



Stress management for middle managers via an acceptance and commitment-based smartphone application: A randomized controlled trial



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ABSTRACT

Stress is a major health problem in today's workplace. Recent studies suggest that acceptance and commitment therapy (ACT) is effective for reducing stress at work, specifically among managers. Moreover, smartphone-delivered treatments have been developed and increasingly used in research. The objective of our study was to evaluate the efficacy of an ACT-based smartphone treatment among middle managers at medium- and large-sized companies (>50 employees) in Sweden. A total of 73 participants were randomized to either receive the six-week stress intervention ($n = 36$) or to a waitlist control group ($n = 37$). Results showed small to moderate within-group effect sizes (Cohen's d range 0.37–0.62) for the treatment group, and small to moderate between group effects (Cohen's d range 0.41–0.50). In conclusion, the study indicates that a smartphone administered stress intervention based on ACT can reduce perceived stress and increase general health among Swedish middle managers in the private sector.

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1. Introduction

Stress is a major health problem in today's workplace (American Psychological Association, 2009). Prolonged occupational stress has been associated with increased risk of burnout (Maslach et al., 2001), anxiety and depression (Melchior et al., 2007). Moreover, somatic problems such as cardiovascular disease (Cohen et al., 2007) and impaired function of the immune system (Mommersteeg et al., 2006) have been reported in association with stress. In the United Kingdom, 40% of work-related illness is related to stress (Health and Safety Executive, 2013), and in the United States, 40% of all professionals state that their job is very or extremely stressful (American Psychological Association, 2009). Stress-related illness is also associated with large costs for society (Boorman, 2009), with increased absenteeism and reduced efficiency at work being two consequences (Hardy et al., 2003).

Acceptance and commitment therapy (ACT) is a form of Cognitive-Behavior Therapy (CBT) that has been applied to organizational settings (Moran, 2011). The general objective in ACT is to promote psychological

flexibility, i. e. the ability to be present in the here and now and adjust one's behavior according to personal values. This ability is increased in ACT by using six central processes: acceptance, mindfulness, defusion, self as context, values and committed action (Hayes et al., 2006b). Recent studies suggest that ACT is effective for reducing stress at work (Hayes et al., 2006a). For example, one study showed a large between group effect size (Cohen's $d = 1.31$) for reducing psychological distress among working individuals when comparing ACT against a waitlist control group (Flaxman and Bond, 2010). In addition, the study showed that ACT worked just as well as the well-established CBT-method Stress Inoculation Training (Flaxman and Bond, 2010). In other studies, a one-day intervention with ACT has been shown to reduce fatigue symptoms and related sickness absence (Dahl et al., 2004; Hayes et al., 2004). Moreover, initial studies have found that ACT is effective for reducing stress specifically among managers (Bond et al., 2006). Since research suggests that managers at intermediate levels (middle managers), are particularly vulnerable to stress (Holden and Roberts, 2004), this is an attractive target group to develop a stress intervention for. However, research on ACT-based stress interventions is relatively new and more studies are needed, particularly with middle managers as a target group.

Since research has shown that the ability to cope with stress is crucial for leader performance (Bartone et al., 2009), there are reasons to believe that an ACT-based stress intervention might improve

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leadership as well. According to Stewart et al. (2006) there are parallels between the presumed mechanisms in ACT and the theory of transformative leadership (Bass and Riggio, 2012), e.g. the focus on acting in line with one's values and persisting in the face of challenges. The "Full-range theory of leadership", where transformative leadership is one of the main components, is one of the most established leadership models in research (Bass, 1998). Transformative leadership is characterized by four factors: idealized influence, inspirational motivation, intellectual stimulation and individualized consideration. Meta-analyses have shown that transformative leadership has a positive effect on employees' performance and motivation (Dumdum et al., 2002; Wang et al., 2011). To our knowledge, no studies have examined the effects of an ACT intervention on transformational leadership.

It is well established that guided self-help interventions, administered through the internet, can have positive effects in a clinical psychological context (Andersson, 2009; Andersson and Titov, 2014). Guided treatments distributed digitally have provided a way to reach a larger number of patients in a manner that in most cases requires less therapist time than face-to-face psychotherapy, but with similar clinical outcome (Andersson et al., in press). Recently, a number of studies have also investigated interventions administered via smartphones (Webb et al., 2010; Ly et al., 2014). Morris et al. (2010) concluded that these studies are promising and show the possibility of delivering psychotherapy in a new and efficient way. The smartphone as a platform for psychological interventions has, however, not yet been investigated to any great extent in an organizational context. Since smartphones already are socially accepted and come at relatively low costs considering their functionalities (Boschen and Casey, 2008), it has been suggested that smartphones will be integrated even further in society (Ly et al., 2014), and therefore may be important in distributing psychological and health interventions both in a clinical (Donker et al., 2013) and an organizational context.

The main objective of our study was to evaluate the efficacy of a smartphone administered stress intervention based on ACT's six basic tools (Hayes et al., 1999) among middle managers working in medium- and large-sized companies (>50 employees) in Sweden. We hypothesized that the participants given the smartphone stress intervention would, in comparison to a waitlist control group, 1) reduce their perceived stress; 2) increase their general health; and 3) increase the effect on transformative leadership.

2. Methods

2.1. Design

This was a randomized controlled trial, conducted in Sweden in 2013, comparing a smartphone stress intervention ($n = 36$) against a wait-list control group ($n = 37$) for middle managers.

2.1.1. Ethics statement

The study was approved by the Regional Ethics Board of Linköping, Sweden. Written informed consent was obtained from all participants by surface mail before the study started.

2.1.2. Recruitment and selection

A vast majority of the participants, 68 out of 73, were recruited after a short presentation about the project at 10 different companies. The typical company was of either Swedish or American origin and had around 10 000 employees worldwide. Five participants were also recruited via advertisements on the internet. Those who were interested were directed to a web page with information about the study, the intervention being tested and how to participate. From the web page, the participants were able to fill out an online screening assessment, which was necessary to complete in order to be included in the study.

2.2. Participants

Inclusion criteria for the study were a) being at least 18 years old, b) being a middle manager with staff responsibilities at a company in the private sector, c) using a smartphone at the workplace, d) not participating in any concurrent psychological intervention, e) not suffering from a severe psychiatric or medical condition that could interfere with the intervention (e.g. bipolar disorder or schizophrenia, assessed during a clinical interview), and f) not having severe alcohol or drug problems.

Of the 125 individuals who initially expressed interest in the study, 76 completed all the questions in the online screening (38 did not finish the screening and 11 did not begin the screening). A short telephone interview was conducted with the remaining participants. The purpose of the interview was to ensure that the participants were well informed about the effort necessary for the six-week intervention, and to ensure that the participants met the inclusion criteria. After the telephone interviews, two individuals were excluded, one because the inclusion criteria were not met and one because of a longer planned absence from work during the period of the study.

Finally, 74 participants were included in the randomization. However, one participant decided not to begin the intervention, leaving 73 participants for the data analysis. The flow of participants through the study is shown in Fig. 1. Among the randomized participants, there were 42.5% women ($n = 31$) and 57.5% men ($n = 42$). The mean age was 41.5 years ($SD = 7.2$) ranging from 25 to 57 years. See Table 1 for additional demographical data.

2.3. Outcome measures

2.3.1. Primary outcome measures

The primary outcome measures were the General Health Questionnaire (GHQ-12; Goldberg and Williams, 2000) administered at pre-treatment, post-treatment and on a weekly basis during the entire treatment phase (6 weeks), and the Perceived Stress Scale (PSS-14; Cohen et al., 1983) that was collected at pre-treatment and post-treatment. In addition to the PSS-14, the PSS-10 was used on a weekly basis. Hence, GHQ-12 and the PSS-10 were measured seven times, and PSS-14 two times during the trial. See Table 2 for an overview of the measurements administered at which time-point.

The GHQ-12 is a self-report instrument used to measure general mental health. Participants are asked to indicate to what extent they experience 12 common symptoms of psychological distress, e.g. hopelessness and dissatisfaction. The instrument is used widely as outcome measure in research on occupational health and has good psychometric properties (Hardy et al., 2003). The PSS-14 is widely used in research to investigate the effects of stress as well as the effectiveness of stress interventions (Cohen and Janicki-Deverts, 2012; Zetterqvist et al., 2003), and scoring on the scale correlates with cortisol level (Pruessner et al., 1999). The internal consistency of the PSS-10 has been shown to be comparable to that of the PSS-14 (Cronbach's $\alpha = .89$) (Roberti et al., 2006).

2.3.2. Secondary outcome measures

To measure leadership effectiveness the Multifactor Leadership Questionnaire (MLQ) was administered (Bass et al., 2003) at pre-treatment and post-treatment. Table 2 shows an overview of the measurements administered at which time-point. The MLQ is the most common tool to measure transformational and transactional leadership (Lowe et al., 2013). Since it is assumed that ACT skills primarily influence transformative leadership (Stewart et al., 2006), only the five subscales that measure this type of leadership were used in the current study. The MLQ contains one form where the participant rates his or her own leadership, and another form where employees rate the leadership of their manager. Due to time constraints, only the self-report form was used. The MLQ contains a subscale for each of the

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