanisms of change

A general assumption is that MBCT leads to an increase in mindfulness itself. This would imply that the mechanism of MBIs is just mindfulness itself (e.g. Chiesa, & Seretti, 2009; Josefsson, Larsman, Broberg, & Lundh, 2011). This hypothesis seems to be supported by the close link between mindfulness measures and mental health outcomes. A cross-sectional study by Bear, Smith, Hopkins, Krietemeyer and Toney (2006) has shown that the facets of the Five Facet Mindfulness Questionnaire (FFMQ) do correlate with related measures such as openness to experience, dissociation, absent-mindedness, psychological symptoms, neuroticism, thought suppression, difficulties with emotion regulation and experiential avoidance. Further they have shown that three of the five facets of mindfulness predicted lower overall psychopathology. Kuyken et al. (2010) found that self-reported mindfulness mediated the relationship between participation in a MBCT intervention and reduced depressive symptoms in a population of patients suffering from recurring depression. The effect persisted over a 15 month follow up period. Chamber, Gullone and Allen (2009, p.569) describe these mindfulness processes by which MBCT works to increases in mental health as “retraining of awareness and non-reactivity, [...] allowing the individual to more consciously choose those thoughts, emotions, and sensations [...], rather than habitually reacting to them”.

Another proposed mechanism of change is psychological flexibility (PF). PF is a higher level construct that incorporates a number of processes, such as experiential avoidance, acceptance, cognitive fusion and mindfulness. The concept PF originated from acceptance and commitment therapy (ACT; Kashdan & Rottenberg, 2010), a form of therapy that explicitly targets PF as a variable for change in several forms of psychopathology and mental health (Hayes et al., 2006; Hayes, Strosahl, & Wilson, 1999). Kashdan and Rottenberg(2010) described PF in more functional terms as “a wide range of human abilities to: recognize and adapt to various situational demands; shift mind-sets or behavioural repertoires when these strategies compromise personal or social functioning; maintaining balance among important life domains; and be aware, open, and committed to behaviours that are congruent with deeply held values”. In simple words, high PF allows one to choose behaviour appropriate to the situation at hand, instead of relying on static or habitual problem solving strategies. Shapiro et al. (2004)

argue that being mindful, i.e. being aware and accepting of not only positive or neutral but also negative or potentially negative experiences, is a “precursor to psychological flexibility”. Similarly, Aldao and Nolen-Hoeksema (2010) point out that the ability to reappraise situations is inhibited by rumination and thought suppression. Maladaptive reappraisal processes in turn are seen as core processes in depression and anxiety according to cognitive theories.

The absence of PF (also named experiential avoidance) has been associated with a number of psychological disorders (Hayes et al., 2006). Gloster et al. (2011) have found PF to be inversely related to self-report measures of depressive and anxious symptoms in four independent samples including clinical and non-clinical populations, and has shown the differentiating value of PF in telling clinical from non-clinical populations. Fledderus et al. (2010) found that PF mediated the beneficial effects of an ACT and a mindfulness based intervention on mental health, in a population of adults with mild to moderate psychological distress.

1.5 Intrapersonal participant characteristics

The amount of possible participant characteristics that moderate how different participants react to an intervention in terms of effectiveness (or simply: moderators) is large. About any socio-demographic variable, personality traits, moods, beliefs and many more could possibly moderate the relationship in question. To prevent ‘guessing’ and finding such characteristics based on chance alone, a set of variables was chosen based on sensible theory and/or observations from previous, related studies.

It is not clear what role participant gender plays in MBCT; some studies do report gender differences while others don’t. Kuyken et al. (2010) found that in a population of depression patients in remission women scored lower than men on depression after a MBCT intervention. The number of men in their study was quite low though, raising questions to the validity of their finding. Katz and Toner (2012) conducted a meta-study on the role of gender in MBIs for treatment of substance use disorder. Out of the six papers that did include participant gender as a variable, two (randomly controlled) trials failed to produce any gender differences, while other (quasi-experimental) studies reported women may have benefitted more from the MBIs. Because of the inconclusive nature of the existing evidence, Katz and Toner highlighted the need for MBI studies to include gender as a variable.

Stice, Shaw, Bohon, Marti and Rhode (2009) concluded from a meta-analysis of 42 depression prevention trials that individuals with higher initial risk benefitted more from the intervention. This could possibly be explained because high-risk individuals have more reason to seek and engage change as well as greater opportunity to show symptom reduction. Brown and Lion (1999), following the same idea, argued that people at higher risk at base line measurement tend to profit more from preventive interventions in general. In congruence with these authors, Button et al. (2011) found that depression patients experiencing more severe symptoms of depression benefitted more from an online CBT intervention.

While MBIs in educational settings have received a good amount of attention (e.g. Lillard, 2011), no literature is available about how educational level might influence one’s ability to engage in and learn the practice of mindfulness. After all, the concept of mindfulness involves abstract reasoning about abstract mental processes and meta-cognitions. Participants’ ability to learn, and to learn about

relationships between abstract cognitive constructs, may play a role in MBCT and how accessible they are to people of different educational levels. There is very little research on the role of cognitive abilities in depression treatment as well (Diressen, & Hollon, 2010). One exception is a study by Fournier et al. (2008), who found lower intelligence predicted poorer response of depression patients to CBT. Note however that education and intelligence are two clearly (cor-)related, yet distinct constructs.

1.6 Present Study

The MBCT based intervention used by Potset al. (2013) led to a decrease in depressive and anxious symptoms and an increase in positive mental health. While this seems to support the value of MBCT as an effective intervention in terms of depression prevention more evidence is needed regarding the underlying processes. Mental health improved, but did it improve for the reasons we expected? Further statistical analysis of their data can shed light on this question. Furthermore variables that may have made the intervention more or less effective for different people must be investigated.

Expectations regarding the first research question are that:

- Both mindfulness and PF will mediate the effect of the intervention on the target variables depression, anxiety and mental health. Higher levels of mindfulness and PF should lead to healthier outcomes.

Expectations regarding the second research question are that:

- Men and women will benefit from the intervention equally in terms of reduced psychopathology and increased positive mental health.
- Participants with higher initial risk of developing psychopathology (i.e. higher base-line measures of depression and anxiety) will benefit more from the intervention in terms of reduced psychopathology and increased positive mental health.
- Participants with higher educational level will benefit more from the intervention in terms of reduced psychopathology and increased positive mental health.

2 Methods

2.1 Design

The study was designed as a randomized, controlled trial involving two parallel groups: an experimental condition, where respondents participated in the course “Minder stress door aandacht” (“Less stress through attention”), and a waiting list condition serving as the control group. Data was collected on two points in time: T0, before the beginning of the course, and T1, after the course was completed.

2.2 Participants

This study involved a group of 151 adults (18+ years) who suffered from mild to moderate depressive symptoms. Participants were recruited through advertisements in newspapers, magazines, and info-brochures available at general practitioners, physiotherapists, pharmacies and libraries. During the recruitment phase potential participants received an informed consent form. The M.I.N.I.-Plus diagnostic interview (Sheehan, et al., 1998) was used for diagnosis.

Inclusion criteria:

- 18 years or older
- mild to moderate depressive symptoms

Exclusion criteria:

- serious psychopathology, i.e. serious depressive disorder according to the M.I.N.I.-Plus
- starting pharmacological treatment regarding the measured symptoms within three months prior to application
- receiving some sort of psychological treatment
- unable to invest the time required to properly follow the course
- insufficient Dutch language skills

Subsequently all appropriate subjects were randomized over the two research conditions. Randomization was stratified by gender to ensure homogenous and comparable groups.

2.3 Research conditions

The course “Minder stress door aandacht” was a group based intervention based on MBCT, though it deviated from the MBCT protocol given by Segal, Williams and Teasdale (2002) on a few points. Since the sub-clinical participants experienced less symptoms and less impairment in their functioning than the original MBCT target group, they were expected to be less motivated to invest time and effort in extended homework assignments and overly lengthy group sessions. Homework assignments have been reduced to 20 minutes of practice per day, instead of the original 45 minutes. Time per session has been reduced to 1,5 hours instead of 2,5 hours. The number of sessions has been increased accordingly from eight to eleven sessions, resulting in a similar total amount of time spent on the course.

The course included 11 sessions of 1 ½ hours each, including an optional follow-up session 4 to 6 weeks after the course ended. Group size varied between 8 and 15 people per group. The intervention

contained three components, attention (session 1, 2, and 3), acceptance (session 5, 7, 9 and 10) and dealing with thoughts differently (session 4, 6 and 8). Session 11 was reserved for evaluation.

During the first couple of session, participants learned to direct their attention towards the here-and-now, and how to return attention towards a desired goal when they get distracted. Two basic exercises were used: the body scan and directing attention towards the breath. Practicing attention in everyday life received particular attention.

During the sessions devoted to acceptance participants learned to accept situations non-judgmentally, that is without wishing to change the situation. Attention exercises were used to teach acceptance of negative feelings and thoughts.

During the sessions devoted to dealing with thoughts differently it was emphasized that thoughts are not the basis of one's identity; rather, the goal is to observe thoughts as phenomena that appear, stay for a certain while, and then disappear, to create distance towards these thoughts, and to not react upon negative feelings and thoughts.

Participants in the control group received no treatment. They might however follow the same training after three months, when datacollection had been completed. Also they might choose to follow any other kind of treatment or therapy at any time during the trial.

2.4 Measures

The test battery contained six questionnaires; demographic variables (age, sex, education, marital status, nationality, confession, work status) were taken as well. Also participants received an evaluation form after the intervention ended.

2.4.1 Primary measure

Center for Epidemic Studies Depression Scale (CES-D; Radloff, 1977):

The CES-D is a 20 item self-report questionnaire that measures the most important dimensions of depression (depressed mood, feelings of guilt and inferiority, feelings of helplessness or desperation, loss of appetite, sleep distortion and psycho-motoric retardation). Respondents have to indicate, on how many days during the last week they experienced the feelings described by the items. The items are scored (0 = less than 1 day; 1 = 1-2 days; 2 = 3-4 days; 3 = 5-7 days), and scores are added up to get a total score (max = 60). A score of 16 or higher indicates a clinically relevant depression (Radloff, 1977; Bouma, Ranchor, Sandermann, & van Sonderen, 1995).

The Dutch version of the scale reported good internal consistency (.79 - .92 depending on the subscale). A test-retest correlation of .90 was found. High correlations with other scales support the validity of the Dutch version (Bouma et al., 1995). Good psychometric properties and its short and simple-to-answer nature make the CES-D an appropriate questionnaire for research purposes.

The internal consistency of the CES-D in this study was good/very good, ranging from $\alpha = .87$ on the pre-test to $\alpha = .92$ on the post-test.

2.4.2 Secondary measures

Hospital Depression and Anxiety Scale – Anxiety (HADS-A; Zigmond & Snaith, 1983)

The HADS-A (i.e. the anxiety subscale of the HADS) is a seven item self-report questionnaire developed to measure the respondent's level of anxiety during the last seven days. Respondents have to indicate how well the items describe how they felt during the last week, on a scale from 0 (not at all) to 3 (very strong). The scores are summed up, a total score (max = 21) of 7 or less indicates normal functioning, a total score of 8 to 10 is suggestive of a disorder, and a total score of 11 or indicates a clinically relevant anxiety disorder. (Zigmond & Snaith, 1983)

Good internal consistency (average $\alpha = .83$), a solid factor structure as well as good discriminant, correlational and predictive validity have been reported for the HADS in an international meta-study by Bjelland, Dahl, Tangen, Haug and Neckelmann (2002). The HADS-A has shown good psychometric properties in several Dutch populations, internal consistency ranged from $\alpha = .80$ to $.84$ (Spinhoven, et al., 1997). Its shortness and simplicity as well as its state like quality make it very appropriate for this study.

The internal consistency of the HADS-A in this study was acceptable/ good, ranging from $\alpha = .77$ on the pre-test to $\alpha = .85$ on the post-test.

Mental Health Continuum – Short Form (MHC-SF; Keyes, 2005; Westerhof & Keyes, 2008)

The MHC-SF is a 14 item self-report questionnaire that measures mental health, yielding three subscales: emotional well-being (3 items), psychological well-being (6 items) and social well-being (5 items). Respondents have to indicate the frequency of the feelings described by the items, as felt during the last month, on a six point scale (never, once or twice a month, about once a week, two or three times a week, almost every day, every day). Total and sub-scale scores were computed by averaging all relevant items, with a higher score indicating more well-being.

The MHC-SF showed good psychometric properties in a sample of Dutch adults (Lamers, Westerhof, Bohlmeijer, ten Klooster, & Keyes, 2011): internal consistency was good overall, with $\alpha = .89$ for the complete scale. The subscales emotional, psychological and social well-being reported Chronbach's alpha values of respectively $.83$, $.83$ and $.74$. The three factor structure was confirmed, and correlations of the subscales with measures of related constructs supported the validity of the MHC-SF. The majority of the respondents rated the items as easy to understand. Again, the shortness and simplicity of the questionnaire make it appropriate for this study, as does its state like quality.

In this study both the pre- and post-test reported a very good internal consistency of $\alpha = .90$ and $\alpha = .93$ for the total scale.

2.4.3 Process measures

Acceptance and Action Questionnaire II (AAQII; Bond et al., 2011)

The AAQ II is a 10-item self-report questionnaire, developed to measure PF, i.e. how well respondents can accept undesired internal experiences. Respondents have to indicate how well an item describes their own behaviour on a seven point scale from "never true" to "always true". The maximum score of 70 is computed by summing up all items, and higher scores indicate higher levels of PF. Up to

this day, the AAQII is the only instrument available for measuring PF.

The scale showed good internal consistency in a Dutch population (Jacobs, Kleen, de Groot, & A-Tjak, 2008). In this study internal consistency was good, too, with $\alpha = .81$ on the pre-test and $\alpha = .88$ on the post-test.

Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006)

The FFMQ is a 39-item self-report questionnaire developed to measure different facets of mindfulness: observing (8 items; the ability to direct attention toward internal and external stimuli), describing (8 items; the ability to put observed stimuli into words), acting with awareness (8 items; sustaining attention while acting), non-judging (8 items; accepting experiences regardless of their nature), and non-reacting (7 items; letting thoughts and emotions be, without acting upon them). Respondents have to indicate how well the items describe their own behaviour on a 5-point Likert scale from “never true” to “always true”. A total score as well as scores for each sub-scale can be derived by summing up all relevant item scores. The maximum total score is 195; a higher score indicates higher levels of mindfulness.

The factor structure as well as internal consistency and convergent and discriminant validity have been confirmed in a sample of Dutch respondents with clinically relevant symptoms of depression and/or anxiety (Bohlmeijer, et al., 2011). In the present study the internal consistency of the scale was very good, with $\alpha = .90$ on the pre-test and $\alpha = .95$ on the post-test. Cronbach’s α values for the sub-scales ranged from .78 to .90.

2.5 Statistical analysis

For statistical analysis the Statistic Package for Social Studies (SPSS) version 18 was used. Eight respondents did not complete data collection at T1. Any missing values have been filled in according to expectation maximization algorithms proposed by Schafer and Graham (2002) in order to maximize statistical power.

2.5.1 Descriptives and preliminary analysis

The Kolmogorov-Smirnovtest was used to confirm that all data was distributed normally. Since normality could be assumed, parametric methods have been used. Parametric methods can produce more precise and accurate estimates and are generally considered to have more statistical power than non-parametric tests. (Freedman, 2000). A one-way ANOVA was used to compare both the MBCT group and the waiting list group for equal means at T0.

Means and standard deviations have been computed for all continuous variables. For the demographic variables the total numbers and percentages have been calculated.

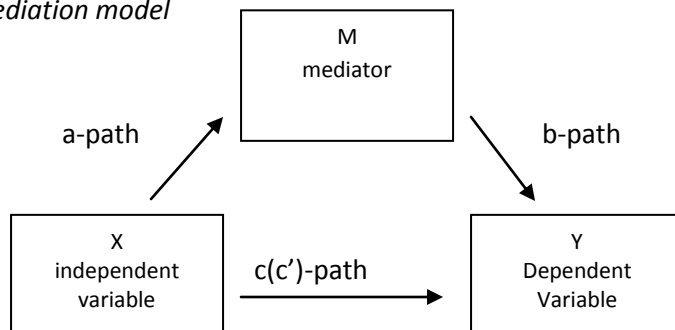
2.5.2 Mediation analysis

Mediation analysis techniques proposed by Baron and Kenny (1986) have been used to determine the mediation coefficients a , b and c (c'), see figure 1. The product of the a - and b -path was the indirect effect of the independent variable (X) on the dependent variable (Y) via the mediator (M). The c -path was the total effect of X on Y . The c' -path was the residual effect of X on Y after the ab -path has been controlled, or $c-ab=c'$ (Verboon, 2010). X was the participation in either the MBCT intervention or the waiting list group. The T1 scores of the CES-D, HADS-A and MHC-SF were used as dependent variables Y . Difference scores ($T1-T0$) of the FFMQ and its subscales and the AAQ-II were used as M . Baron and Kenny proposed a series of regression analyses to test mediation. The first step was to regress X on Y , estimating and testing the c -path. This step was needed to make sure there is an effect that may be mediated. The second step was to regress X on M , estimating and testing the a -path. Step three was to regress M on Y , estimating and testing the b -path. When the first three steps produced significant values for the c - as well as the ab -path, mediation has been established. The fourth step was to check whether the c' had become zero (or insignificant). If so, the mediation was complete, i.e. the complete effect of X on Y could be accounted for by the addition of M . All reported coefficients are standardized β – coefficients.

The bootstrapping method by Preacher and Hayes (2008) was used to determine reliability intervals of the indirect effect. This method tests the significance of a mediator (unlike the method of Baron & Kenny) and is suitable for small samples (unlike the method of Sobel, 1982). The necessary SPSS macro has been provided by Andrew Hayes (Hayes, 2012). Bootstrapping involves repeatedly computing the desired statistic from a series of random sub-samples taken from the data set to generate a reliability interval for the different path-coefficients. Statistical significance was indicated when such an interval did not contain a value of zero. 5000 resamples have been used in this analysis.

Figure 1

Mediation model



2.5.3 Moderation analysis

For moderator analysis multiple regression analysis was used: the dependent variable (Y) was regressed on the independent variable (X), the moderator variable (Z), in the second step the interaction term (XZ) was added to the equation. If XZ proved to be a significant predictor of Y , proof of moderation had been found (Baron & Kenny, 1986). The independent variable was participation in either the MBCT

intervention or the waiting list group. The dependent variables were T1 scores on the CES-D, HADS-A and MHC-SF. Moderator variables were participant gender, education, and base-line symptoms (T0 CES-D, HADS-A). The education variable was recoded into three categories (low, medium, high); six respondents indicated their education as 'other'. Those were re-coded manually: two were assigned to the 'low' category, one to 'medium' and four to 'high.' All variables were centered for this analysis.

3.Results

Table 2. *Demographic variables*

	MBCT (n=76)		Waiting list (n=75)		Total (n=151)	
Gender; n %						
Female	59	77.6	59	78.7	118	78.1
Male	17	22.4	16	21.3	33	21.9
Age (years); m std	48.0	10.6	47.9	12.0	47.9	11.3
Marital status; n %						
Single	17	22.4	20	26.7	37	24.5
Living w/partner	59	77.6	55	73.3	114	75.5
Nationality; n %						
Dutch	71	93.4	74	98.7	145	96.0
Other	5	6.6	1	1.3	6	4.0
Education; n %						
Low	2	2.6	4	5.3	6	4.0
Medium	21	27.6	25	33.3	46	30.5
High	53	69.7	46	61.3	99	65.5
Occupation; n %						
Paid	53	69.7	48	64.0	101	66.9
No Paid	23	30.3	27	36.0	50	33.1

Notes. MBCT = participants in the MBCT group; Waiting list = participants in the waiting list group.

The Kolmogorov-Smirnov test confirmed there were no differences between the research conditions at T0 on any of the primary, secondary or process measures, as well as demographic variables gender, age, marital status, nationality, education, occupation. Both conditions can thus be assumed to be equal at T0. A one-way ANOVA has been used to confirm there were no differences between the MBCT group and the waiting list group on T0-measures. No differences have been found. For exact values refer to table A1.

3.1 Descriptives

Of the 151 participants 118 (78%) were female and 33 (22%) were male. The average age was 47.9 years (SD=11.3). Most of the participants (94%) were of Dutch nationality. A complete overview of demographic variables is presented in table 2. Means and standard deviations of all measures can be found in table 3.

3.2 Mediation analysis

It was predicted that the process measures (FFMQ, AAQ-II) would mediate the effect of the intervention on the dependent measures (CES-D, HADS-A, MHC-SF). All coefficients can be found in Table 4.

For the CES-D, the total FFMQ as well as the observing, describing and non-reacting subscale as well as the AAQ-II have shown mediating effects. The FFMQ subscales acting with awareness and non-judging did not predict the CES-D scores and therefore did not mediate.

For the HADS-A, the total FFMQ as well as the observing, non-judging and non-reacting subscales as well as the AAQ-II mediated the effects of the intervention. The describing and acting with awareness subscales did not produce mediation effects as they did not predict HADS-A scores.

For the MHC-SF, all proposed mediators produced significant a- and b-paths. The c-path was marginally significant ($p=.052$) and has been included in the analysis. Mediation has thus been established for all process measures.

Table 3. Means and standard deviations of all measures

	T0				T1			
	MBCT (n=76)		Waiting list (n=75)		MBCT (n=76)		Waiting list (n=75)	
	M	SD	M	SD	M	SD	M	SD
FFMQ								
Total	115.44	16.21	117.44	19.04	133.42	18.57	120.70	21.81
Observe	24.77	5.58	25.21	5.78	27.98	5.15	25.28	6.29
Describe	26.39	6.14	27.43	6.29	28.60	5.56	27.80	6.35
ActAware	20.92	5.45	22.61	5.47	25.30	5.53	22.67	6.05
Non-judge	23.64	6.04	22.87	5.69	27.68	5.16	24.72	5.66
Non-react	19.73	4.29	19.31	4.30	23.86	4.27	20.23	4.32
AAQ	44.28	8.42	43.03	7.86	49.59	8.80	44.36	10.00
CES-D	15.62	7.86	16.46	8.32	11.79	8.76	16.43	9.94
HADS-A	7.96	3.40	8.57	3.58	6.14	3.52	8.22	3.89
MHC-SF								
Total	2.77	.85	2.76	.82	3.11	.91	2.82	.95
Emotion.	3.15	.95	3.15	.78	3.46	.85	3.19	.88
Social.	2.38	1.04	2.28	.96	2.72	1.08	2.49	1.05
Psycho.	2.91	.89	2.96	1.00	3.27	.99	2.90	1.11

Notes. MBCT = participants in the MBCT group; Waiting list = participants in the waiting list group. FFMQ = Five Facet Mindfulness Questionnaire. ActAware = acting with awareness. Non-Judge = non-judging. Non-react = non-reacting. AAQ = Acceptance and Action Questionnaire. CES-D = Center for Epidemic Studies Depression Scale. HADS-A = Hospital Depression and Anxiety Scale-Anxiety. MHC-SF = Mental Health Continuum – Short Form. Emotion = emotional well-being. Social = social well-being. Psycho = psychological well-being.

3.3 Moderation analysis

It was predicted that participant gender, level of education and baseline CES-D and HADS-A scores would moderate post-treatment CES-D, HADS-A and MHC-SF scores. Table 5 presents standardized coefficients of the multiple regression analysis.

Three moderation effects have been found. Baseline CES-D scores moderated post-treatment HADS-A scores (see figure 2), and baseline HADS-A scores post-treatment HADS-A (see figure 3) scores as

well as post-test MHC-SF scores (see figure 4). Gender and educational level did not produce any moderating effects.

Higher baseline CES-D scores led to higher post-test HADS-A scores in both the MBCT and the control group. The MBCT group scored overall lower on post-test anxiety than the control group. While there was almost no difference between groups for low baseline depression, at high baseline depression the MBCT group scored much lower on post-test anxiety than the control group.

When predicted by baseline HADS-A scores, the post-test HADS-A scores behave similarly. In both conditions, post-test anxiety increases as base-line anxiety increases. The control group again scored higher overall on post-test anxiety. Again, the difference between both groups was bigger for high baseline symptoms.

When T0 HADS-A scores predicted T1 MHC-SF scores both conditions trended differently from each other. As base-line anxiety increased post-test positive mental health increased as well for the MBCT group, but decreased for the control group. There was almost no difference between the groups at low baseline anxiety, but for high baseline anxiety the MBCT group showed higher post-test MHC-SF scores.

Table 4. *Mediation coefficients*

Y	M	a-path	b-path	c-path	c'-path	Bootstrapping 95%BI	
T1	T1-T0					lower	Upper
CES-D							
	FFMQ						
	Total	-.463***	-.343***	.242**	.083	.1620	.5286
	observe	-.355***	-.308***	.242**	.132	.1064	.3848
	describe	-.237**	-.181*	.242**	.199*	.0067	.2296
	actaware	-.412***	-.160	.242**	.176*	.0157	.2950
	non-judge	-.216**	-.158	.242**	.208*	.0078	.1846
	non-react	-.388***	-.275***	.242**	.135	.0911	.3767
	AAQ-II	-.249**	-.387***	.242**	.145	.0889	.3500
HADS-A							
	FFMQ						
	Total	-.463***	-.296**	.272**	.135	.1313	.4888
	observe	-.355***	-.190*	.272**	.204*	.0324	.2992
	describe	-.237**	-.143	.272**	.238**	-.0055	.1976
	actaware	-.412***	-.077	.272**	.240**	-.0816	.2193
	non-judge	-.216**	-.209**	.272**	.226**	.0013	.0461
	non-react	-.388***	-.314***	.272**	.150	.1118	.4202
	AAQ-II	-.249**	-.366***	.272**	.180*	.0754	.3450
MHC-SF							
	FFMQ						
	Total	-.463***	.474***	-.158°	.061	-.6468	-.2828
	observe	-.355***	.330***	-.158°	-.041	-.4009	-.1222
	describe	-.237**	.222**	-.158°	-.106	-.2334	-.0274
	actaware	-.412***	.298**	-.158°	-.036	-.4310	-.1033
	non-judge	-.216**	.317***	-.158°	-.090	-.2705	-.0462
	non-react	-.388***	.288**	-.158°	-.047	-.3982	-.0951
	AAQ-II	-.249**	.439***	-.158°	-.049	-.3855	-.0907

Note. CESD = Center for Epidemic Studies Depression Scale; HADS-A = Hospital Depression and Anxiety Scale – Anxiety; MHC-SF = Mental Health Continuum – Short Form; FFMQ = Five Facet Mindfulness Questionnaire; actaware = acting with awareness; non-judge = non-judging; non-react = non-reacting; AAQ = Action and Acceptance Questionnaire II.

* $p < .05$. ** $p < .01$. *** $p < .001$. ° $p = .052$.

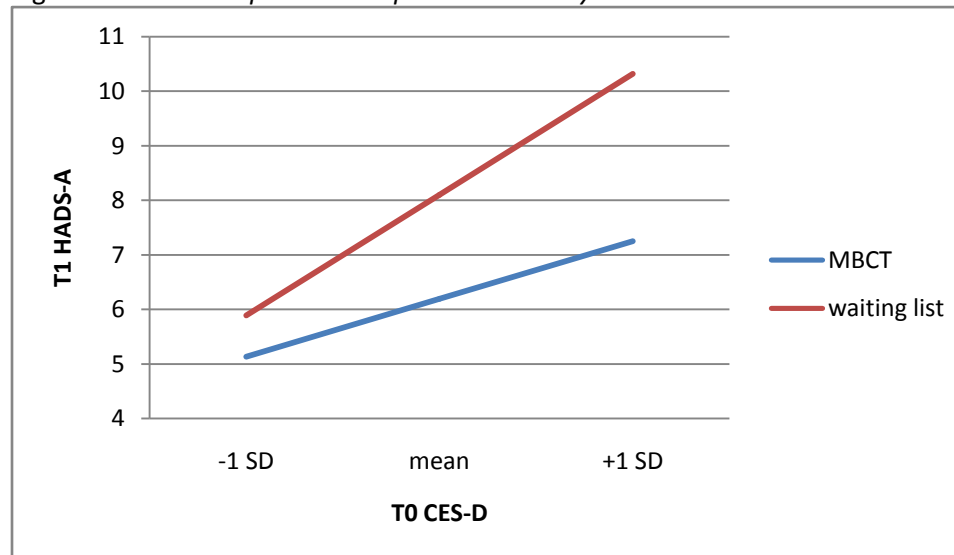
Table 5. *Hierarchical regression moderation coefficients*

Independent variables	CES-D T1		HADS-A T1		MHC-SF T1	
	B	t	β	t	β	T
(I)gender	.101	1.269	.108	1.377	.007	.087
(I)condition	.241	3.033**	.270	3.438**	-.158	-1.951
(II)gender*condition	-.351	-.824	-.051	-.121	.055	.125
(I)education	-.016	-.205	-.011	-.137	.022	.265
(I)condition	.240	2.998**	.271	3.403**	-.156	-1.915
(II)education*condition	-.538	-1.227	-.309	-.709	-.191	-.426
(I)CES-D T0	.548	8.308***	.435	6.153***	-.274	-3.506**
(I)condition	.213	3.237**	.249	3.525**	-.144	-1.845
(II)CES-D T0*condition	.230	1.086	.482	2.149*	-.193	-.766
(I)HADS-A T0	.314	4.147***	.575	9.009***	-.075	-.925
(I)condition	.214	2.826**	.221	3.462**	-.152	-1.867*
(II)HADS-A T0*condition	.060	.246	.371	1.825°	-.622	-2.427**

Notes: condition = MBCT group/waiting list group; CES-D = Center for Epidemic Studies Depression Scale; HADS-A = Hospital Anxiety and Depression Scale – Anxiety; MHC-SF = Mental Health Continuum – Short Form.

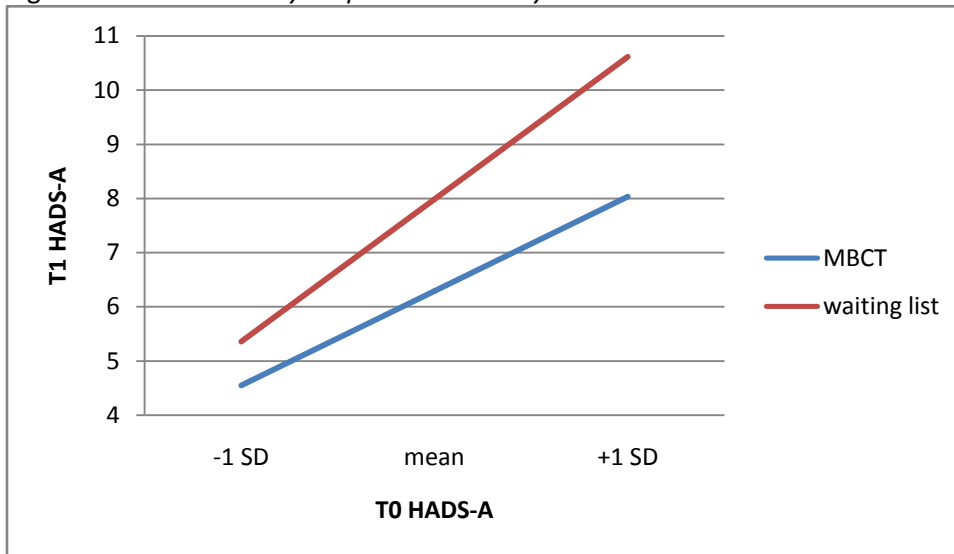
*p<.05. **p<.01. ***p<.001. °p=.07.

Figure 2. *Baseline depression vs. post-test anxiety.*



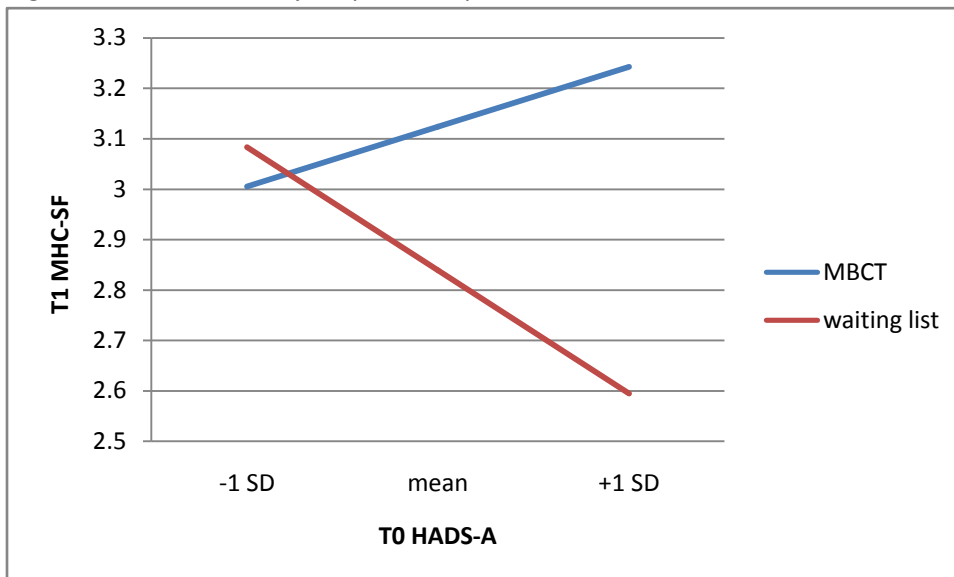
Note: CES-D = Center for Epidemic Studies Depression Scale; HADS-A = Hospital Anxiety and Depression Scale – Anxiety; MBCT = Mindfulness-based cognitive therapy condition; waiting list = waiting list control condition.

Figure 3. *Baseline anxiety vs. post-test anxiety.*



Note: HADS-A = Hospital Anxiety and Depression Scale – Anxiety; MBCT = Mindfulness-based cognitive therapy condition; waiting list = waiting list control condition.

Figure 4. *Baseline anxiety vs. post-test positive mental health.*



Note: HADS-A = Hospital Anxiety and Depression Scale – Anxiety; MHC-SF = Mental Health Continuum – Short Form; MBCT = Mindfulness-based cognitive therapy condition; waiting list = waiting list control condition.

4. Discussion

The results support the hypotheses regarding mediating effects of PF and mindfulness. Results for the moderation hypotheses were in line with predictions for some measures.

Depression scores were mediated by change in the total mindfulness scores as well as the observing, describing and non-reacting sub-scales, and by psychological flexibility. The acting with awareness and non-judging sub-scales did not moderate depression scores. These results seem somewhat surprising, as Bohlmeijer et al. (2011) found no correlation between the CES-D and the observing sub-scale, but did find correlations for the acting with awareness and non-judging sub-scales. These differences might be explained by differences in populations: the study of Bohlmeijer et al. involved adults with clinically relevant symptoms of depression. Anxiety scores were mediated by the total FFMQ, as well as the observing, non-judging and non-reacting sub-scale, as well as the AAQ-II. The describing and acting with awareness sub-scales did not affect the HADS-A scores. These results differ again from the findings of Bohlmeijer et al. (2011). Again the observing sub-scale had no correlation with HADS-A scores in Bohlmeijer's study. The acting with awareness sub-scale did produce correlation in their study. Positive mental health scores were mediated by the total FFMQ, all sub-scales, as well as the AAQ-II.

It can be concluded that the effect of the MBCT based intervention on depressive symptoms, anxious symptoms and mental health was for the most part mediated either partially or completely by the proposed mechanisms of change PF and mindfulness and some of its five facets. It is therefore valid to assume, that the MBCT based intervention caused increases of PF and mindfulness in the participants, and that these increases in turn caused the reduction of (self-reported) depressive and anxious symptoms, as well as increased positive mental health. However it remains unclear which role the different facets of mindfulness play. It is noteworthy that all FFMQ facets and the AAQ-II moderated positive mental health scores. These findings support the intervention's worth beyond reduction of pathological symptoms, and the roles that mindfulness and PF play.

A number of moderators have been supposed and subsequently been tested. In line with the predictions no moderating effect was found for the participant gender. In other words, it is valid to assume men and women did not react differently to the intervention in terms of depressive and anxious symptom reduction and positive mental health benefits. However, just as in the study by Kuyken et al. (2010), men were underrepresented in the present study (22%). One should therefore be careful when generalizing these findings to different populations.

The analysis found no differences between medium and high education groups in terms of decreased depressive and anxious symptoms, and increased positive mental health. The sample of respondents did contain only few low-education respondents (4%), so unfortunately no valid conclusions can be drawn about this category. In other words, the intervention seems to be equally beneficial for both groups, indicating that the intervention could be implemented equally effective for similar populations.

Unlike predicted, post-test depressive symptoms were not moderated by base-line depression

or anxiety. In line with predictions, post-test anxious symptoms were moderated by both base-line depression and anxiety. In both cases, higher base-line symptoms produced higher post-test anxiety. For low base-line symptoms the MBCT group scored only slightly lower on post-test anxiety than the control group. For high base-line symptoms however the MBCT group scored distinctly lower than the control group. This indicates that participants with high base-line depressive and anxious symptoms benefited more from the intervention in terms of reduced anxiety, but not in terms of reduced depression.

Post-test positive mental health scores were expected to be moderated by base-line symptoms of both depression and anxiety. No effect was found for baseline depression, but anxiety did produce an interaction. For the MBCT group, post-test positive mental health did increase as base-line anxiety increased. Quite the opposite was true for the control group: post-test positive mental health decreased as anxiety increased. While both groups scored about the same for low base-line anxiety, at high base-line anxiety there was a quite big gap between those groups, favouring the MBCT group. Those with highest base-line anxiety ended up scoring highest on post-test positive mental health. This strongly highlights the interventions value beyond symptom reduction.

4.1 Strengths and limitations

One strength and limitation of this study lies in its chosen pool of respondents. Unlike most other studies on the topic, this research involved a non-clinical population, which gives this study a unique value as it explores the unexplored. However this also means that the results cannot readily and validly be compared to most existing studies.

With specific regard to the question of moderating effects of base-line symptoms on post-test depression, it could be proposed that such effect do in fact exist. However they may not have been detected because the respondents were chosen based on a certain, elevated yet non-clinical level of depressive base-line symptoms, resulting in a sample with quite homogenous base-line symptom levels. Subjects with either relatively high or low base-line symptoms may simply have been underrepresented.

The present study involved a control group, which is a certain strength. However, a waiting list condition as used in the study is generally considered a rather weak form of control as it leaves a number of aspects uncontrolled, such as social interactions and expectations. A placebo control group would be advisable.

The study had good generalizability for the most part: the respondents were chosen to match the actual target group for mental health prevention and have been recruited in ways similar to an actual intervention in a natural setting. The intervention itself was carried out in a natural setting as well. While the waiting list control group may not be ideal in terms of psychometrics, it fits the actual real world conditions where people are free to engage in any other form of (mental) health care or therapy. Note that respondents with low educational level were underrepresented and one must be careful when generalizing outcomes of this study to similar lowly educated populations.

While the study at hand does support and highlight the mediating role of mindfulness and PF it draws no conclusion about the relations between those two. The two concepts are linked by theory, as mindfulness is named as a “precursor” PF (Shapiro, et al. 2004), but it is not clear if and how they affected each other, whether the intervention caused an increase in both at the same time, or if possibly one caused the other.

Finally this study focused heavily on the outcome and process variables and socioeconomic variables. It overlooks: a) variables and processes related to the intervention itself and the way it was executed, such as proficiency and teaching styles of the instructors. The intervention used did differ from the standard MBCT protocol after all. It also overlooks b) variables and processes related to participants' (learning) experience. Ireland (2012) highlights the importance of not only the time participants invest in formal and informal practices of meditation, but also of the proficiency with which participants practice. These factors were not controlled in the present study and may have played a role, possibly overshadowing the role of other variables.

4.2 Future research

The present study can be improved on in some ways. First of all, mindfulness as a construct has not been explored sufficiently and while it is generally assumed that MBIs all rely on the same process arguably they don't (Chiesa & Malinowski, 2011). Differences between MBIs, how they work and form mindfulness could explain why different studies find different results. It would therefore be favourable to use different MBIs in one study, to detect possible differences between them and their working mechanisms. In line with this, future research should pay special attention to the variables and processes related to the intervention(s) and to the learning experience of the participants.

Another limitation of this study can be overcome by involving a more diverse set of respondents. While it is sufficient for an effect study to involve target group respondents only, a study involving a completely 'healthy' population as well as an elevated symptoms population as well as a clinical population might tie together the different findings and give a more complete picture of how these differences influence the complex processes of gaining mindfulness, PF, and improving mental health.

While the present study confirmed that people with medium and high levels of education benefitted equally from the intervention, no conclusions were drawn about the low education subgroup. Future studies aiming to enlighten this topic should involve a representable amount of participants from of all education levels. Education was included in this study because it was hypothesized to represent participants' ability to learn and adapt to the teachings of the intervention, but possibly it was not an accurate operationalization of the concept. After all, educational level depends on more than just one's ability to learn. If one wants to pursue the issue further, the author wants to suggest operationalizing one's ability to learn as either intelligence or emotional intelligence. Schutte and Malouff (2011) have found that emotional intelligence mediated the relationship between mindfulness and well-being, supporting emotional intelligence as an important ingredient in the workings of mindfulness.

4.3 Implications

Pots et al. (2012) concluded that the intervention "Minder stress door aandacht" had value as a preventive intervention, but suggested to further investigate how the intervention's benefits can be explained. This paper affirms their conclusions that both mindfulness and psychological flexibility

mediated the effects of the intervention. The interventions appeared to work equally well for men and women. It worked equally well for participants with a high versus a medium level of education. The amount/severity of base-line symptoms did differentiate between respondents who benefited from the intervention more/less than others in some cases. This implies that participants with higher depressive and anxious symptoms at would benefit more from the intervention.

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6. Appendix

6.1 Table A1

Table A1. *Test of equal means of all T0 measures*

Measure	<i>F</i> (1, 149)	<i>p</i>
CES-D	.402	.527
HADS-A	1.165	.282
MHC-SF	.012	.913
AAQ-II	.880	.350
FFMQ		
Total	.480	.489
Observe	.226	.635
Describe	1.071	.302
ActAware	3.626	.059
Non-judge	.649	.422
Non-react	.353	.554
gender	.023	.879
age	.003	.954
nationality	1.453	.230
education	1.468	.228
occupation	1.351	.247

Note. CES-D = Center for Epidemic Studies Depression Scale. HADS-A = Hospital Anxiety and Depression Scale – Anxiety. MHC-SF = Mental Health Continuum – Short Form. AAQ-II = Acceptance and Action Questionnaire – II. FFMQ = Five Facet Mindfulness Questionnaire. ActAware – acting with awareness. Non-judge = non-judging. Non-react = non-reacting.