Department of Clinical Neuroscience
Psychology program, semester 9-10
Main field of study: Psychology
Master thesis in psychology (2PS026), 30 credits
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ACT-based self-help without therapist support: An online randomised controlled trial

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Sammanfattning/abstract

Tillgång till interventioner som effektivt reducerar stress är begränsad och ofta kostsam. Denna studie undersökte effekten av en Acceptance and commitment therapy (ACT) - baserad självhjälpsbok utan terapeutkontakt för vuxna med minst lindriga stressnivåer. Deltagare rekryterades primärt genom bokens hemsida. Deltagarna (n = 133) randomiserades till antingen intervention (n = 67) eller väntelista (n = 66). Både det primära utfallsmåttet, stress, och de sekundära utfallsmåtten livskvalitet, oro, depressiva symtom och burnoutsymtom mättes innan och efter interventionen. Jämfört med väntelista var effekterna i interventionsgruppen stora gällande stress ($_p\eta2$ = .17) och oro ($_p\eta2$ = .15) samt delskalorna fysisk trötthet ($_p\eta2$ = .23) och hjärntrötthet ($_p\eta2$ = .15) i burnoutformuläret. Effekten för depressiva symtom och suicidala intentioner ($_p\eta2$ = .09) var av måttlig storlek. De ACT-specifika konstrukten psykologisk flexibilitet och mindfulness analyserades med hjälp av medieringssanalyser men ingen medieringseffekt hittades för varken psykologisk flexibilitet eller mindfulness. Dessa resultat indikerar att en ACT-baserad självhjälpsbok utan terapeutkontakt kan vara en effektiv metod för att minska stress.

Nyckelord: Acceptance and Commitment Therapy, psykologisk flexibilitet, självhjälp, stress, utan terapeutstöd

Access to interventions that effectively reduce stress is limited and often costly. This study examined the effectiveness of an Acceptance and Commitment Therapy (ACT)-based self-help book without therapist support for adults with at least mild levels of stress. Participants were recruited primarily through the website of the book. Participants (n = 133) were randomly assigned to an intervention group (n = 67) or a wait-list group (n = 66). Both the primary outcome measure, stress, and the secondary outcome measures quality of life, worry, depressive symptoms and burnout symptoms were measured before and after the intervention. Compared to the wait-list group, the effects in the intervention group were large for stress ($_p\eta2$ = .17), worry ($_p\eta2$ = .15), and the subscales physical fatigue ($_p\eta2$ = .23) and cognitive weariness ($_p\eta2$= .15) in the burnout questionnaire. The effect on depressive symptoms and suicidal intent ($_p\eta^2$ = .09) was medium. The ACT-specific constructs psychological flexibility and mindfulness were assessed with mediation analyzes but no mediation effects were found for either psychological flexibility or mindfulness. These results suggest that an ACT-based self-help book without therapist support may be an effective method to reduce stress.

Keywords: Acceptance and Commitment Therapy, no therapist support, psychological flexibility, self-help, stress

ACT-based self-help without therapist support: A randomised controlled trial

My Eklund & Caroline Kiritsis

Stress is a renowned concept that we all have an individual definition and experience of. In a report from The National Board of Health and Welfare (Socialstyrelsen, 2003), stress is operationalized as the organism's reaction to imbalance between the pressure it is exposed to and the resources the organism has to deal with that pressure. However, there is no consensus regarding the definition of stress in the scientific field (Selye, 1950; Socialstyrelsen, 2003) despite being a concept described as early as the 14th century (Ekman & Arnetz, 2013; Lazarus & Folkman, 1984). One of the first definitions of stress in the psychological scientific field was established by Selye (1950), who described stress as a way to mobilize energy when exposed to perceived threats. Stress is thought to have a positive effect in the short term by promoting survival, but a negative effect in the long run as it may result in both mental and physiological illness (Ekman & Arnetz, 2013; Ljungberg & Friberg, 2004; Selye,1950; Socialstyrelsen, 2003). Within the Swedish healthcare system stress is divided into at least three stages of stress-related mental illness (excluding post-traumatic stress disorder): adjustment disorder, fatigue syndrome and fatigue syndrome with the addition of depression. The last stage is often referred to as *burnout* in English literature and as *fatigue depression* in Sweden (Busch et al., 2011; Statens beredning för medicinsk utvärdering; SBU, 2014).

Currently the evidence for psychological treatment for stress-related mental illness is insufficient (Busch et al., 2011; Yrkesföreningar för fysisk aktivitet, 2016). However, there is some consensus regarding the effects of physical activity as prevention for stress-related diagnoses and symptoms, such as depression, fatigue and cognitive impairment (Yrkesföreningar för fysisk aktivitet, 2016). According to The National Board of Health and Welfare the contradictory evidence for psychological treatment may be caused partly by the heterogeneity of the samples, in particular regarding work status and degree of stress-related exhaustion (Socialstyrelsen, 2003). Therefore, it has been proposed that different interventions for different stages of stress-related mental illness should be developed to clarify the effects of the treatments. According to the Swedish Agency for Health Technology Assessment and Assessment of Social Services (SBU, 2015) the number of studies needs to increase in order to determine which psychological methods are efficacious for people with stress-related mental illness. However, meta-analyses and reviews do favor cognitive behavioural therapy (CBT) and mindfulness-based interventions when compared to other treatments (Regehr, Glancy, & Pitts, 2013; Van der Klink, Blonk, Schene, & van Dijk, 2001).

In addition to increased research regarding efficacy and effectiveness of treatments, modes of delivery and adequate implementation of treatments are also prioritized areas of research. Many CBT manuals have been published as self-help books, so-called self-administered materials, aiming to give people without access to ordinary psychological treatment an opportunity to benefit from CBT and improve their mental health (Palmkron Ragnar, 2006). Other benefits of self-help is the possibility for the patients to work in their own pace and that the patients' integrity and anonymity are better protected (Williams, 2001).

The core of CBT treatments is operant learning, a type of learning in which behaviour followed by reinforcement will occur more frequently in the future, whereas behaviour followed by punishment will occur less frequently in the future (Kåver, 2007; Myers, 2013). In CBT it is argued that the actual healing is a result of homework assignments rather than attending the therapeutic sessions themselves. Between the sessions new experiences from exposures changes the way the participant behaves and feels in relation to the subject in focus. This helps the participant to obtain more effective ways of dealing with their problems

(Almén, 2007; Kåver, 2007). According to Linton & Flink (2011), homework assignments are an opportunity to learn something new and to optimize learning. Most evaluated self-help books have used a CBT format and CBT-based self-help books have been shown to belong to the group of self-help books with the strongest evidence of effectiveness (Williams, 2001).

The term *self-administered* refers to interventions where written material constitutes the sole basis of the treatment and where the clients have no contact with a therapist (Glasgow & Rosen, 1978). According to French et al. (2017) there are four variations of self-help: 1) self-administered, meaning only therapist contact for assessment, 2) predominantly self-help, meaning therapist contact for assessment but also sporadic check-in with a therapist, 3) minimal contact, meaning active involvement by the therapist but to a lesser degree than in traditional therapy and 4) predominantly therapist-administered, meaning the same degree of active involvement by the therapist as in traditional therapy but unlike ordinary face-to-face therapy based on a self-administered material instead of a manual. The efficacy of self-administered materials has not been sufficiently evaluated (Andersson et al., 2006) and different operationalizations of the practical delivery of self-help has made it difficult to establish reliable analyses and extrapolate the results (French et al., 2017). Several authors have delivered self-help under therapist-controlled or therapist-administered conditions, although their programs were later marketed as self-administered materials (Glasgow & Rosen, 1978). According to Andersson et al. (2006) the most significant limitation of self-help is the low level of follow-through or engagement.

Self-help can be delivered in various formats such as printed, internet-based or through mobile phone applications, each with their own advantages and disadvantages. There are, however, mixed outcomes regarding their efficacy. There are research that indicates that computer-based or audio interventions produce better outcomes while other research suggest that this kind of format create greater barriers to engagement (French et al., 2017). Other research indicates that the format of delivery does not impact the outcome (French et al., 2017; Gould & Clum, 1993). Studies from the 1970's show that treatment with only minimal therapist support is effective, but that self-administered treatment without any therapist support at all is less successful (Lilienfeld, Lynn, & Lohr, 2015). According to Gould & Clum (1993), however, self-administered treatment without any therapist support has as good effects as other forms of self-help. Hofer et al. (2018) emphasize the latter view by reporting good effects for stress and burnout in a self-help intervention without therapist support. Self-help without any therapist support has the advantage of being cost-effective compared to self-help with more therapist involvement (Muto, Hayes, & Jeffcoat, 2011).

Socio-Economic Costs and Psychological and Physical Effects of Long-Term Stress

The onset of psychiatric diagnoses between 2010 and 2015 accounted for 59% of the total increment of number of cases of illness in Sweden (Försäkringskassan, 2016). Off the 59% with psychiatric diagnoses, women represented 79%. Since 2014 stress-related psychiatric diagnoses are the most common reason for sick leave in Sweden and represent 66% of the total increase mentioned above.

Some of the negative psychological and physical effects of long-term stress include a weakened immune system, cardiovascular disease, depression, poorer learning ability, type 2 diabetes, abdominal obesity, cognitive disorders and inhibition of thyroid stimulating hormone (Ljungberg & Friberg, 2004). Stress has also been shown to increase dendritic growth in parts of the amygdala and may subsequently contribute to anxiety reactions induced by stress (Ekman & Arnetz, 2013). In the research field of stress-induced exhaustion, cumulative adversity has been shown to have greater predictive value regarding future mental illness compared to separate major stressful events (Turner & Lloyd, 1995).

Acceptance and Commitment Therapy (ACT) and Its Effectiveness for Stress-Related Mental Illness

ACT is a relatively new form of CBT and has shown to be promising in a wide range of psychosocial and psychiatric problems, such as drug abuse, chronic pain, anxiety, depression, psychosis symptoms, stress, fatigue depression, self-injurious behaviour and obsessive-compulsive disorder (A-Tjak et al., 2015; Jiménez, 2012; Powers, Zum Vörde Sive Vörding, and Emmelkamp, 2009).

ACT is based on functional contextualism (Hayes, 1993) and Relational Frame Theory (RFT; Hayes, 1991). One explanation in RFT for the roots of psychological distress is the ability of language to create relational links between stimuli without direct experience, which enable more complex cognitions and potential psychological distress (Hayes et al., 2006). By increasing psychological flexibility, which is considered to be the goal of ACT (Jiménez, 2012) the influences of these distressing relational links and cognitions diminish, and the individual becomes freer to live their life as they want (French et al., 2017). Psychological flexibility is defined as the ability to fully be in touch with the present moment with consciousness and to change or continue the behaviour in accordance with valued direction (Hayes et al., 2006). ACT includes six core processes, all intended to help develop psychological flexibility (A-Tjak et al., 2015) and all needed to be present in order for an intervention to be termed ACT (French et al., 2017). Acceptance, defusion, self as context, committed actions, values and being present are the processes which are considered in psychological flexibility (Levin, Hildebrandt, Lillis & Hayes, 2012).The treatment in ACT is primarily aimed to increase the psychological flexibility and decrease the experiential avoidance in patients (A-Tjak et al., 2015). In ACT-based therapy the focus is on teaching the individuals to accept their experiences instead of changing them and to let the patient's goals and values guide the behavioural changes in the treatment process (A-Tjak et al., 2015).

A large number of studies have investigated the effects of ACT, including a study by Jiménez (2012) which show potential benefits for ACT over other treatments. Four meta-analyses have also evaluated the clinical symptom improvements of ACT. In a meta-analysis by Powers, Zum Vörde Sive Vörding, and Emmelkamp (2009), which included 18 randomized controlled trials (RCT's), it was reported that ACT outperformed all control conditions on the primary outcome measures with a power size of 0.42. However, ACT was not significantly better than other established treatments (i.e., CBT). In the meta-analysis of Ruiz (2012) which included 16 studies, the efficacy of ACT and CBT were compared on both outcome and process measures. The meta-analysis reported a significant mean effect size favouring ACT regarding the primary outcome measures (Hedges'g = 0.40). A-Tjak et al. (2015) reported that ACT is more effective than both treatments as usual (defined as the standard treatment; Hedges'g = 0.64) and placebo. However, no significant difference between ACT and other established treatments (CBT; p = 0.140) was found. A systematic review and meta-analysis of third wave therapies involving 13 studies showed medium-high effect size for ACT (Öst, 2008). There is also growing evidence, through a number of face-to-face studies, that ACT effectively reduces stress (Flaxman & Bond, 2010) and alleviates burnout symptoms (Brinkborg, Michanek, Hesser, & Berglund, 2011; Lloyd, Bond, & Flaxman, 2013). In the research field of ACT there are some methodological problems in the meta-analyses, most likely due to the fact that ACT is a relatively new treatment method (A-Tjak et al., 2015). The research method used in ACT is considerably less stringent than in traditional CBT research (Öst, 2008). RFT, on the other hand, which is one of the two foundations of ACT, is the most researched basic behavioral analytic theory of human behavior and empirical studies have shown that several of the ACT components are connected conceptually to RFT (Hayes, Louma, Bond, Masuda, & Lillis, 2006). However, the mediating processes in ACT are not yet scientifically established (Curtiss & Klemanski, 2014; Hofer et

al, 2018). In a study by Gloster, Meyer, and Lieb (2017) they conclude that psychological flexibility moderates the relationship between daily stress and physical health, mental health and well-being following a dose-response, meaning higher levels being more protective. Levin et al. (2012) describe in their meta-analysis significant positive effect sizes for acceptance, defusion, values, present moment and mixed mindfulness components compared to inactive control conditions which suggest the mentioned components to be psychologically active and operating in the treatment. Some research has been done on underlying mechanisms mediating the effects of ACT-based interventions. Psychological flexibility has been shown to mediate the effects of ACT interventions for participants with mild to moderate depression and anxiety (Fledderus, Bohlmeijer, Fox, Schreurs, & Spinhoven, 2013) and an ACT-based bibliotherapy study by Muto & Hayes (2012) reported that the follow-up outcomes were statistically mediated by psychological flexibility, but not vice versa. Another study by Lloyd et al. (2013) showed that increased psychological flexibility mediated the reduction of fatigue during burnout, which in turn generates a buffer against cynicism. Further research to provide support for the ACT model is requested (Hofer et al., 2018).

In ACT, mindfulness is defined as a process, an interface for the following four processes: being present, acceptance, defusion and the self as a context (Munoz-Martinez et al., 2017). Several studies support the effectiveness of mindfulness-based interventions for a number of syndromes (including depression, mental and physical pathologies and generalized anxiety disorder) (Grossman, Niemann, Schmidt, & Walach, 2004; Teasdale et al., 2000; Wells et al., 2010). These findings indicate that "low mindfulness" may contribute to symptomatology and that the main mechanisms of mindfulness could be seen as the reason for symptom improvement (Curtiss & Klemanski, 2014).

Study Aims and Objectives

The aim of this study is to evaluate the effects of the ACT-based self-help book *Tid att leva* (Livheim, Ek, & Hedensjö, 2017) for adults with self-perceived stress, compared to the effects of no intervention (i.e. wait-list). In order to study these effects, the participants in the intervention group read a chapter in the book each week. The study is a constructive replication of a previous study conducted by Hofer et al. (2018) and aims to make a further contribution by investigating the mediating effects of two of the core processes in ACT (i.e. psychological flexibility and mindfulness).

1. Are there any differences between the intervention group and the wait-list group on any of the measures at post assessment?
2. Is the effect of the intervention mediated by psychological flexibility or mindfulness?
3. Are there any significant relationships between number of pages read, understanding of the treatment components, perceived helpfulness of the weekly assignments or the number of restorative activities and our primary outcome measure perceived levels of stress?

Our first hypothesis is that there is a significant difference between the groups on all measures, favouring the intervention group. Our second hypothesis is that psychological flexibility and mindfulness mediate the primary outcome measure perceived levels of stress. Finally, we hypothesize that number of pages read, understanding of the treatment components, perceived helpfulness of the weekly assignments and the number of restorative activities are related to the primary outcome measure perceived levels of stress.

Method

Participants

The mean age of the participants was 42 years (*SD* = 9.0). In this sample, 87% of participants were female (111 out of 123). There were no significant differences between the two groups regarding age or gender. For more detailed information regarding the sample, see Table 1.

Table 1
Demographic characteristics of the whole study sample, as well as for the two conditions separately.

		Intervention (*n* = 67)	**Wait-list (*n* = 66)**	**Total (*n* = 133)**
	Variable			
Age	Mean age (SD)	42.89 (9.09)	40.74 (8.68)	41.88 (8.93)
	Age range	24-70	27-64	24-70
Gender	Female	58 (89%)	53 (84%)	111 (86%)
	Male	7 (11%)	5 (8%)	12 (9%)
Relationship status	Single	7 (11%)	6 (10%)	13 (10%)
	Married	27 (42%)	26 (41%)	53 (41%)
	Domestic partner	24 (37%)	22 (35%)	46 (36%)
	Divorced or widowed	7 (11%)	4 (6%)	11 (9%)
Highest level of education	Upper secondary school	9 (14%)	2 (3%)	11 (9%)
	Vocational education	4 (6%)	4 (6%)	8 (6%)
	University	44 (68%)	50 (79%)	94 (73%)
	Postgraduate studies	8 (12%)	2 (3%)	10 (8%)
Occupation	Working	57 (88%)	46 (73%)	103 (80%)
	Studying	0 (0%)	7 (11%)	7 (5%)
	Other*	8 (12%)	5 (8%)	13 (10%)

*Including on parental leave, long term sick-listed/on disability pension, senior citizen or unemployed
Note. SD = Standard Deviation.

Procedure

Inclusion. Participants (*n* = 133) were recruited through several different channels; primarily the website of the book (http://www.tidattleva.se) and posts in suitable Facebook

groups. These posts either prompted the group members to visit the website of the study themselves or prompted them to forward the information to others who might benefit from participation in the study. Individuals who declared interest for participation were screened for inclusion into the study on an online platform. All participants provided informed consent prior to participation.

Inclusion criteria consisted of scoring at least 15 on the Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 1995). This value was chosen as it is considered the cut-off between normal and mild levels of perceived stress, thus ensuring that all participants have at least mild levels of perceived stress at the time of inclusion. DASS was used during the screening process only. Exclusion criteria consisted of possible depression as indicated by more than 9 points on the Patient Health Questionnaire-9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001), possible suicidal intent as indicated by more than 0 on question 9 on PHQ-9 ("Over the last 2 weeks, how often have you been bothered by thoughts that you would be better off dead or of hurting yourself in some way?"), having an established psychiatric diagnosis, or concurrent psychotherapy. Participants below 18 years of age were also excluded, as was anyone who had already read the book.

Randomization was carried out using the List Randomizer on http://www.random.org. The participant IDs were reorganized in a random order and then manually split into two groups - the intervention group, which is the active condition (n = 67) and the wait-list group, which is the control condition (n = 66). Participants in the wait-list group were informed they would receive the same intervention as the intervention group as soon as the intervention group had completed the intervention.

Intervention. The intervention group received ACT in self-help format without therapist support. Each week for a duration of ten weeks the participants read a chapter in an ACT-based self-help book and answered questionnaires as well as additional questions on an online platform. Both groups answered the same questionnaires and additional questions with the exception of questions regarding the intervention itself, which were only answered by the intervention group.

No feedback was given to the participants at any time, but automated prompts were e-mailed to participants who did not answer on time. During the beginning of the intervention participants who still did not answer after the automated prompts were contacted to determine if there were any technical issues that needed to be resolved. Participants could also send an e-mail if they had any questions during the course of the intervention. No aspects of the book were discussed during this contact.

The study was approved by the Swedish Ethical Review Authority (dnr 2018/2391-31 and 2019-007702).

Materials and Apparatus

All the information regarding the participants was collected through an online platform called BASS4. BASS4 uses a dedicated hospital server with encrypted traffic and an authentication login function to guarantee participant confidentiality.

The ACT-based self-help book *Tid Att Leva* (Livheim, Ek, & Hedensjö, 2017) consists of ten chapters. Chapter 1 focuses on psychoeducation, early signs of stress and how to schedule restorative activities. Chapter 2 focuses on physical exercise, the importance of taking short breaks, mindfulness and sleep. Chapter 3 focuses on values and introduces the concept of committed action. Chapter 4 focuses on finding a balance in life and on problem solving. Chapter 5 focuses on acceptance and the distinction between natural and unnecessary suffering. Chapter 6 focuses on the cost of avoidance and how to use acceptance and mindfulness to deal with obstacles. Chapter 7 focuses on communication, using I-messages, how to say no and how to ask for help. Chapter 8 focuses on how to be mindful in everyday

life. Chapter 9 focuses on self-compassion. Chapter 10 discusses values, goals, milestones and the importance of everyday actions. In every chapter, the reader is encouraged to regularly engage in physical exercise. Each chapter also includes an assignment that relates to the topic of that chapter.

Questionnaires

All measures were assessed on the online platform. While most information on reliability and validity have been collected using paper-and-pencil versions of these questionnaires, using questionnaires over the internet does not seem to change their psychometric properties (Hedman et al., 2010).

Primary outcome.

Perceived Stress Scale-14. The primary outcome was perceived levels of stress and was assessed with Perceived Stress Scale-14 (PSS-14; Cohen, Kamarck, & Mermelstein, 1983). PSS-14 consists of 14 items that are rated on a 5-point Likert scale resulting in scores that range between 0 and 56. Lower scores indicate lower levels of perceived stress. PSS-14 has shown adequate reliability and validity (Cohen, Kamarck, & Mermelstein, 1983).

Secondary outcomes.

Brunnsviken Brief Quality of Life Inventory. To assess quality of life the Brunnsviken Brief Quality of Life Inventory (BBQ; Lindner et al., 2016) was used. It consists of 12 items that are rated on a 5-point Likert scale resulting in scores that range between 0 and 96. Higher scores indicate a better quality of life. BBQ has a Cronbach's alpha of .68 and a test-retest reliability of .89 (Frykheden, 2014).

General Anxiety Disorder-7. To assess worry and anxiety the General Anxiety Disorder-7 (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006) was used. It consists of 7 items that are rated on a 4-point Likert scale resulting in scores that range between 0 and 21. Lower scores indicate lower levels of worry and anxiety. GAD-7 has a Cronbach's alpha of .92 and a test-retest reliability of .83 (Spitzer, Kroenke, Williams, & Löwe, 2006).

Patient Health Questionnaire-9. To assess depressive symptoms and suicidal intent the Patient Health Questionnaire-9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001) was used. It consists of 9 items that are rated on a 4-point Likert scale resulting in scores that range between 0 and 27. Lower scores indicate lower levels of depressive symptoms. PHQ-9 has a Cronbach's alpha of .86-.89 and a test-retest reliability of .84 (Kroenke, Spitzer, & Williams, 2001).

Shirom-Melamed Burnout Measure. To assess work engagement and burnout symptoms the Shirom-Melamed Burnout Measure (SMBM; Shirom & Melamed, 2006) was used. It consists of 14 items and three subscales: emotional exhaustion, physical fatigue, and cognitive weariness. The items are rated on a 5-point Likert scale resulting in scores that range between 3 and 15. Higher scores indicate higher levels of work engagement and lower levels of burnout symptoms. SMBM has a Cronbach's alpha of .92 and was found to have a test-retest reliability of .52 in a 3- to 5-year follow-up study (Shirom & Melamed, 2006).

Two measures for specific processes assumed to be active in ACT were also included; psychological flexibility and mindfulness.

Acceptance and Action Questionnaire-II. Psychological flexibility was assessed with the Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011). 7 items are rated on a 7-point Likert scale resulting in scores that range between 7 and 49. Lower scores indicate higher levels of psychological flexibility. A Swedish 6-item version of AAQ-II (SAAQ; Lundgren & Parling, 2017) has shown good internal consistency (Cronbach's alpha = .85-.87) and test-retest reliability (r = .80).

Mindful Attention Awareness Scale. Mindfulness was assessed with the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003). 15 items are rated on a 6-point

Likert scale. The score is computed by the mean of these items and ranges between 1 and 6. Higher scores indicate higher levels of mindfulness. MAAS has shown good psychometric properties (Black, Sussman, Johnson, & Milam, 2012; Brown & Ryan, 2003).

Other measures.

Client Satisfaction Questionnaire-8. To measure the participants' satisfaction with the intervention the Client Satisfaction Questionnaire-8 (CSQ-8; Attkisson & Zwick, 1982) was used. It consists of 8 items that are rated on a 4-point Likert scale. The score ranges between 8 and 32. Higher scores indicate higher satisfaction. CSQ-8 is a shorter version of CSQ-18 (Larsen, Attkisson, Hargreaves, & Nguyen, 1979). It has a Cronbach's alpha of .93. Overall it has similar or sometimes even better psychometric properties compared to the original 18-item version (Attkisson & Zwick, 1982).

Credibility/Expectancy Questionnaire. To measure the perceived credibility of the intervention as well as expectations, the Credibility/Expectancy Questionnaire (CEQ; Devilly & Borkovec, 2000) was used. As the name suggests, the scale has two subscales; credibility and expectancy. It consists of 6 items that are rated either on a 9-point Likert scale (0-8) or an 11-point Likert scale (0-100%). The individual items are first standardized and then summed up in each subscale. Higher scores indicate a better outcome. It has a standardized alpha of .84-.85. Test-retest reliability is .82 for expectancy and .75 for credibility (Devilly & Borkovec, 2000).

Negative Effects Questionnaire. To identify iatrogenic events the Negative Effects Questionnaire (NEQ; Rozental, Kottorp, Boettcher, Andersson, & Carlbring, 2016) was used. It consists of 32 items that are rated on a 5-point Likert scale. The score ranges between 0 and 128. Lower scores indicate a better outcome, i.e. fewer negative effects from the intervention. It has a Cronbach's alpha of .95, but there is no available data regarding test-retest reliability yet (Rozental, Kottorp, Boettcher, Andersson, & Carlbring, 2016).

Additional questions. Demographic data regarding age, gender, relationship status, education and occupation was collected during the beginning of the intervention. All participants were asked to answer the following question each week as one of the measures of adherence for the intervention group:

- How many restorative activities have you done during the week? Restorative activities are defined as activities that promote recovery, relaxation and energy, such as playing a musical instrument, watching a movie, or going for a walk.

Participants in the intervention group were also asked to do a comprehension quiz with questions about the contents of the week's chapter, and to answer two more questions regarding the intervention itself:

- How many pages have you read during the week?
- How helpful did you find this week's assignment? Specify on a scale from 1 to 10 where 1 means "Not helpful at all" and 10 means "Very helpful".

Data Reductions and Statistical Analyses

All data analyses were conducted using Statistical Package for the Social Sciences (SPSS) for Macintosh, version 25. The alpha level for statistical significance was set at .05. Power analyses indicated that 128 participants would be sufficient to obtain a power of .80 across analyses, assuming an alpha level of .05 (Cohen, 1988).

Chi-square tests and *t*-tests were used to examine whether there were any statistically significant differences between the intervention group and the wait-list group regarding age or gender at baseline. *T*-tests were also used to check for statistically significant differences on any of the measures between the groups at baseline. A two-way repeated measures ANOVA was used to assess whether the primary outcome measure, PSS-14 (i.e. perceived levels of stress), would develop differently for the two groups from baseline to post assessment

(within-subject factor; time, two levels: baseline and post assessment, between-subject factor; condition, two levels: intervention group and wait-list group). The same analysis was used to assess the secondary outcome measures; SMBM (i.e. work engagement and burnout symptoms), PHQ-9 (i.e. depressive symptoms and suicidal intent), BBQ (i.e. quality of life) and GAD-7 (i.e. worry and anxiety) as well as the mediators; AAQ-2 (i.e. psychological flexibility) and MAAS (i.e. mindfulness).

For the mediation analyses, the SPSS add-on *PROCESS macro* using bootstrapping was used (Hayes, 2013; Preacher & Hayes, 2004). The statistical significance of the mediators was estimated by calculating bias-corrected 95% confidence intervals around mean-centered OLS regression coefficients by bootstrapping. The change in the primary outcome measure from baseline to post assessment was used as the dependent variable. Early change in the mediators was obtained across different time spans early in the intervention: from baseline to week three, from baseline to week five, and from week three to week five.

Finally, correlation analyses were used to assess the relationship between the adherence and change in the primary outcome measure PSS-14 (i.e. perceived levels of stress).

Results

Attrition

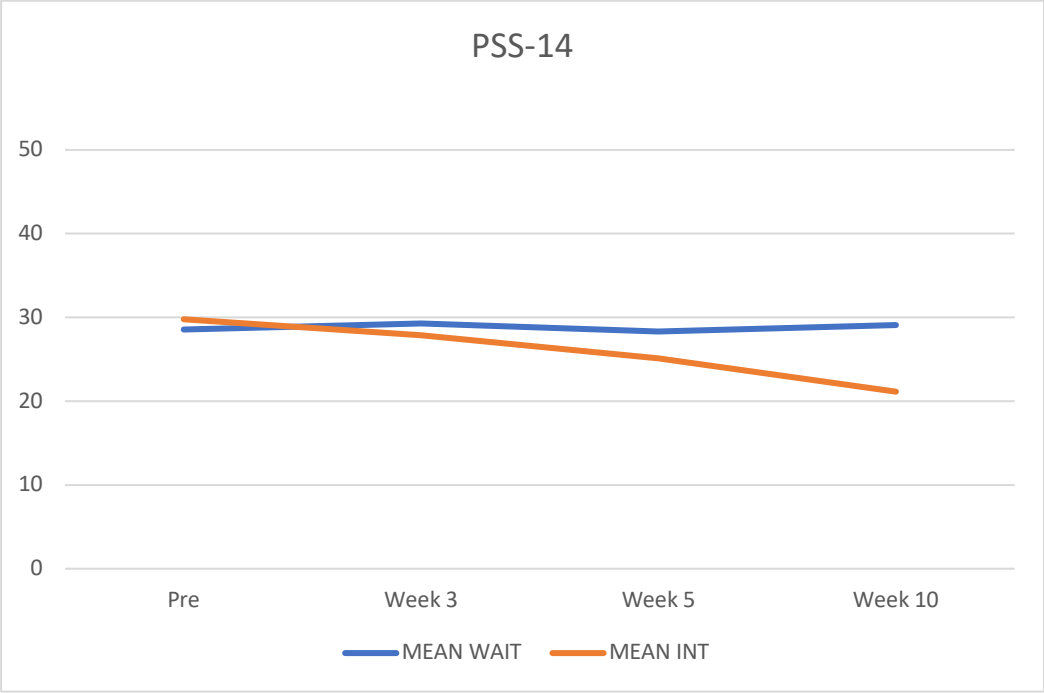
Dropout occurred when a participant actively reported that they did not wish to continue or failed to complete the assessments. Among the 133 participants, 5.3% (n = 7) actively reported that they did not wish to continue; 3% (n = 4) dropped out of the intervention group and 2.3% (n = 3) dropped out of the wait-list group. At the time of data extraction 48.9% (n = 65) of the participants who completed the baseline assessment had not completed the post assessment. However, the participants who answered the post assessment did not differ from the participants who had dropped out or those who had not answered the post assessment at the time of data extraction on any of the baseline measures.

Intervention Effects

To investigate the first hypothesis, whether or not there were any statistically significant differences between the intervention group and the wait-list group on any of the outcome measures at post assessment, the two groups were compared. At baseline there were no statistically significant differences between the groups for any of the following outcome measures: PSS-14, BBQ, GAD-7, PHQ-9 or SMBM.

Primary outcome measure: PSS-14. There were statistically significant main effects of time ($F(1, 56) = 11{,}95$, $p = .001$, ${}_p\eta^2 = .18$) and condition ($F(1, 56) = 9{,}55$, $p = .003$, ${}_p\eta^2 = .146$). There was also a statistically significant interaction between time and condition ($F(1, 56) = 11{,}74$ $p = .001$ ${}_p\eta^2 = .17$), indicating a difference in the development of perceived levels of stress between the groups from baseline to post assessment. See Figure 1 for a graphic representation. The means and standard deviations at baseline and post assessment are displayed in Table 2.

Figure 1
Outcome data on PSS-14 at baseline (pre), week 3, week 5 and post assessment (week 10).



Note. PSS-14 = Perceived Stress Scale-14. WAIT = Wait-list group. INT = Intervention.

Secondary outcome measures: BBQ, GAD-7, PHQ-9 and SMBM. The secondary outcome measures assessed quality of life, worry and anxiety, depressive symptoms and suicidal intent, and work engagement and burnout symptoms. The intervention group improved significantly more than the wait-list group on all secondary outcome measures except for BBQ and one of the subscales of SMBM, namely emotional exhaustion. The means and standard deviations of each outcome measure at baseline and post assessment are displayed in Table 2. The statistical test of the effects with regards to the secondary outcome measures are presented in Table 3.

Table 2
Outcome data at baseline (pre) and post assessment (post) for the two conditions separately.

Outcome measure	**Wait-list**		**Intervention**	
	Pre Mean (SD)	**Post Mean (SD)**	**Pre Mean (SD)**	**Post Mean (SD)**
PSS-14	28.55 (6.38)	29.06 (6.96)	29.78 (7.19)	21.14 (6.37)
BBQ	48.50 (13.84)	49.50 (15.91)	51.14 (17.29)	58.14 (19.41)
GAD-7	7.31 (3.61)	7.42 (4.44)	7.36 (3.34)	4.14 (3.24)
PHQ-9	7.44 (3.53)	6.92 (4.54)	7.59 (4.31)	4.64 (3.57)
SMBM-1	3.05 (0.89)	2.84 (0.94)	2.98 (0.85)	3.61 (0.86)
SMBM-2	2.84 (0.59)	2.89 (0.89)	3.02 (0.47)	3.66 (0.92)
SMBM-3	3.13 (1.03)	3.03 (1.08)	3.56 (1.17)	3.95 (1.01)

Note. SD = Standard Deviation. PSS-14 = Perceived Stress Scale-14. BBQ = Brunnsviken Brief Quality of Life. GAD-7 = General Anxiety Disorder-7. PHQ-9 = Patient Health Questionnaire-9. SMBM-1 = Shirom-Melamed Burnout Measure, subscale physical fatigue. SMBM-2 = Shirom-Melamed Burnout Measure, subscale cognitive weariness. SMBM-3 = Shirom-Melamed Burnout Measure, subscale emotional exhaustion.

Table 3
Outcome data on the effects of time, group and interaction.

Outcome measure	Time effect Pre vs post		Group effect Wait-list vs Intervention		Interaction effect Time X Group	
	F(1, 56)	**$_p\eta^2$**	**F(1, 56)**	**$_p\eta^2$**	**F(1, 56)**	**$_p\eta^2$**
BBQ	5.13*	0.08	1.95	0.03	2.89	0.05
GAD-7	8.78*	0.14	3.36	0.06	10.08*	0.15
PHQ-9	11.15*	0.17	1.24	0.02	5.41*	0.09
SMBM-1	4.10*	0.07	2.55	0.04	17.11*	0.23
SMBM-2	12.50*	0.18	7.23*	0.11	9.48*	0.15
SMBM-3	1.26	0.02	6.86*	0.11	3.64	0.06

* = $p < 0.05$
Note. BBQ = Brunnsviken Brief Quality of Life. GAD-7 = General Anxiety Disorder-7. PHQ-9 = Patient Health Questionnaire-9. SMBM-1 = Shirom-Melamed Burnout Measure, subscale physical fatigue. SMBM-2 = Shirom-Melamed Burnout Measure, subscale cognitive weariness. SMBM-3 = Shirom-Melamed Burnout Measure, subscale emotional exhaustion.

Mediation

Mediation analyses were used to investigate the second hypothesis, whether or not the changes in PSS-14 (i.e. perceived levels of stress) were mediated by psychological flexibility (as measured with AAQ-2) or mindfulness (as measured with MAAS). For the mediation analyses to be significant the bootstrapped 95% confidence intervals should not contain zero. Changes in PSS-14 were not mediated by either psychological flexibility or mindfulness, as can be seen in Table 4.

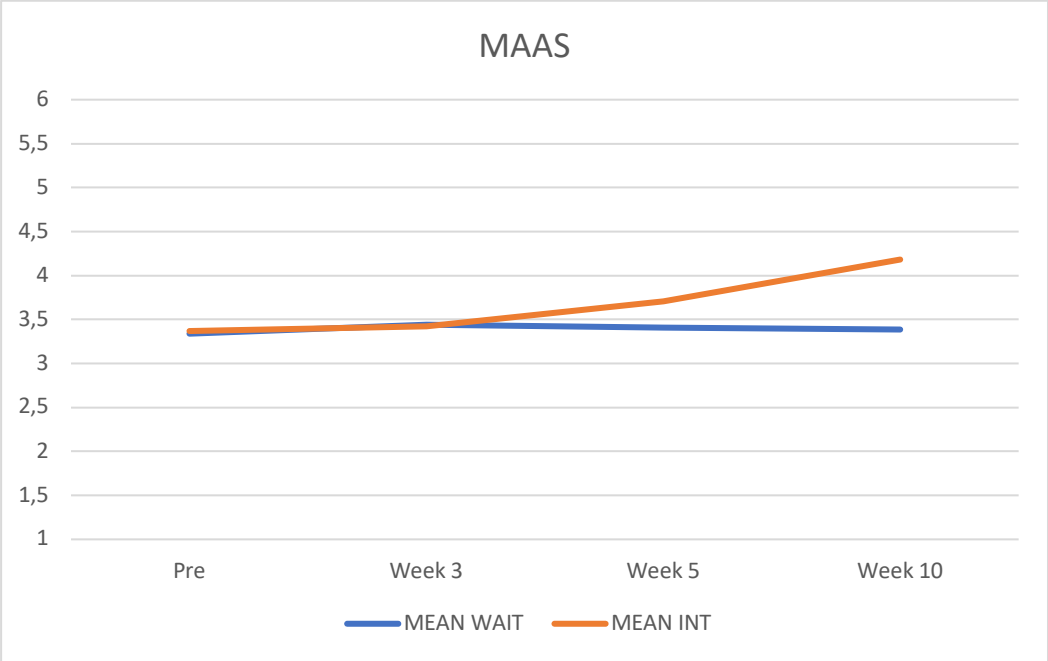
Although early change in mindfulness did not statistically mediate the outcome, mindfulness per se had changed across time. There were statistically significant main effects of time (F(1, 56) = 23,479, $p < .001$, $_p\eta^2 = .30$) and condition (F(1, 56) = 7,22, $p = .009$, $_p\eta^2 = .22$) for mindfulness from baseline to post assessment. There was also a statistically significant interaction between time and condition (F(1, 56) = 18,07 $p = .003$, $_p\eta^2 = .24$), indicating a difference in the development of mindfulness between the groups from baseline to post assessment. See Figure 2 for a graphic representation.

Table 4
Outcome data on the mediation of changes in psychological flexibility and changes in mindfulness on changes in PSS-14, i.e. perceived levels of stress.

Mediator	Pre-Week 3 Indirect effects		Pre-Week 5 Indirect effects		Week 3-Week 5 Indirect effects	
	BootLLCI	**BootULCI**	**BootLLCI**	**BootULCI**	**BootLLCI**	**BootULCI**
AAQ-2	-0.60	0.42	-0.78	0.44	-1.23	0.37
MAAS	-0.56	1.35	-0.63	2.76	-2.46	1.56

Note. AAQ-2 = Acceptance and Action Questionnaire-2, i.e. psychological flexibility. MAAS = Mindful Attention Awareness Scale, i.e. mindfulness.

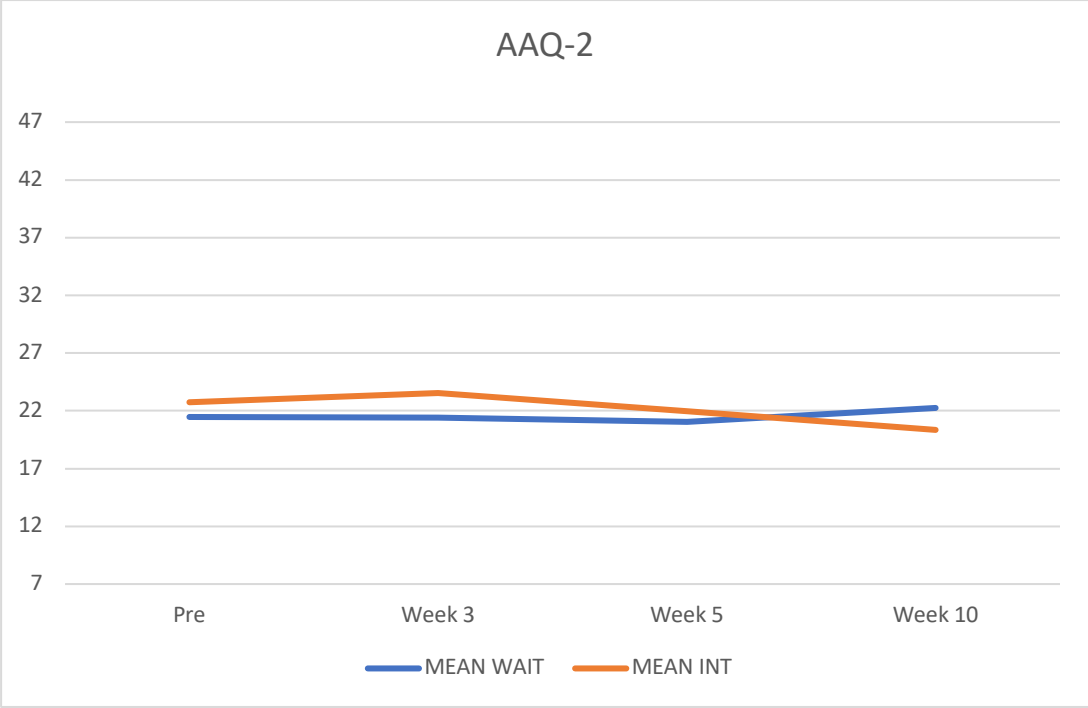
Figure 2
Outcome data on MAAS at baseline (pre), week 3, week 5 and post assessment (week 10).



Note. MAAS = Mindful Attention Awareness Scale. WAIT = Wait-list group. INT = Intervention.

For psychological flexibility there were no main effects of either time or condition from baseline to post assessment. There was, however, a statistically significant interaction between time and condition ($F(1, 57) = 6.31$, $p = .02$, ${}_{p}\eta^2 = .10$), indicating a difference in the development of psychological flexibility between the groups from baseline to post assessment. See Figure 3 for a graphic representation.

Figure 3
Outcome data on AAQ-2 at baseline (pre), week 3, week 5 and post assessment (week 10).



Note. AAQ-2 = Acceptance and Action Questionnaire-2. WAIT = Wait-list group. INT = Intervention.

At baseline there were no statistically significant differences between the groups for either AAQ-2 or MAAS.

Adherence and Outcome

Correlation analyses were made to investigate the third hypothesis, whether or not there was a statistically significant correlation between PSS-14 (i.e. perceived levels of stress) and any of the following variables, indicating adherence to the intervention protocol: the number of pages read, understanding of the treatment components, the perceived helpfulness of the weekly assignments and the number of restorative activities. The number of pages read in the book ($r = 0.42$, $p = 0.05$), understanding of the treatment components as measured with the number of correct answers on the comprehension quizzes ($r = 0.02$, $p = 0.95$), or the number of restorative activities ($r = 0.12$, $p = 0.60$) did not correlate with change in the PSS-14 from baseline to post assessment. How helpful the participants perceived the weekly assignments to be, however, correlated with change in PSS-14 ($r = 0.62$, $p = 0.002$). The more helpful the participants perceived the assignments to be, the bigger the reduction in PSS-14 from baseline to post assessment.

The Participants' Perspective

Three outcome measures were used to assess the participants' perspective on the intervention: credibility and expectancy beforehand as well as client satisfaction and negative effects afterwards. These results are presented in Table 5.

Table 5

Outcome data on the participants expectations on the intervention, satisfaction with the intervention and negative effects from the intervention.

Outcome measure	Minimum	Maximum	Mean (SD)
CEQ-1[1]	-8.63	7.20	0.00 (3.22)
CEQ-2[1]	-4.45	4.41	0.00 (1.89)
CSQ	10	32	24.27 (5.68)
NEQ	6	85	17.09 (18.44)

[1] Standardized values that have been summed up for each subscale.

Note. SD = Standard Deviation. CEQ-1 = Credibility/Expectancy Questionnaire, subscale credibility. CEQ-2 = Credibility/Expectancy Questionnaire, subscale expectancy. CSQ = Client Satisfaction Questionnaire. NEQ = Negative Effects Questionnaire.

As shown in Table 5, participants had positive expectations about the intervention, and they reported good satisfaction (CSQ range is 8-32). The majority of the participants reported very few negative events (NEQ range is 0-128).

Discussion

Results

This study is a constructive replication of Hofer et al. (2018) who examined the effectiveness of an ACT-based self-help intervention without therapist support for perceived stress. Our definition of self-help without therapist support is based on French et al. (2017), meaning no therapist contact except for clarifying or complementary information regarding assessment and onset of the intervention. In our study we found a large interaction effect on the primary outcome measure (i.e., perceived levels of stress: ${}_p\eta^2 = .17$), as well as on the

secondary outcome measures worry and anxiety ($_p\eta^2$ = .15), symptoms of physical fatigue ($_p\eta^2$ = .23) and cognitive weariness ($_p\eta^2$ = .15) in burnout and a medium effect size on depressive symptoms and suicidal intent ($_p\eta^2$ = .09). These results are in line with those of Hofer et al. (2018).

In Hofer et al. (2018) psychological flexibility improved significantly more in the intervention group than in the wait-list group. Our results reflect this finding in terms of a significant and medium sized interaction effect ($_p\eta^2$ = .10), favouring the intervention group. Hofer et al. (2018) found a small effect size for some mindfulness skills as measured with Kentucky Inventory of Mindfulness Skills (Ströhle, Nachtigall, Michalak, & Heidenreich, 2010; *describing*: d = 0.2, *acting with awareness*: d = 0.4) and no differences for the other mindfulness skills (*observing*: d = 0.1, *accepting without judging*: d = 0.2), whereas we found a significant and large effect size as measured with MAAS ($_p\eta^2$ = .24). This indicates a difference in the development of mindfulness between the groups from baseline to post assessment in our study.

We did not find a significant interaction for early change in psychological flexibility, no significant correlations between early change in psychological flexibility (from baseline to week three, from baseline to week five, or from week three to week five) or change in the primary outcome measure, which contradicts some of the results in French et al. (2017). Their results indicated that larger effects for distress (i.e. higher levels of distress) were negatively associated with lower levels of psychological flexibility. Another study reported that improved psychological flexibility mediated the effects of the ACT intervention and that especially the last three sessions of their nine week long intervention were important for the reductions (Fledderus, Bohlmeijer, Fox, Schreurs, & Spinhoven, 2013). In our study we used a more conservative method for the mediating analyses (meaning that we only analyzed the first five weeks of the intervention) which may have contributed to the divergent results. There are also a number of other factors that may have led to the divergent results; the scientific uncertainty of the underlying processes in the construct of psychological flexibility (Curtiss & Klemanski, 2014), the focus of targets in the examined ACT-based self-help book and the specificity of the instruments used to measure psychological flexibility.

Focus of the book during the first five weeks was: 1) psychoeducation, early signs of stress and how to schedule restorative activities, 2) physical exercise, the importance of taking short breaks, mindfulness and sleep, 3) values and the concept of committed action, 4) finding a balance in life and problem solving and 5) acceptance and the distinction between natural and unnecessary suffering. Our view is that the contents of these chapters may focus more on mindfulness than on psychological flexibility, regarding e.g. the daily exercises suggested to the participants. This could be part of the explanation for the major effects on mindfulness that we found at post assessment. It is also well known that physical exercise, better sleep quality and problem solving have positive effects on stress, which may make it more difficult to find mediating effects of mindfulness and psychological flexibility, if there are any to be found. AAQ-2, the instrument we used to measure psychological flexibility, was developed to assess the construct of psychological flexibility, acceptance and experiential avoidance (Bond et al., 2011) and this broad focus may also have affected the results on psychological flexibility in our study.

In a study by Lloyd et al. (2013) it was shown that psychological flexibility mediated a reduction in emotional exhaustion. The results of our study was not in line with this; the decrease in emotional exhaustion was not significant, and neither was the increase in psychological flexibility as already mentioned. This may be due to several factors, such as the use of different measures for burnout or the different way of delivering the intervention (face-to-face vs self-help). According to French et al. (2017) some form of therapist guidance improves the outcomes for ACT-based self-help interventions, but these results contradict

Gould & Clum (1993) who found no differences between self-administered or predominantly self-administered materials. French et al. (2017) also mention that there is no existing literature directly comparing self-administered to predominantly self-help material within ACT-based interventions.

The large effect sizes for most of our outcomes may be due to the fact that we did not use an active control group. Gould & Clum (1993) report that studies that used placebo as a control group had lower mean effect sizes compared to studies utilizing a non-treatment control. Another problem which makes it difficult to interpret our results is the dropout, which supports the statement of Andersson et al. (2006) that the most significant limitation of self-help is the low level of follow-through. Due to time constraints, we had to extract the data at the beginning of the week following the end of the intervention. As the participants have a full week to answer the questionnaires, this means that we have only extracted data from the individuals who had the time to answer the questionnaires during the first two days, and as a consequence we have fewer answers than what can be expected in total. The answers we do have may be from the participants who were the most motivated and who have been keeping up with the reading assignments, which has to be taken into account when interpreting the results. We have also noted that some of the participants must have misunderstood some of the questions, for example how many pages they have read during the week. This makes the results even harder to interpret.

Limitations

A number of limitations have been identified regarding this study. Some of them are pure weaknesses, and some of them can be seen as a strength or a weakness depending on perspective. For example, our sample consisted almost entirely of women; approximately 90% of the participants. This makes it difficult to generalize the results to the entire population. However, it can also be argued that women tend to be more stressed than men (Cohen & Williamson, 1988) and that stress-related mental illnesses are diagnosed more frequently in women than in men (Försäkringskassan, 2016) thus making the results even more relevant as this is a group in need of an affordable and accessible treatment to alleviate these symptoms.

While the gender distribution in this sample is not necessarily a weakness, other characteristics of the sample may be more troublesome. Particularly the level of education, as approximately 81% of the sample have studied at the university. This makes it difficult to generalize the result to a more representative population and highlights the need for future studies where this weakness is addressed. It is possible the recruitment process would have to target less educated individuals specifically in order to achieve a more representative sample, as it is not unlikely that self-help interventions attract well educated individuals as these individuals are used to work with written material from their years at the university. Far from everyone is comfortable working with written material, not only due to level of education but also factors such as learning style and proficiency in the language the material is written in.

Other limitations are related to the study design per se. While the participants were prompted to answer the questionnaires and this added some structure and might be motivating to some individuals, other individuals were affected negatively by this as they felt some distress by the constant reminders to log on to the platform. While these prompts were necessary for testing some of our hypotheses in this study, future studies might limit data collection to baseline and post assessment. This would make it possible to assess the possible effects these prompts may have on the results. It would also make the results more generalizable as individuals who participate in a self-help intervention like this at home will not receive any prompts during this process.

While the study design with regular prompts and questionnaires did provide some added structure, this structure sometimes had the opposite effect as some participants became confused as to what chapter they were supposed to be reading. There were also a lot of confusion regarding user names and passwords in the beginning of the study and some participants did not understand how to get to the next questionnaire after having filled out the first one.

Some individuals, particularly in the intervention group, found it taxing and demoralizing to answer so many questionnaires. In future studies it might be beneficial to reduce the number of questionnaires. Some individuals were especially frustrated by this as they had misunderstood the study design and thought they would have contact with a therapist or at least receive feedback. While the study information did include this information, it could have been highlighted to minimize the risk for misunderstanding and disappointment.

There are also some limitations regarding the delivery format of the intervention and the focus of targets in this particular book. Firstly, the act of sitting down to read a book may alleviate stress in itself, regardless of the topic of that book. As the participants in the wait-list group were not instructed to read, we cannot know how much of the effects may be attributed to this simple act alone. Secondly, the specific book used in this intervention also introduces a number of different components thought to alleviate stress in addition to the specific ACT components. For example, the first two chapters in the book addresses (among other things) restorative activities, physical exercise, the importance of taking short breaks and sleep. We cannot know for certain whether these components may explain our results better than the specific ACT components do.

Strengths

While a number of studies have examined the effects of ACT-based self-help interventions without therapist support in other countries, this is one of the first studies to examine this in a Swedish context. This is important for a number of reasons. More evidence is needed to support the development of ACT-based self-help interventions without therapist support. A lot of people could potentially benefit from ACT-based treatment, but the availability is limited due to the number of therapists. If ACT-based self-help interventions without therapist support can be shown to be of similar effect as traditional ACT treatment they could be made available to a lot more people, in particular people living in more remote or less populated regions who do not have access to a therapist. Also, people who suffer from stress or stress-related mental illness put a lot of effort in to follow the programs described in these self-help interventions even though their effectiveness is still unclear. Hopefully the present study can add some insight into the effectiveness of ACT-based self-help interventions without therapist support.

As the National Board of Health and Welfare (Socialstyrelsen, 2003) have speculated that the evidence for psychological treatment for stress-related mental illness is contradictory due to the heterogeneity of the samples, this study may be of interest since the sample is relatively homogenous, especially regarding one of the variables the National Board of Health and Welfare points out, namely work status. Approximately 85% of the participants in this study are working or studying, and very few are long term sick-listed or on a disability pension. Participants with other psychiatric conditions were excluded during the screening process, further contributing to the homogeneity of the sample. As has already been mentioned, the gender distribution and level of education make this sample even more homogenous. Future studies could potentially target specific groups in order to assess the effectiveness of ACT-based self-help interventions without therapist support for people with more severe stress-related mental illness, such as fatigue syndrome and fatigue depression, as well as comorbid conditions.

Lastly, this study is a randomized controlled trial comparing the active condition with a control condition. This is the best way to examine the effects of any intervention. In future studies it would be beneficial to explore the possibility to include an active control condition instead of a passive control condition such as a wait-list group, as we did in this study.

Future Studies

A number of suggestions for future studies have already been mentioned throughout this discussion. Further research is needed to examine the effectiveness of ACT-based self-help interventions without therapist support as the evidence is still limited. More specifically, we would like to see studies that focus on either more representative samples, namely regarding gender and education, or studies that focus on more specific samples, for example participants with fatigue syndrome or fatigue depression. It would also be beneficial to include an active control condition instead of a passive control condition, and to make the study condition as similar to the real-life experience as possible, for example by minimizing the data collection to baseline and post assessment. As the book used in this study is also available as an audio book, it would also be of interest to do another study similar to this one in order to compare the results. This might make it easier for individuals with a different learning style or reading disabilities to benefit from the material. It is also possible that individuals with higher levels of perceived stress would find it easier to concentrate while listening to the material rather than reading it.

While psychological flexibility and mindfulness are considered to be important processes in ACT, their role in mediating the effects of the treatment remains unclear. Research has been done on both psychological flexibility and mindfulness and their potential mediating effects on diverse psychological pathologies, but the results are diverse and heterogeneous. In search for a better understanding of the underlying processes in ACT future studies may examine not only the potential mediating effects of these variables but also their potential moderating effects. A mediator mediates the relationship between the independent and dependent variables and explains the reason for such a relationship to exist. Moderation is a way of examining whether a third variable influences the strength or direction of the relationship between an independent and dependent variable, in contrast to mediation where the third variable explains this relationship. We believe that a bigger focus on the moderating effects of psychological flexibility and mindfulness in future studies may be helpful and perhaps lead to a better and increased understanding of the core processes in ACT.

Other complicating factors in the research of ACT that needs to be further studied are how the processes of psychological flexibility and mindfulness relate to each other and what we are actually measuring with the instruments developed to assess them. If mindfulness really does represent an interface for four of the six core processes in psychological flexibility, then what separates mindfulness from psychological flexibility is the remaining two core processes: committed action and values. We suggest future studies focus on clarifying the relationship between these processes, as well as the properties of the instruments used to assess them.

Summary

The use of self-help interventions without therapist support is a promising method as it is cost effective and would enable more people to gain access to psychological treatment. As self-help material can be produced in written form as well as in for example audio format it can be made to suit almost everyone. It is important to keep exploring this area and to study the effectiveness of these interventions to ensure they are as helpful as possible to the people who spend so much time and effort to follow them. If they can be proven to be effective, they should be made readily available.

Ethical Considerations

In the informed consent all participants signed prior to participation the participants were informed that participation is voluntary, that the collected data will not be shared with third parties, that data is handled under confidentiality and that no unauthorized persons will have access to the data. Participants were also informed that they could cancel their participation at any time without having to state any explanation. Signed consent was obtained electronically via the secure online platform and logged in a server. All data was anonymized, and the code key was stored locked away in a location separately from the encoded data. Data was compiled at group level and reported in an unidentified form. Personal data was processed according to the EU Data Protection Regulation (GDPR). The risks of physical or psychological side effects of this study were expected to be minor as it was a self-help intervention and the participants had full control over their participation. Participants with more severe psychiatric problems in the form of depression, suicidal thoughts, established psychiatric diagnoses or ongoing psychotherapeutic treatment were excluded during the screening process. While the exclusion of these individuals may raise some ethical concerns, all individuals received a personal e-mail detailing the exact reason for their exclusion and information on where to turn for help if needed. It is possible that the reading assignments and the weekly assessments may have caused some of the participants additional stress. However, at the beginning of the study all participants received information on what to do if they experienced a deterioration in well-being during the course of the intervention.

It should also be noted that the co-supervisor, Fredrik Livheim, is one of the authors of the book used in this study. He funded the application to the Swedish Ethical Review Authority as well as the books used in the intervention. However, he was not involved in either randomization, statistical analyses or the interpretation of results.

Reference List

Almén, N. (2007). *Stress och utmattningsproblem*. Lund: Studentlitteratur.

Andersson, G., Carlbring, P., Holmström, A., Sparthan, E., Furmark, T., Nilsson-Ihrfelt, E., … Ekselius, L. (2006). Internet-based self-help with therapist feedback and in vivo group exposure for social phobia: A randomized controlled trial. *Journal of Consulting and Clinical Psychology, 74*, 677–686. doi:10.1037/0022-006X.74.4.677

A-Tjak, J. G., Davis, M. L., Morina, N., Powers, M. B., Smits, J. A., & Emmelkamp, P. M. (2015). A meta-analysis of the efficacy of acceptance and commitment therapy for clinically relevant mental and physical health problems. *Psychotherapy and Psychosomatics*, *84*, 30–36. doi:10.1159/000365764

Attkisson, C. C., & Zwick, R. (1982). The client satisfaction questionnaire. *Evaluation and Program Planning*, *5*, 233–237. doi:10.1016/0149-7189(82)90074-X

Black, D. S., Sussman, S., Johnson, C. A., & Milam, J. (2012). Psychometric assessment of the mindful attention awareness scale (MAAS) among Chinese adolescents. *Assessment, 19*, 42–52. doi:10.1177/1073191111415365

Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K., … Zettle, R. D. (2011). Preliminary psychometric properties of the acceptance and action questionnaire–II: A revised measure of psychological inflexibility and experiential avoidance. *Behavior Therapy*, *42*, 676–688. doi:10.1016/j.beth.2011.03.007

Brinkborg, H., Michanek, J., Hesser, H., & Berglund, G. (2011). Acceptance and commitment therapy for the treatment of stress among social workers: A randomized controlled trial. *Behaviour Research and Therapy*, *49*, 389–398. doi:10.1016/j.brat.2011.03.009

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, *84*, 822–848. doi:10.1037/0022-3514.84.4.822

Busch H., Bonnevier H., Hagberg J., Lohela Karlsson M., Bodin L., Norlund A., & Jensen, I. (2011). *En nationell utvärdering av rehabiliteringsgarantins effekter på sjukfrånvaro och hälsa. Slutrapport, del I.* Stockholm: Karolinska Institutet.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, *24*, 385–396. doi:10.2307/2136404

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the U.S. In S. Spacapam, & S. Oskamp (Eds.), *The social psychology of health: Claremont symposium on applied social psychology*. Newbury Park, CA: Sage.

Curtiss, J., & Klemanski, D. H. (2014). Teasing apart low mindfulness: Differentiating deficits in mindfulness and in psychological flexibility in predicting symptoms of generalized anxiety disorder and depression. *Journal of Affective Disorders, 166*, 41-47. doi:10.1016/j.jad.2014.04.062

Devilly, G. J., & Borkovec, T. D. (2000). Psychometric properties of the credibility/expectancy questionnaire. *Journal of Behavior Therapy and Experimental Psychiatry*, *31*, 73–86. doi:10.1016/S0005-7916(00)00012-4

Ekman, R., & Arnetz, B. (2013). *Stress: Gen, individ, samhälle*. Stockholm: Liber.

Flaxman, P. E., & Bond, F. W. (2010). A randomised worksite comparison of acceptance and commitment therapy and stress inoculation training. *Behaviour Research and Therapy*, *48*, 816–820. doi:10.1016/j.brat.2010.05.004

Fledderus, M., Bohlmeijer, E. T., Fox, J-P., Schreurs, K. M.G., & Spinhoven, P. (2013). The role of psychological flexibility in a self-help acceptance and commitment therapy intervention for psychological distress in a randomized controlled trial. *Behaviour Research and Therapy*, *51*, 142-151. doi:10.1016/j.brat.2012.11.007

French, K., Golijani-Moghaddam, N., & Schröder, T. (2017). What is the evidence for the efficacy of self-help acceptance and commitment therapy? A systematic review and meta-analysis. *Journal of Contextual Behavioral Science*, *6*, 360–374. doi:10.1016/j.jcbs.2017.08.002

Frykheden, O. (2014). *Effektiv mätning av livskvalitet - Brunnsviken brief quality of life inventory (BBQ): en psykometrisk utvärdering* (Master's thesis, Stockholms universitet, Stockholm). Retrieved from http://urn.kb.se/resolve?urn=urn:nbn:se:su:diva-111136

Försäkringskassan (2016). Korta analyser 2016:2. Retrieved 2019-05-02 from https://www.forsakringskassan.se/wps/wcm/connect/41903408-e87d-4e5e-8f7f-90275dafe6ad/korta_analyser_2016_2.pdf?MOD=AJPERES

Glasgow, R. E., & Rosen, G. M. (1978). Behavioral bibliotherapy: A review of self-help behavior therapy manuals. *Psychological Bulletin*, *85*, 1–23. doi: 10.1037/0033-2909.85.1.1

Gloster, A. T., Meyer, A. H., & Lieb, R. (2017). Psychological flexibility as a malleable public health target: Evidence from a representative sample. *Journal of Contextual Behavioral Science*, *6*, 166–171. doi:10.1016/j.jcbs.2017.02.003

Gould, R. A., & Clum, G. A. (1993). A meta-analysis of self-help treatment approaches. *Clinical Psychology Review*, *13*, 169–186. doi: 10.1016/0272-7358(93)90039-O

Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits. Journal of Psychosomatic Research, *57*, 35–43. doi: 10.1016/S0022-3999(03)00573-7

Hayes, S. C. (1991). A relational control theory of stimulus equivalence. *Journal of the Experimental Analysis of Behaviour, 51*, 385–392. doi:10.1016/S00057894(04)80013-3.

Hayes, S. C. (1993). Analytic goals and the varieties of scientific contextualism. In S. C. Hayes, L. J. Hayes, H. W. Reese, & T. R. Sarbin (Eds.), *Varieties of scientific contextualism*. Reno, NV, US: Context Press

Hayes, S. C., Louma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes and outcomes. *Behavior Research and Therapy*, *44*, 1–25. doi:10.1016/j.brat.2005.06.006

Hayes, A. F. (2013*). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: The Guilford Press.

Hedman, E., Ljótsson, B., Rück, C., Furmark, T., Carlbring, P., Lindefors, N., & Andersson, G. (2010). Internet administration of self-report measures commonly used in research on social anxiety disorder: A psychometric evaluation. *Computers in Human Behavior*, *26*, 736–740. doi:10.1016/j.chb.2010.01.010

Hofer, P. D., Waadt, M., Aschwanden, R., Milidou, M., Acker, J., Meyer, A. H., … Gloster, A. T. (2018). Self-help for stress and burnout without therapist contact: An online randomized controlled trial. *Work & Stress*, *32*, 189–208. doi:10.1080/02678373.2017.1402389

Jiménez, F. J. (2012). Acceptance and commitment therapy versus traditional cognitive behavioural therapy. A systematic review and meta-analysis of current empirical evidence. *International Journal of Psychology and Psychotherapy, 12*, 333–358. Retrieved from https://reunir.unir.net/handle/123456789/679

Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine*, *16*, 606–613. doi:10.1046/j.1525-1497.2001.016009606.x

Kåver, A. (2006). *KBT i utveckling*. Stockholm: Natur och kultur.

Larsen, D. L., Attkisson, C. C., Hargreaves, W. A., & Nguyen, T. D. (1979). Assessment of client/patient satisfaction: Development of a general scale. *Evaluation and Program Planning*, *2*, 197–207. doi:10.1016/0149-7189(79)90094-6

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping* [Electronic resource]. Retrieved from http://ebookcentral.proquest.com/lib/ki/detail.action?docID=423337

Levin, M. E., Hildebrandt, M. J., Lillis, J., & Hayes, S. C. (2012). The impact of treatment components suggested by the psychological flexibility model: A meta-analysis of laboratory-based component studies. *Behavior Therapy*, *43*, 741–756. doi:10.1016/j.beth.2012.05.003

Lilienfeld, S. O., Lynn, S. J., & Lohr, J. M. (Red.). (2015). *Science and pseudoscience in clinical psychology* (Second edition). New York: The Guilford Press.

Lindner, P., Frykheden, O., Forsström, D., Andersson, E., Ljótsson, B., Hedman, E., …
Carlbring, P. (2016). The Brunnsviken brief quality of life scale (BBQ): Development and psychometric evaluation. *Cognitive Behaviour Therapy*, *45*, 182-195. doi:10.1080/16506073.2016.1143526

Linton, S. J., & Flink, I. (2011). *12 verktyg i KBT: Från teori till färdighet*. Stockholm: Natur & kultur.

Livheim, F., Ek, D. & Hedensjö, B. (2017). *Tid att leva: Ett tioveckors program för stresshantering med ACT och medveten närvaro*. (Första utgåvan). Stockholm: Natur & kultur.

Ljungberg, T., & Friberg, P. (2004). Stressreaktionernas biologi, *Läkartidningen*, Volym 101, s 1089-1094. Retrieved from http://lakartidningen.se/OldPdfFiles/2004/28278.pdf

Lloyd, J., Bond, F. W., & Flaxman, P. E. (2013). The value of psychological flexibility: Examining psychological mechanisms underpinning a cognitive behavioural therapy intervention for burnout. *Work & Stress*, *27*, 181–199. doi: 10.1080/02678373.2013.782157

Lovibond, S. H., & Lovibond, P. F. (1995). *Manual for the depression anxiety stress scales*. Sydney: The Psychology Foundation of Australia.

Lundgren, T., & Parling, T (2017). Swedish acceptance and action questionnaire (SAAQ): A psychometric evaluation. *Cognitive Behaviour Therapy*, *46*, 315-326. doi:10.1080/16506073.2016.1250228

Munoz-Martinez, A., Monroy-Cifuentes, A., & Torres-Sanchez, L. (2017). Mindfulness: Process, skill or strategy? A behavioral-analytic and functional-contextualistic analysis. *Psicologia USP, 28*, 298-303. doi:10.1590/0103-656420160038

Muto, T., Hayes, S. C., & Jeffcoat, T. (2011). The effectiveness of acceptance and commitment therapy bibliotherapy for enhancing the psychological health of Japanese college students living abroad. *Behavior Therapy*, *42*, 323–335. doi:10.1016/j.beth.2010.08.009

Myers, D. G. (2013). *Psychology* (10th ed). New York, NY: Worth Publishers.

Palmkron Ragnar, Å. (2010). *KBT: Komma på bättre tankar*. Lund: Palmkrons.

Powers, M. B., Zum Vörde Sive Vörding, M. B., & Emmelkamp, P. M. G. (2009). Acceptance and commitment therapy: A meta-analytic review. *Psychotherapy and Psychosomatics*, *78*, 73–80. doi:10.1159/000190790

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments & Computers*, *36*, 717– 731. doi:10.3758/BF03206553

Regehr, C., Glancy, D., & Pitts, A. (2013). Interventions to reduce stress in university students: A review and meta-analysis. *Journal of Affective Disorders*, *148*, 1–11. doi:10.1016/j.jad.2012.11.026

Rozental, A., Kottorp, A., Boettcher, J., Andersson, G., & Carlbring, P. (2016). Negative effects of psychological treatments: An exploratory factor analysis of the negative effects questionnaire for monitoring and reporting adverse and unwanted events. *PLoS ONE*, 11,e0157503. doi:10.1371/journal.pone.0157503

Ruiz, F. (2012). Acceptance and commitment therapy versus traditional cognitive behavioral therapy: A systematic review and meta-analysis of current empirical evidence. *International Journal of Psychology and Psychological Therapy. 12*, 333-357. Retrieved from https://www.ijpsy.com/volumen12/num3/334.html

Selye, H. (1950). Stress and the general adaptation syndrome. *British Medical Journal*, *1*, 1383–1392. doi:10.1136/bmj.1.4667.1383

Shirom, A., & Melamed, S. (2006). A comparison of the construct validity of two burnout measures in two groups of professionals. *International Journal of Stress Management*, *13*, 176–200. doi:10.1037/1072-5245.13.2.176

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archives of Internal Medicine*, *166*, 1092. doi:10.1001/archinte.166.10.1092

Statens beredning för medicinsk utvärdering. (2014). *Arbetsmiljöns betydelse för symtom på depression och utmattningssyndrom: En systematisk litteraturöversikt.* Stockholm: Statens beredning för medicinsk utvärdering (SBU).

Statens beredning för medicinsk utvärdering. (2015). *Behandling av stressrelaterade sjukdomar med fokus på maladaptiv stressreaktion och utmattningssyndrom*. Retrieved

from https://www.sbu.se/contentassets/47eefb74d90048e69058e5ded5ecf9c9/behandling-av-stressrelaterade-sjukdomar-med-fokus-pa-maladaptiv-stressreaktion-och-utmattningssyndrom.pdf

Ströhle, G., Nachtigall, C., Michalak, J., & Heidenreich, T. (2010). Measuring mindfulness as a multidimensional construct: A German version of the Kentucky inventory of mindfulness skills (KIMS-D). *Zeitschrift für Klinische Psychologie und Psychotherapie: Forschung und Praxis, 39,* 1–12. doi: 10.1026/1616-3443/a000001

Socialstyrelsen (2003). *Utmattningssyndrom: Stressrelaterad psykisk ohälsa.* Stockholm: Socialstyrelsen.

Teasdale, J. D., Segal, Z. V., Williams, J. M., Ridgeway, V. A., Soulsby, J. M., & Lau, M. A. (2000). Prevention of relapse/recurrence in major depression by mindfulness-based cognitive therapy. Journal of Consulting and Clinical Psychology, *68*, 615–623. doi:10.1037/0022-006X.68.4.615

Turner, R. J., & Lloyd, D. A. (1995). Lifetime traumas and mental health: The significance of cumulative adversity. *Journal of Health and Social Behavior*, *36*, 360–376. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/8719054

Van der Klink, J. J., Blonk, R. W., Schene, A. H., & van Dijk, F. J. (2001). The benefits of interventions for work-related stress. *American Journal of Public Health*, *91*, 270–276. doi: 10.2105/AJPH.91.2.270

Williams, C. (2001). Use of written cognitive–behavioural therapy self-help materials to treat depression. *Advances in Psychiatric Treatment*, *7*, 233–240. doi:10.1192/apt.7.3.233

Wells, A., Welford, M., King, P., Papageorgiou, C., Wisely, J., & Mendel, E. (2010). A pilot randomized trial of metacognitive therapy vs applied relaxation in the treatment of adults with generalized anxiety disorder. Behaviour Research and Therapy, *48*, 429–434. doi:10.1016/j.brat.2009.11.013

Yrkesföreningar för fysisk aktivitet. (2016). *FYSS 2017: Fysisk aktivitet i sjukdomsprevention och sjukdomsbehandling*. Stockholm: Läkartidningen förlag AB.

Öst, L.-G. (2008). Efficacy of the third wave of behavioral therapies: A systematic review and meta-analysis. *Behaviour Research and Therapy*, *46*, 296–321. doi:10.1016/j.brat.2007.12.005