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A Psychological Flexibility -Based Intervention for Burnout:

A Randomized Controlled Trial

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Abstract

A novel eight-week program based on Acceptance and Commitment Therapy (ACT) principles was created to alleviate burnout-related ill-being and to enhance well-being. This randomized controlled trial investigated the effectiveness of the program and explored whether changes in psychological flexibility mediated the results of the intervention. The program consisted of structured weekly face-to-face group meetings and daily practices provided via a website. Employees from varying professional backgrounds with burnout (mean age = 47 years, 79% female), who all received usual treatment, were randomized into *control* (TAU, $n = 80$, receiving no other support) and *ACT+TAU intervention* ($n = 88$, receiving additional ACT support) groups. The ACT+TAU group outperformed the TAU group in all 14 scales used, indicating that *burnout-related ill-being at work* (between-group Cohen's $d = 0.36-0.76$) and *psychological symptoms* ($d = 0.27-0.61$) decreased and *general well-being* ($d = 0.14-0.38$) and *psychological flexibility skills* ($d = 0.29-0.64$) increased during the intervention. These gains were maintained during the one-year follow-up period. The changes in the psychological flexibility -factor mediated almost completely the changes in the outcome factors of burnout, well-being, and psychological symptoms. The study suggests that psychological flexibility skills can be crucial elements in job-related burnout interventions and that combined group and web-based interventions may offer an efficient treatment method.

The trial was registered at ClinicalTrials.gov (NCT01929230).

Keywords: Acceptance and commitment therapy (ACT), Mindfulness-Based Stress Reduction (MBSR), psychological flexibility, burnout, stress, well-being, psychological symptoms

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A Psychological Flexibility -Based Intervention for Burnout:**A Randomized Controlled Trial**

Burnout is a prolonged state of emotional, physical, and mental exhaustion caused by excessive and prolonged stress. In the work context, burnout is characterized by psychological symptoms, such as exhaustion, cynicism, and reduced professional efficacy (Maslach & Leiter, 2008). It affects between 13% and 25% of employed people in Western countries (Honkonen et al., 2006; Norlund et al., 2010). Burnout has been closely connected to perceived stress (Malinauskas, Malinauskiene, & Dumciene, 2010) and workability (Ahola, Toppinen-Tanner, Huuhtanen, Koskinen, & Väänänen, 2009). Burnout produces individual health problems, including different psychological and physical symptoms, and decreases job performance (for example, in the form of absenteeism) and thus, also increases societal costs (Ahola et al., 2008; Richardson et al., 2012). Consequently, effective intervention methods are needed to prevent and treat burnout-related problems. Such methods should also be feasible, cost-effective, and easy to implement in practice.

The main goal of ACT-based interventions is to promote psychological flexibility. In addition to mindfulness and acceptance practices, psychological flexibility is also promoted by behavioral commitment exercises (Hayes, Pistorello, & Levin, 2012). Psychological flexibility is cultivated by strengthening the following six core psychological processes: (a) remaining flexibly and purposefully in the present moment and being mindful of thoughts, feelings, bodily sensations, and action potentials; (b) maintaining open and accepting perspective toward thoughts and feelings; (c) clarifying values, hopes, and goals; (d) performing and promoting actions in accordance with identified values and desired results; (e) learning to willingly accept unwanted feelings elicited when performing value-based actions; and (f)

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increasing defusion skills, such as recognizing thoughts that interfere with valued actions and seeing them as just thoughts rather than literal truths (Flaxman, Bond, & Livheim, 2013; Hayes et al., 2012). Each of these processes is a psychological skill that can be enhanced to help to deal with unwanted or distressing internal experiences and symptoms. ACT interventions are considered to be trans-diagnostic psychological treatments that potentially influence multiple psychologically derived symptoms and life issues (Dindo, Van Liew, & Arch, 2017; Hayes & Hofmann, 2017). These theoretical assumptions suggest that interventions based on ACT may alleviate diverse burnout-related symptoms and promote health.

The main target of ACT interventions is not to change diverse symptoms or conditions but rather to enhance psychological flexibility by changing the six core psychological processes described above. These, in turn, are considered to change individual experiences of well-being and ill-being. In line with these theoretical views, there is a plethora of studies showing that brief modern therapeutic methods and interventions based on ACT are effective in treating a variety of psychological symptoms and conditions (Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Powers, Vörding, & Emmelkamp, 2009; Ruiz, 2012), including depression (Kyllönen, Muotka, Puolakanaho, Astikainen, Keinonen, & Lappalainen, 2018) and anxiety (Bluett, Homan, Morrison, Levin, & Twohig, 2014). Furthermore, ACT-related skills, such as mindfulness and psychological flexibility, have been positively associated with experienced emotional, psychological, and social well-being (Christopher & Gilbert, 2010; Hayes et al., 2006; Howell, Digdon, & Buro, 2010).

Psychological flexibility and mindfulness skills have been associated with better job performance and job-related well-being (Bond & Bunce, 2003; Puolakanaho, Tolvanen, Kinnunen, & Lappalainen, 2018), lowered job stress (Bond, Flaxman, & Bunce, 2008;

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Puolakanaho et al., 2018), and lowered burnout levels (di Benedetto & Swadling, 2014; Puolakanaho et al., 2018; Vilardaga et al., 2011). Luken and Sammons (2016) conducted a systematic review of mindfulness practices for reducing job burnout in health care professionals and teachers and found that mindfulness practices effectively reduced job burnout. Brinkborg, Michanek, Hesser, and Berglund (2011) examined the effectiveness of a brief ACT intervention on stress and general mental health among Swedish social workers and reported that participants with high stress achieved a clinically significant decrease in stress and burnout symptoms and an increase in general mental health. In a meta-analytical study of mindfulness interventions, Khoury, Sharma, Rush, and Founier (2015) argued that, while many studies show that the interventions improve stress-related symptoms among healthy individuals, their effectiveness in persons with burnout is less impressive. Since burnout is thought to result from long-lasting stress (e.g., Ahola et al., 2009; Richardson et al., 2012), it may take longer to recover from it, as is also suggested by empirical findings of an ACT-based burnout intervention (Hayes et al., 2004). The current study applied a longitudinal design with a one-year follow-up to explore possible delayed effects of ACT-based intervention on burnout.

Recent intervention studies emphasize the importance of examining the mechanisms that underlie changes in outcomes (Gu, Strauss, Bond, & Cavanagh, 2015). In ACT interventions, positive changes are expected to derive from changes in processes related to psychological flexibility (e.g., Hayes et al., 2006; Hayes et al., 2012). Lloyd, Bond, and Flaxman (2013) showed that an ACT-based intervention increased acceptance and action skills, that is, skills related to psychological flexibility. Moreover, they observed that these skills mediated changes in emotional exhaustion (a subdimension of burnout), which, in turn, prevented the experience of depersonalization (another subdimension of burnout). Furthermore, Nyklíček and Kuijpers

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(2008) studied the effects of mindfulness-based stress reduction (MBSR) interventions and concluded that increased mindfulness could partially mediate the effects of perceived stress on the quality of life.

Although previously investigated interventions have been shown to decrease job-related stress, there is little evidence of their capacity to effectively alleviate burnout. Randomized intervention studies based on ACT are missing. Further, no previous intervention has applied brief web-based intervention models to burnout symptoms, despite their promising results with other mental disorders (Andersson & Titov, 2014), and their apparent ability to promote psychological flexibility and well-being (Räsänen, Lappalainen, Muotka, Tolvanen, & Lappalainen, 2016). There is also evidence that web-based interventions reduce psychological symptoms, such as depression and anxiety (Lappalainen et al., 2014; Lappalainen et al., 2015). The current study aimed to develop a brief process-based intervention model for burnout that could be easily adapted to occupational health care services by applying a combined group and web intervention approach. Furthermore, previous research suggests that mindfulness practices can reduce job-related burnout (e.g., Luken & Sammons, 2016) and mediate the effects of perceived stress on the quality of life (Nyklíček & Kuijpers, 2008). Influenced by these results, we emphasized the role of mindfulness practices in our ACT intervention and applied procedures typically used in MBSR (e.g., Williams and Penman, 2011). However, the MBSR intervention program was substantially modified by including ACT elements.

The Current Study

This study explored whether an effective program combining group meetings and web material can be created based on ACT principles. It also investigated if such a program can have

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broad effects on health and well-being outcomes. This study explored the effectiveness of an eight-week program for employees of different professional backgrounds with notable levels of burnout. The results of participants in the ACT+TAU intervention group (n = 88, who received the usual treatment and an additional eight-week ACT intervention) were compared to the results of participants in the control group (TAU, n = 80, who received only the usual treatment). It has been suggested that process-based interventions, such as ACT, can have broad effects on well-being. These interventions are likely to influence core psychological processes, which, in turn, could alleviate diverse symptoms and promote well-being (e.g., Dindo et al., 2017; Hayes et al., 2006; Hayes et al., 2012; Hayes & Hofmann, 2017). The *first* aim of the current randomized controlled trial was to explore whether the ACT program had a significant impact on skills related to psychological flexibility, burnout-related ill-being at work, psychological symptoms, and subjective well-being. The *second* aim was to investigate whether the skills related to psychological flexibility mediated the outcomes of the intervention. In the current study, we propose that skills related to psychological flexibility are the fundamental sources of changes (mediators) in diverse well-being outcomes, such as burnout-related ill-being at work, subjective well-being, and psychological symptoms.

Method

Trial Design and Ethics

This study presents findings from the randomized controlled parallel-group research project titled “The Effectiveness of Mindfulness Practices in Recovery from Burnout” (Muupu). The research was conducted during the period from March 2013 to February 2016. After the selection procedure, the eligible participants were randomized (see Figure 1) into the two conditions with a 1:1 allocation ratio. A power calculation was conducted to determine the

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adequate number of participants. The calculation was based on pilot study with alpha at 0.05 and 80 % power, and a need for over 70 persons in each group was estimated. The trial protocol is described in detail in Puolakanaho, Kinnunen, and Lappalainen (2016).

This study was conducted in compliance with the ethical standards of APA and the institutional and national research committee, as well as following the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The research project was registered at ClinicalTrials.gov (NCT01929230). Ethical approval was provided by the Research Ethics Committee of the Central Finland Health Care District (Dnro: 18U/2012). Informed consent was obtained from all individual participants of the study.

Recruitment and Inclusion and Exclusion Criteria

The participants were recruited via announcements in local newspapers and web pages and through employee health care units from the Central Finland region. The study was open to all who met the following inclusion criteria: 25–60 years of age; currently working; ability to access the Internet on a daily basis; and having burnout scores equal to or above the 75th percentile for the age group, based on normative data measured with the Bergen Burnout Indicator (BBI-15; Näätänen, Aro, Matthiesen, & Salmela-Aro, 2003). Participants were excluded from the study if they reported having a severe mental illness (severe depression, bipolar disorder or psychosis, drug or alcohol abuse), a somatic or other (medical) condition that hindered intervention attendance, current regular psychotherapeutic treatment, or major medical changes during the last four months before the study. All applicants completed a short web application, including the BBI-15 questionnaire (Näätänen et al., 2003), and they were interviewed via telephone using a structured formula to verify that they fulfilled the inclusion criteria. The applicants were informed that they would be randomly assigned to a group

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receiving a brief ACT intervention (in addition to treatment as usual) or to a group receiving only treatment as usual (e.g., treatment provided by their occupational health care services).

Randomization

A total of 283 people applied to the study (see Figure 1, Flow Diagram). Following the interviews, 218 participants were identified as eligible and randomized into the two groups, that is, the intervention group (ACT+TAU) and the control group (TAU). The following procedure was used for randomization: Each participant was paired with another participant based on the closest match in sex, age, and education level (measures shown in Table 1). One of the participants in the matched pair was assigned to the ACT+TAU group using simple randomization, and consequently, the other participant fell into the TAU group. Significant within-group pre to post ES in stress and work inability were found in both groups. However, for TAU, the change in PSS-10 from pre- to post-assessment was insignificant. The randomization procedure was conducted several times during the intervention year since the participants applied to the study during different time windows, and the goal was that no participant had to wait extended period of time for the beginning of their study period.

The findings of this study are, therefore, based on data of 168 participants (ACT+TAU: $n = 88$; TAU: $n = 80$) who voluntarily committed to the study, fulfilled the inclusion criteria, were randomized and answered all the required questionnaires in the pre-assessment phase. Analyses were limited to a subset of the randomized sample (i.e., the full intention-to-treat sample was not used) since two participants declined to use their data, and one participant did not meet the inclusion criteria when controlled (all three belonged to the ACT+TAU group). Figure 1 presents in detail the flow of the participants in different phases of the study. All participants were employed and worked approximately 39.9 hours per week ($SD = 12.2$). The majority (82%) of

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the participants worked in the following fields: health and social services (31%), education services (17%), industry (11%), management and IT services (7%), public administration services (5%), scientific and information technology services (4%), information and communication services (4%), as well as financial and insurance services (3%). Before the study, 46% of the participants had no experience with practices related to mindfulness or ACT, 35% had read about them, 19% had minor experience with them (such as an occasional practice session), and none had practiced them regularly.

Assessments

All the assessments were completed online. The personal link for the questionnaire was delivered via email two weeks before the beginning of the intervention (pre-assessment phase) and immediately after the 8-week intervention (post-assessment phase). Follow-up assessments were completed 6 and 12 months after the start of the study. The diverse measures were presented in a fixed order in the questionnaire, but participants could complete it at their own pace across several separate sessions.

Measures

Owing to a large number of measures planned for assessing both the skills related to psychological flexibility and burnout-related outcomes, detailed information of the measures and Cronbach's alphas for them at the pre-, post-, and follow-up assessments are provided in Table 2. The final score in each of the measures was created based on the scoring recommended for the measure and dividing the score by the number of questions in the measure. To increase confidence for the measurement procedure and the conclusions, the four outcome variables were measured using several questionnaires. The different measures were categorized into four main groups (*1st, 2nd, 3rd outcomes and skills related to psychological flexibility*) based on structural

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equation modeling conducted in an earlier study by Puolakanaho and colleagues (2018) that used the same sample ($n = 168$) as the current study.

1st outcomes, i.e., ill-being at work (ILLB), were assessed with three scales (1, 2, and 3 in Table 2), measuring burnout (Bergen Burnout Inventory, BBI-15), perceived stress (Perceived Stress Scale, PSS), and work inability (Workability Questionnaire, WAQ). Notably, the reversed score of workability reflects work inability. *2nd outcomes, i.e., Psychological Symptoms (SYMPT)*, were assessed with four scales (4, 5, 6, and 7 in Table 2), measuring psychological and physical symptoms (Symptom Check List, SCL-90), anxiety (Depression, Anxiety and Stress Questionnaire, Anxiety sub-scale, DASS-A), depressive symptoms (Depression, Anxiety and Stress Questionnaire, Depression sub-scale, DASS-D), and stress (Depression, Anxiety and Stress Questionnaire, Stress sub-scale, DASS-S). *3rd outcomes, i.e., Well-being in life (WELLB)*, were assessed with three scales (8, 9, and 10 in Table 2, based originally on research by Kokko, Korkalainen, Lyyra & Feldt, 2013), measuring life satisfaction (Life Satisfaction Questionnaire, LSQ), psychological well-being (Scales of Psychological Well-Being, RYFF), and social well-being (Scales of Social Well-Being, KEYES). *Skills related to psychological flexibility (PSYFLE)* were measured using four scales (11, 12, 13, 14 in Table 2). These questionnaires measured mindfulness skills (The Five Facet Mindfulness Questionnaire, FFMQ); believability (The Automatic Thoughts Questionnaire, Believability, ATQ-B) and frequency of automatic thoughts (The Automatic Thoughts Questionnaire, Frequency, ATQ-F) which are thought to reflect defusion skills; as well as acceptance skills and value-based actions (Acceptance and Action Questionnaire II, AAQ-II). These measures are considered to measure the core processes in the intervention, and PSYFLE is explored also as a mediating factor in the following analyses.

Treatments

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The intervention program. The intervention program used the same themes, structure, and most of the exercises used in the mindfulness-based stress reduction (MBSR) intervention described by Williams and Penman (2011). However, the program was substantially modified based on the ACT model. In particular, value-based components and several exercises from ACT interventions (Hayes & Smith, 2005; Lappalainen et al., 2009) were added to the program. Thus, the current program combined elements from traditional mindfulness intervention (MBSR) and ACT to increase psychological flexibility. The 8-week program consisted of 2-hour weekly face-to-face small group sessions and daily web-based home practices. Thus, the program was a combined face-to-face group and web-based program (influenced by earlier experiences of web interventions using ACT approach, e.g., Lappalainen et al., 2014; Räsänen et al., 2016).

To maintain a clear structure in group sessions, the program followed the week-to-week curriculum of the original intervention by Williams and Penman (2011), including the suggested practices and weekly themes. The program did not include any retreat sessions. Value-based components and practices derived from the ACT approach were added to the weekly themes. The main practices and principles were presented weekly in structured group meetings, and the participants were encouraged to deepen their experiences through a structured home program provided via a website. Each week of the program had a certain theme (see Appendix A and Table A1). In brief, the program focused on the core processes of psychological flexibility, although the main structures and themes of the program were derived from Williams and Penman (2011). Mindfulness was practiced as a homework assignment between the sessions, and more intensively during four sessions (2, 3, 6, and 7). Acceptance was practiced during five sessions (3, 4, 5, 6, and 7) and defusion skills during three sessions (3, 4, and 7). Exercises related to conceptualized self were conducted during three sessions (1, 3, and 8), and work with

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values was carried out during six sessions (1, 2, 5, 6, 7, and 8). See a more precise description in Appendix A.

Between the group sessions, participants were encouraged to engage in *formal mindfulness practices* (e.g., breathing meditation, body scanning, loving-kindness meditation) twice a day, six days per week (they were instructed to listen to approximately 10 minutes long audiotapes provided via a website). They were also encouraged to complete *informal practices* that incorporated skills related to psychological flexibility into daily living. The web-based program included both recorded formal mindfulness practices and informal practices with the following aims: 1) to incorporate mindfulness into daily activities, such as cooking, walking, or taking a shower; 2) to practice facing emotionally challenging situations with space and peace; 3) to break daily routines on purpose to demonstrate the connection between “the mind” and behavioral patterns; and 4) to take action toward personally important work and life goals (see Williams & Penman, 2011). The program also included additional *voluntary* material, such as written information related to psychological flexibility and burnout, recorded metaphors, and videos. The aim was to clarify the patterns of mind and to enhance the core change processes of the intervention (see Tables A1 and A2). The themes of each week, all the formal mindfulness practices, and many informal practices were similar to those presented in the group sessions.

The program was delivered by two researchers who were clinical psychologists with training in the principles and practices of ACT-based interventions. One had a doctorate and the other a master’s degree in clinical psychology. The former had 5 years of experience with mindfulness practices and knowledge about ACT, and she was responsible for six of the groups; the latter had 2 years of experience with ACT-based practices and led four of the groups. Each group had 8-12 participants. The therapists used a manual that described the content and the

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order of the themes and exercises (i.e., it included fixed-order tasks and practices). In addition, all mindfulness exercises and several other exercises were presented in recorded form and via the website to keep the intervention constant both over time and between the two group leaders.

The usual treatment. Participants in both groups could get support from the currently available services, including different therapeutic activities, the possibility of sick leave if necessary, medical support, and other kinds of support from employers. The participants were encouraged to use these resources, although it was voluntary. It is notable that according to the International Classification of Diseases (ICD-10), burnout is not categorized as a medical condition in Finland (or in other Western countries), and therefore, it is not treated as such. Rather the related symptoms, such as depression and anxiety, are the formal causes for treatment. Participants in the TAU group could get a web-version of the ACT program after they returned their final, 12-month follow-up questionnaire. No payment was provided for the participants, except for one free movie ticket after returning the 6-month follow-up questionnaire. In addition, all participants received short graphical and written feedback on the changes in their results during the study year, after they returned the 12-month follow-up questionnaire.

Statistical Analysis Strategy

In the preliminary stage, the reliability calculations of the unidimensional scales (shown in Table 2) and analyses of the means, standard deviations, and differences between the dropout and the remaining cases were conducted. Characteristics of the participants and the success of the randomization were also explored. Common variance estimates of groups were averaged across four measurement points. Preliminary descriptive statistics were performed using SPSS Statistics 22. Further analyses were performed with Mplus (version 7.31; Muthén & Muthén, 1998–2012).

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In the first stage, statistical tests were carried out to address the first research goal, which was considering the difference between conditions over time. All descriptive analyses and tests were based on full information maximum likelihood (FIML) estimation with robust standard errors and scale-corrected chi-square test values (MLR estimator in Mplus version 7.31). The method produces unbiased estimates of mean values for the second, third, and fourth measurements. Between-group comparisons of changes in mean values were based on the scale-corrected chi-square difference test (Satorra-Bentler). If there were statistically significant group differences, new parameters measuring the differences in between-group changes in mean values of successive measurements were defined (feature implemented in Mplus) and tested. Further, with the help of the new parameters, changes between successive measurements were tested separately in both groups. In these analyses, observed measures were used, allowing them to correlate freely.

The effects of the treatments were investigated using the following procedure: *First*, four overall tests were conducted to investigate whether ill-being at work (ILLB, including four scales), symptoms (SYMPT, including four scales), well-being in life (WELLB, including four scales), and psychological flexibility skills (PSYFLE, including four scales) changed differently during the study period (from pre-assessment to the 12-month follow-up). *Second*, each subscale (e.g., for ILLB: BBI-15, PSS-10, and WAQ) was investigated separately to see if the groups changed differently. *Third*, within-group changes for each scale were investigated by testing whether within-ES (d) changes were statistically significant (from pre- to post-assessment, from pre-assessment to 6-month follow-up, and from pre-assessment to 12-month follow-up). In addition, between-group changes in terms of ES differences in each phase (post, 6-month, and 12-month follow-ups) were investigated.

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In the second stage, we investigated whether changes in skills related to psychological flexibility mediated changes in ill-being at work, psychological symptoms, and well-being in life (the second aim). The structural equation modeling (SEM) technique was applied to study mediation effects. This method allows simultaneous examination of direct (c') and indirect ($a \times b$) relationships between multiple variables (see c' , a , b in Figure 2) (Iacobucci et al., 2007; Kline, 2011). First, latent factors of psychological flexibility (PSYFLE: scales 11, 12, 13, and 14; see Table 2), ill-being at work (ILLB: scales 1, 2, and 3), psychological symptoms (SYMPT: scales 4, 5, 6, and 7), and well-being in life (WELLB: scales 8, 9, and 10) were modeled based on earlier modeling results by Puolakanaho et al. (2018, see also Measures in this paper and Table 2). Before testing the mediator effect, factorial invariance of each latent factor related to the measurement structure was tested across measurements. When the invariance holds, it guarantees that content interpretation of latent factors remains equal across measurements. The results of the conducted invariance analyses are presented in detail in Appendix C and Table C1.

Results

Baseline Characteristics and Randomization Check The characteristics of the 168 participants in the two groups are described in Table 1. The mean age of the participants was 46.9 ($SD = 8.3$). There were more women (79%) than men (21%). The participants' mean score for burnout symptoms (BBI-15) was 57.3 ($SD = 11.1$), while the mean score of a Finnish normative sample was 39.13 ($SD = 13.4$) (Näätänen et al., 2003). Ninety-eight percent and 99% of the participants in ACT+TAU and TAU groups, respectively, were currently working; the rest had a short sick leave period when accepted into the study. None of the participants reported having regular weekly psychotherapeutic treatment in the application phase. There were no significant differences between the ACT+TAU and TAU groups concerning age, sex,

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education, or burnout score distribution. Nor were there differences in family relationships, work status, weekly working hours, the economic situation in the family, experience with ACT practices, health situation, or any of the psychological scales at the initial stage of the study (χ^2 or t -tests' p -values > 0.05), indicating that the randomization was successful.

Preliminary Analyses

Drop-out cases. First, drop-out cases were compared to the participants who successfully passed the program to see if they differed from each other. The results of these preliminary analyses are presented in detail in Appendix C. In the first phase, the participants of the study ($n = 168$) were compared to the cases who had dropped out before completing pre-assessment ($n = 50$), in terms of age, sex, education, income, and BBI-15 scores (derived from the application phase). The results showed that those who dropped out had higher burnout scores (BBI-15: $M = 66.7$; $SD = 9.6$) than those who remained ($M = 63.4$; $SD = 8.8$, $p < .05$). In the following phases, drop-outs during the intervention period (from pre- to post-assessment) were compared with participants who completed the interventions. There were no significant differences between the groups in any measure (age, sex, education, and the pre-assessment scales shown in Table 2). In the third phase (between the post- and 6-month follow-up assessments), those who had dropped out were less stressed (DASS-S: $M = 0.54$; $SD = 0.29$) than those who remained in the study (DASS-S: $M = 0.78$; $SD = 0.51$) ($p < .05$). In addition, they had fewer psychological symptoms (SCL-90: $M = 0.52$; $SD = 0.28$) than those who remained (SCL-90: $M = 0.71$; $SD = 0.42$) ($p < .05$). The drop-out cases also tended to have higher mindfulness skills (FFMQ: $M = 3.40$; $SD = 0.28$) than those who remained (FFMQ: $M = 3.21$; $SD = 0.43$) ($p < .05$), and tended to have greater psychological (RYFF: $M = 3.12$; $SD = 0.22$) and psychosocial well-being (KEYES: $M = 3.00$; $SD = 0.21$) than those who remained (RYFF: $M = 2.95$; $SD = 0.29$; KEYES: $M = 2.86$; $SD = 0.21$).

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= 0.34) ($p < .05$), respectively. Thus, those who dropped out before attending to the interventions had higher burnout scores, while those who left during the follow-up period had higher levels of well-being.

Received other support. The difference between the ACT+TAU and TAU groups in terms of received other support was also explored, as well as adherence to ACT program protocol. The results of these preliminary analyses are presented in detail in Appendix C. Participants in both groups reported using intermittent support provided by their workplace or occupational health care services, but no significant ($p > .05$) differences were found between the groups in terms of quality or quantity of the support. Adherence to the program protocol was high. Of the 81 participants who completed pre-assessment in the ACT+TAU group, 89% completed at least five of the eight group sessions. Overall, the average number of home exercises completed every week was 14.6 ($SD = 4.2$).

Effects of the Intervention

Burnout-related ill-being at work (ILLB). Overall, the changes in ill-being at work (ILLB) were different between the groups ($\chi^2(12) = 35.44, p < 0.001$). In addition, the changes between the groups were significantly different when all three subscales were analyzed separately (burnout, BBI-15: $\chi^2(4) = 11.92, p = 0.018$; stress, PSS: $\chi^2(4) = 27.81, p < 0.001$; and work inability, WAQ: $\chi^2(4) = 20.48, p < 0.001$). *Between-group ESs* (see Table 4), in favor of the ACT+TAU, varied from small to medium at the post- (0.38–0.76), 6-month follow-up (0.36–0.65), and 12-month follow-up (0.49–0.60) assessments. *Within-group ESs* in the ACT+TAU were significant and medium to large for all the subscales at post-, 6-month and 12-month follow-up assessments, varying from 0.69 to 1.01. For the TAU group, they were small to medium in the three subscales, varying from 0.19 to 0.56. Significant within-group ESs

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from pre- to post-assessments were found in both groups for stress and work inability. However, for TAU, the change in PSS-10 from pre- to post-assessment was non-significant. Thus, the control condition was also influential, but the impact was smaller. At the 12-month follow-up, between-group ESs were significant for all three subscales in favor of the ACT+TAU group, indicating that the difference in changes continued after the intervention. It is also notable that the between-group ES for subjective workability (WAQ) increased constantly during the study (from 0.38 to 0.57).

Psychological symptoms (SYMPT). Overall, the changes in SYMPT were different between the groups ($\chi^2(16) = 33.36, p = 0.007$). In addition, the changes between the groups were significantly different when all four subscales were analyzed separately (general symptoms, SCL-90: $\chi^2(4) = 13.50, p = 0.009$; stress, DASS-S: $\chi^2(4) = 27.01, p < 0.001$; depression, DASS-D: $\chi^2(4) = 12.66, p = 0.013$; and anxiety, DASS-A: $\chi^2(4) = 12.46, p = 0.014$). *Between-group ESs*, in favor of the ACT+TAU, varied from small to medium at post- (0.27–0.58), 6-month follow-up (0.40–0.61), and 12-month follow-up (0.28–0.53) assessments. *Within-group ESs* in the ACT+TAU were significant and medium to large for all the subscales at post-, 6-month and 12-month follow-up assessments, varying from 0.44 to 0.91. For TAU, there were significant and small effects for SCL-90 at all assessment phases (0.17-0.42), DASS-A at post-assessment (0.28), and DASS-S at 6- and 12-month follow-up assessments (0.30-0.33).

Well-being in life (WELLB). Overall, the changes in SYMPT were different between the groups ($\chi^2(12) = 25.88, p = 0.011$). In addition, the changes between the groups were significantly different in three of the four subscales when analyzed separately (life satisfaction, LSQ: $\chi^2(4) = 12.21, p = 0.016$; psychological well-being, RYFF: $\chi^2(4) = 12.95, p = 0.012$; social wellbeing, KEYES: $\chi^2(4) = 8.84, p = 0.065$). *Between-group ESs*, in favor of the

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ACT+TAU, were small for post- (0.21–0.38), 6-month follow-up (0.14–0.30), and 12-month follow-up (0.22–0.38) assessments. *Within-group ESs* in the ACT+TAU were significant and small to medium for all the subscales at post-, 6-month, and 12-month follow-up assessments, varying from 0.33 to 0.59. For TAU, they were small in three subscales, varying from 0.01 to 0.31. The within-group ESs were non-significant for RYFF at post- and for LSQ at 12-month follow-up assessments. Of the three well-being measures, only the between-group ES measuring life satisfaction (LSQ) differed significantly between the groups at 12-month follow-up, suggesting that adding ACT intervention to usual care affected especially life satisfaction.

Skills related to psychological flexibility (PSYFLE). Overall, the changes in PSYFLE scales were different between the groups ($\chi^2(16) = 46.68, p < 0.001$). In addition, the changes between the groups were significantly different when all four subscales were analyzed separately (mindfulness, FFMQ: $\chi^2(4) = 35.30, p < 0.001$; flexibility, AAQ-II: $\chi^2(4) = 22.65, p < 0.001$; frequency, ATQF: $\chi^2(4) = 10.83, p = 0.029$; believability, ATQB: $\chi^2(4) = 16.64, p = 0.002$). The *between-group ESs*, in favor of the ACT+TAU, varied from small to medium in the post- (0.29–0.57), 6-month follow-up (0.32–0.64), and 12-month follow-up (0.33–0.62) assessments. *Within-group ESs* in the ACT+TAU were significant and medium to large for all subscales at post-, 6-month, and 12-month follow-up assessments, varying from 0.54– to 0.94. For TAU, they were small in the three subscales, varying from 0.10 to 0.34. In the TAU group, ATQ-B and AAQ-II were significant only at follow-up assessments. The between-group ES results were significant for all four scales in all assessment phases, suggesting that the ACT intervention had a significantly larger impact on mindfulness and acceptance skills than TAU.

Results of the Mediation Analyses

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The second goal was to explore whether skills related to psychological flexibility (PSYFLE) mediated the outcomes. Analyses were based on the invariance test results (see Appendix 1), which showed that the proposed factors (based on an earlier study by Puolakanaho et al., 2018, using the same sample) of burnout-related ill-being (ILLB), psychological symptoms (SYMPT), and well-being in life (WELLB) were confirmed and statistically significant. In addition, the factor loadings were satisfactorily invariant (shown by partially invariant factor loadings, intercepts of items, and residual variances), which enabled longitudinal data to be analyzed. The results of SEM analyses and the three developed models are illustrated in Figure 2, in which the main paths (i.e., assessments from pre-assessment to 12-month follow-up) and their connections with groups, flexibility skills (PSYFLE), and the outcomes (OUT) of ill-being (ILLB), symptoms (SYMPT), and wellbeing (WELLB) are shown.

The “path a” from Groups (including ACT+TAU and TAU groups) to change in skills related to psychological flexibility (PSYFLE 2–4), as well as the path from change of PSYFLE skills to change in outcome variables (path b) at the post-assessment phase, were statistically significant in all three models (see Figure 2). The standardized regression coefficients for ILLB, SYMPT, and WELLB, were 0.30, 0.28, and 0.26 for “path a,” and 0.91, 0.89, and 0.96 for “path b,” respectively, whereas the direct path (c') from Group to (change in) post-assessment outcome factor was not significant (after controlling “ $a \times b$ ”) in any of the three models (coefficients were -0.07 , 0.05 and 0.02 for ILLB, SYMPT, and WELLB, respectively). The differences (between the ACT+TAU and TAU groups) at the pre-assessment phase were controlled while adding the path from Group to the pre-assessment factors (the non-significant standardized coefficient varied between -0.01 and 0.06). Standardized path coefficients between successive measurements for flexibility (PSYFLE 1–4 in Figure 2) were high, suggesting consistency of the

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intervention effect on flexibility skills over time (from intervention to follow-up). Path coefficients between outcome factors (OUT1–4 in Figure 2, including ill-being (ILLB), symptoms (SYMPT), and well-being (WELLB)) were low, reflecting (minor) changes in outcome measures over time. Coefficients in “path b” (reflecting the impact of changes in PSYFLE on outcome measures) were high over time, indicating the stability of the results. The indirect effects ($a \times b$) from Group to post-assessment phase ILLB, SYMPT, and WELLB via post-PSYFLE scores were statistically significant ($p < 0.001$), and their standardized coefficients were -0.27 , 0.25 , and -0.25 , respectively (counted by multiplying coefficient values of paths from Group to PSYFLE with values of indirect effects from Group to post-assessment). It is notable that at the same time, the direct effects (c') were near zero and statistically non-significant. Thus, the results indicated that the changes in ill-being (ILLB), symptoms (SYMPT), and wellbeing (WELLB) were nearly completely explained by changes in psychological flexibility skills (PSYFLE).

Discussion

The Effects of the Intervention

This study investigated the impact of a novel program designed to enhance skills related to psychological flexibility and to, thereby, alleviate burnout and other psychological symptoms and improve general well-being and well-being at work. The results showed that adding a brief combined group and web-based intervention to current occupational health care services had significant benefits compared to treatment-as-usual (TAU). Burnout, stress, and psychological symptoms decreased, while general well-being and workability increased. These differences were sustained through the 12-month follow-up.

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The first positive signs of change were visible in perceived stress levels (within-group $d = 0.95$), which decreased more than burnout levels during the eight-week intervention (within-group $d = 0.73$). One year after the intervention, the changes in burnout, stress, and workability were considerably larger in the ACT+TAU group compared to TAU alone (between-group $d = 0.49, 0.60, \text{ and } 0.57$ for burnout, stress, and workability, respectively) showing the usefulness of adding the combined group and web-approach to occupational health care services. The burnout-related changes during the intervention were larger than those reported in the meta-analysis by Khoury et al. (2015). In addition, burnout continued to decrease during the one-year follow-up.

The intervention had also a moderate positive impact on psychological symptoms, including depression, anxiety, and stress, and some effect on well-being. These results are in line with findings presented in Eberth and Sedlmeier's (2012) meta-analysis of MBSR intervention effects on various psychological measures in nonclinical populations. The current study also showed that the intervention significantly enhanced psychological flexibility and mindfulness skills and decreased negative beliefs and depressive thoughts. These findings were consistent with those of recent studies (e.g., de Vibe et al., 2013; Eberth & Sedlmeier, 2012; Jain et al., 2007; van Dam, Hobkirk, Sheppard, Aviles-Andrews, & Earleywine, 2014) that also suggested that MBSR- and ACT-related interventions have broad effects on human experiences.

The trend of a slow decrease in burnout and work inability, coupled with a minor increase in psychological and social well-being, suggested that burnout-related ill-being needs time to recover. These results were consistent with the earlier findings that burnout and work inability are persistent, and improvements may take time (Ahola, Toppinen-Tanner, Huuhtanen, Koskinen, & Väänänen, 2009).

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In sum, the results of this novel intervention model are promising and indicate that a relatively short intervention focused on skills related to psychological flexibility can initiate a long-lasting change process in burnout-related ill-being and improve general well-being. These findings suggest that a relatively low-cost combination of group and web-based intervention may have broad effects and clinical relevance.

Psychological Flexibility Skills as a Mechanism of Change

The second aim of the present study was to explore whether psychological flexibility mediated changes in overall well-being, ill-being at work, and psychological symptoms, as suggested by previous empirical studies (e.g., Bardeen, Fergus, & Orcutt, 2013; Bond et al., 2008; Hayes, 2006) and by the process-based cognitive-behavioral therapy (CBT)/ACT model (Dindo et al., 2017; Hayes et al., 2012; Hayes & Hofmann, 2017). The current study explored this issue using information from multiple measures that were combined using structural equation modeling (SEM). Results of the mediation analyses showed a consistent pattern in which all group differences and outcome changes representing burnout-related ill-being at work, overall well-being, and psychological symptoms were mediated by changes in psychological flexibility. These findings are in accordance with the studies by Lloyd et al. (2013), who showed that psychological flexibility influenced changes in burnout-related ill-being and Nyklíček and Kuijpers (2008), who concluded that increased mindfulness could at least partially mediate the effects of burnout on perceived stress and quality of life. Studies of mindfulness-based interventions have also shown that enhanced mindfulness is associated with reduced ruminative thoughts and behavior (Jain et al., 2007), decreased anxiety, depression, and stress (van Dam et al., 2014), improved job satisfaction (Hülshager, Alberts, Feinholdt, Lang, & Jonas, 2013),

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recovery from work (Hülshager, Feinholdt, & Nübold, 2015), and improved work-life balance (Michel, Bosch, & Rexroth, 2014).

To the best of our knowledge, this study was the first to show a nearly complete mediation effect of psychological flexibility skills in several outcome factors. The SEM method likely facilitated this finding since it was a powerful method for examining direct and indirect relationships among multiple variables (Iacobucci et al., 2007; Kline, 2011). A potential explanation for the high correlations could be that the study sample was relatively homogenous in terms of burnout symptoms, with no other severe somatic or mental disorders. The findings suggest that psychological flexibility skills may be a key mechanism of change in burnout-related ill-being, overall well-being, and psychological symptoms.

Limitations

Notably, the program focused on mindfulness more than is typical in the ACT approach. Also, the intervention program followed the structure typically used in MBSR intervention but was substantially modified with elements from ACT. However, the results showed that all measures (i.e., FFMQ, AAQ-II, ATQF, and ATQB) showed significant and positive changes during the study period, reflecting the targeted changes in psychological flexibility skills. MBSR and ACT intervention models have many elements in common; therefore, the influence of the individual approaches cannot be separated. The results are in line with earlier studies, which have shown that both ACT-based (Brinkborg et al., 2011; Hayes et al., 2004) and mindfulness-based (di Benedetto & Swadling, 2014; Luken et al., 2016) burnout interventions are associated with positive gains. The findings of the current study should be studied in more detail in the future.

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The therapists used a manual that described the contents of the intervention step-by-step (see Appendix A, Table A1). However, we did not record the sessions and, therefore, no fidelity checks could be conducted. There was considerable variation in the interventions used in the TAU group. In addition, we were not willing to prohibit ACT+TAU participants from using occupational healthcare services. However, there were no significant between-group differences in the number of occupational healthcare services used (see Appendix C: Other support reported). Thus, the outcome differences were likely a result of the additional ACT intervention.

This does not diminish the problem of the vague description of control intervention (TAU). It is also possible that the between-group outcome differences resulted from other variables, such as participants' involvement and attendance to group intervention. However, the results showed that the impact of the ACT intervention was almost completely mediated by psychological flexibility skills, as was originally proposed. Further, it should be noted that the results and conclusions can reliably be generalized only to relatively highly motivated and highly educated middle-aged women.

Challenges in the Burnout Intervention

It is a challenge to motivate men to attend psychological interventions aimed at enhancing well-being (nearly 80% of the participants in the current study were women). In addition, during the recruitment phase, about 20% of those originally interested in the study dropped out, and this group had slightly higher burnout scores than those who attended the interventions. Thus, whether the investigated intervention would produce similar results in participants with more severe burnout and low motivation for lifestyle changes remains an open question. Those who withdrew had higher burnout scores and reported that they did not have the time to commit to the practices. Thus, more attention needs to be devoted to individuals with

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high burnout symptoms and developing methods to motivate them to engage in interventions. In contrast, once the participants started the current intervention, the drop-out rate was relatively low (less than 10% during the intervention phase). This indicates that the combined group and web-based intervention was well accepted. Further, the changes observed during the follow-up period could be an underestimation, since the drop-outs reported higher well-being after the intervention.

Conclusion

The current study showed that a brief combined group and web-based intervention aimed at enhancing psychological flexibility processes had significant, broad, and long-lasting effects on burnout-related ill-being and general well-being. Adding the current brief intervention model to services already provided by occupational health care could significantly increase treatment effectiveness. In addition, in line with other observations (e.g., Hayes et al., 2012), this study supports the importance of psychological flexibility as a core skill for increasing overall well-being and workability and decreasing burnout, stress, and psychological symptoms. More research is needed to explore new intervention models for burnout, stress, and workability that apply web and mobile technologies in conjunction with psychological flexibility practices.

Abbreviations

ACT+TAU: The ACT-intervention group receiving additional support from occupational health services

TAU: Control group receiving only usual support from occupational health services

ILLB: Ill-being at work

PSYFLE Psychological flexibility

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SYMPT: Psychological symptoms

WELLB: Well-being in life

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Figure Captions

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Figure 1. Flow of participants in the different study phases.

Figure 2. Mediation effects of PSYFLE factor on ILLB, WELLB, and SYMPT outcomes (OUT)

– a generalized picture illustrating all three outcome models simultaneously

		ACT+TAU (n = 88)	TAU (n = 80)
		%	%
<u>Sex</u>	Male (ACT n =18; TAU n = 17)	20.5	21.3
	Female (ACT n = 70; TAU n = 63)	79.5	78.8
<u>Age in Years</u>	25–31	5.7	6.3
	32–38	12.5	16.3
	39–45	17.0	16.3
	46–52	37.5	31.3

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	53+	27.3	30.0
<u>Education</u>	Polytechnic/university level	64.8	68.8
	Vocational education	33.0	27.5
	Shorter courses	2.3	3.8
	Single	8.0	13.8
<u>Family</u>	Married/cohabiting	79.5	71.3
	Divorced or widowed	12.5	15.0
<u>Economic Situation</u>	Very good	13.6	10.0
	Good	52.3	62.5
	Tight	29.5	26.3
	Very Tight	4.5	1.3
<u>Health Situation</u>	Any somatic disorder (≥ 1)	64.8	71.3
	Medical treatment for somatic disorder (≥ 1)	43.2	48.8
	Minor mental symptoms ¹ (≥ 1)	49.6	50.4
	Medical treatment for mental reasons ² (≥ 1)	25.1	15.4
	Sick leave due to burnout symptoms in the 3 years (≥ 1 time) before the study	19.3	25.0
<u>Working Situation</u>	Total amount of sick leave weeks ³ during the study period (none/1–2/3–4/more)	51.9/26.6/6.3/15.2	53.7/22.4/10.4/13.4
	Working regularly in the application phase	98.0	99.0
	Weekly work hours (mean/SD)	40.7 (9.7)	42.4 (8.6)
	BBI-15 scores ⁴ (mean/SD) in the application phase	62.8 (8.5)	64.1 (9.0)

Note. ¹None of the participants had current major diagnosed psychiatric disorders (during the past 10 years), such as psychotic symptoms, bipolar disorder, severe depression, or alcohol or drug abuse problems. Minor mental symptoms were most often sleeping difficulties (34%), mild depressive symptoms (18%), or anxiety (10%) in the reported cases. ²Most often, the medicine was used for sleeping difficulties (5%), mild or average depressive mood (5%), anxiety (6%), or a combination of these and somatic symptoms (14%). This score included medicine used for neurological disorders like migraine and mixed symptoms (4.2% of all reported cases). ³Eighty-seven percent of participants in the ACT+TAU and 84% of participants in the TAU group reported that they had not used any sick leave weeks due to burnout.

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Table 2
The Measures and Their Items, Scales, and Cronbach's Alphas

	<u>Abbreviation</u>	<u>Items</u>	<u>Scale</u>	<u>α</u>	<u>Reference</u>
1st Outcomes: Ill-being at Work ILLB					
1 Bergen Burnout Inventory	BBI-15	15	Totally disagree (1) to totally agree (6)	.84, .90, .91, .92	Nääätänen et al., 2003
2 Perceived Stress Scale	PSS-10	10	Never true (1) to very often true (5)	.86, .89, .84, .87	Cohen, Kamarck, & Mermelstein, 1983
3 Work Ability Questionnaire	WAQ	7	Several scales for different questions	.70, .78, .82, .83	Puolakanaho et al, 2018
2nd Outcomes: Symptoms SYMPT					
4 Symptom Check List	SCL-90	90	Not at all (0) to Very often (4)	.96, .97, .97, .97	Holi, 1998; Derogatis & Savitz, 1999
Depression, Anxiety and Stress Questionnaire			Never or very rarely true (0) to Very often or always true (3)		Lovibond & Lovibond, 1995
5 Depression	DASS-D	14	-/-	.93, .93, .94, .94	
6 Anxiety	DASS-A	14	-/-	.85, .82, .90, .94	
7 Stress	DASS-S	14	-/-	.91, .90, .92, .93	
3rd Outcomes: Well-being in Life WELLB					
8 Life Satisfaction Questionnaire	LSQ	7	Very dissatisfied (1) to very satisfied (4)	.49, .64, .60, .68	Kokko et al., 2013
9 Scales of Psychological Well-Being	RYFF	18	Strongly disagree (1) to strongly agree (4)	.64, .66, .75, .73	Ryff, 1989
10 Scales of Social Well-Being	KEYES	15	-/-	.71, .76, .78, .79	Keyes, 1998
Mediators: Psychological flexibility related skills PSYFLE					
11 The Five Facet Mindfulness Questionnaire	FFMQ	39	Never or very rarely true (1) to Very often or always true (5)	.90, .92, .92, .94	Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006
12 The Automatic Thoughts Questionnaire- Believability	ATQ-B	30	-/-	.96, .97, .96, .95	Zettle & Hayes, 1986
13 The Automatic Thoughts Questionnaire- Frequency	ATQ-F	30	-/-	.95, .96, .96, .96	Hollon & Kendall, 1980
14 Acceptance and Action Questionnaire-II	AAQ-II	10	Never true (1) to always true (7)	.90, .88, .87, .89	Bond et al., 2011

Note. Cronbach's alpha (α) values presented at pre-, post-, f-up6, and f-up12 assessment phases, respectively.

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	Pre-assessment Scores		Post-assessment Scores		F-up6 Scores		F-up12 Scores	
	ACT+TAU	TAU	ACT+TAU	TAU	ACT+TAU	TAU	ACT+TAU	TAU
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
1 st Outcomes: Ill-Being at Work (ILLB)								
1) BBI-15	3.79 (0.70)	3.86 (0.77)	3.15 (0.91)	3.55 (0.78)	2.97 (0.99)	3.37 (0.83)	2.92 (1.03)	3.38 (0.87)
2) PSS-10	1.98 (0.53)	1.93 (0.57)	1.44 (0.59)	1.82 (0.53)	1.45 (0.59)	1.77 (0.54)	1.43 (0.62)	1.72 (0.58)
3) WAQ	3.06 (0.54)	3.01 (0.54)	3.46 (0.55)	3.19 (0.55)	3.53 (0.65)	3.27 (0.60)	3.57 (0.59)	3.21 (0.62)
2 nd Outcomes: Symptoms (SYMPT)								
4) SCL-90	0.70 (0.43)	0.69 (0.42)	0.45 (0.34)	0.56 (0.34)	0.38 (0.33)	0.53 (0.36)	0.40 (0.40)	0.54 (0.33)
5) DASS-D	0.64 (0.50)	0.27 (0.53)	0.39 (0.42)	0.23 (0.43)	0.37 (0.44)	0.24 (0.51)	0.42 (0.51)	0.22 (0.49)
6) DASS-A	0.29 (0.32)	0.62 (0.32)	0.17 (0.25)	0.53 (0.25)	0.13 (0.32)	0.55 (0.32)	0.16 (0.31)	0.54 (0.28)
7) DASS-S	0.78 (0.54)	0.74 (0.46)	0.43 (0.39)	0.65 (0.39)	0.38 (0.37)	0.61 (0.46)	0.40 (0.43)	0.59 (0.47)
3 rd Outcomes: Well-Being in Life (WELLB)								
8) LSQ	2.88 (0.35)	2.83 (0.38)	3.04 (0.38)	2.92 (0.37)	3.08 (0.35)	2.92 (0.36)	3.09 (0.42)	2.90 (0.37)
9) RYFF	2.97 (0.30)	2.94 (0.29)	3.08 (0.28)	2.94 (0.31)	3.08 (0.36)	3.00 (0.33)	3.10 (0.36)	2.99 (0.32)
10) KEYES	2.84 (0.34)	2.90 (0.33)	3.05 (0.37)	2.97 (0.34)	3.02 (0.40)	3.00 (0.36)	3.02 (0.39)	3.01 (0.36)
Mediators: Skills related to psychological flexibility (PSYFLE)								
11) FFMQ	3.23 (0.46)	3.23 (0.40)	3.56 (0.41)	3.32 (0.40)	3.63 (0.42)	3.36 (0.41)	3.63 (0.51)	3.38 (0.40)
12) ATQ-B	1.73 (0.59)	1.68 (0.50)	1.45 (0.58)	1.62 (0.60)	1.37 (0.39)	1.58 (0.54)	1.39 (0.42)	1.56 (0.49)
13) ATQ-F	1.85 (0.51)	1.89 (0.55)	1.56 (0.48)	1.75 (0.50)	1.52 (0.50)	1.73 (0.48)	1.55 (0.53)	1.75 (0.55)
14) AAQ-II	4.89 (1.10)	4.91 (0.97)	5.49 (0.83)	5.06 (0.94)	5.59 (0.91)	5.22 (0.92)	5.52 (1.02)	5.21 (0.85)
<i>Note.</i> N = 168. The final score in each of the measures was created based on the scoring recommended for each measure and dividing the score by the number of questions in the measure.								

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Table 4

Within- and Between-Group ESs (Cohen's d) for the Scales

	<u>Within-Group ESs</u>						<u>Between-Group ESs</u>		
	Pre-Post		Pre-F-up6		Pre-F-up12		Pre-Post	Pre-F-up6	Pre-F-up12
	ACT+TAU d	TAU d	ACT+TAU d	TAU d	ACT+TAU d	TAU d	d	d	d
<i>1st Outcomes: Ill-Being at Work (ILLB)</i>									
BBI-15	0.73 ^a	0.35 ^a	0.95 ^a	0.56 ^a	1.01 ^a	0.52 ^a	0.38 ^b	0.39 ^c	0.49 ^b
PSS-10	0.95 ^a	0.19	0.94 ^a	0.29 ^c	0.99 ^a	0.39 ^b	0.76 ^a	0.65 ^a	0.60 ^a
WAQ	0.69 ^a	0.31 ^a	0.81 ^a	0.45 ^a	0.89 ^a	0.32 ^b	0.38 ^b	0.36 ^c	0.57 ^a
<i>2nd Outcomes: Symptoms (SYMPT)</i>									
SCL-90	0.63 ^a	0.17 ^b	0.84 ^a	0.42 ^a	0.78 ^a	0.38 ^a	0.31 ^c	0.42 ^b	0.40 ^b
DASS-D	0.54 ^a	0.10	0.56 ^a	0.16	0.47 ^a	0.15	0.32 ^b	0.40 ^b	0.32
DASS-A	0.57 ^a	0.28 ^b	0.54 ^a	0.09	0.44 ^a	0.16	0.27 ^c	0.45 ^a	0.28
DASS-S	0.78 ^a	0.21	0.91 ^a	0.30 ^c	0.86 ^a	0.33 ^c	0.58 ^a	0.61 ^a	0.53 ^b
<i>3rd Outcomes: Well-Being in Life (WELLB)</i>									
LSQ	0.45 ^a	0.24 ^c	0.55 ^a	0.25 ^b	0.57 ^a	0.19	0.21	0.30 ^c	0.38 ^c
RYFF	0.33 ^a	0.01	0.34 ^a	0.20 ^c	0.39 ^a	0.17 ^c	0.32 ^b	0.14	0.22
KEYES	0.59 ^a	0.21 ^b	0.50 ^a	0.26 ^b	0.56 ^a	0.31 ^b	0.38 ^b	0.24	0.25
<i>Mediators: Skills related to psychological flexibility (PSYFLE)</i>									
FFMQ	0.63 ^a	0.17 ^b	0.73 ^a	0.33 ^a	0.67 ^a	0.30 ^a	0.46 ^a	0.40 ^a	0.37 ^a
ATQ-B	0.54 ^a	0.10	0.70 ^a	0.21	0.66 ^a	0.23 ^c	0.44 ^b	0.49 ^b	0.43 ^b
ATQ-F	0.57 ^a	0.28 ^b	0.66 ^a	0.34 ^b	0.60 ^a	0.27 ^b	0.29 ^c	0.32 ^c	0.33 ^c
AAQ-II	0.78 ^a	0.21	0.94 ^a	0.30 ^a	0.94 ^a	0.32 ^b	0.57 ^a	0.64 ^b	0.62 ^c

Note. $N = 168$. The ESs were calculated based on the difference between the group means at pre-assessment and the following three assessment phases (i.e., post-assessment, 6-month follow-up, and 12-month follow-up). The denominator in the effect size calculations was based on the pooled standard deviation of every assessment point. The statistical significance of the ESs is marked as follows: ^a $p < .001$, ^b $p < .01$, ^c $p < .05$.

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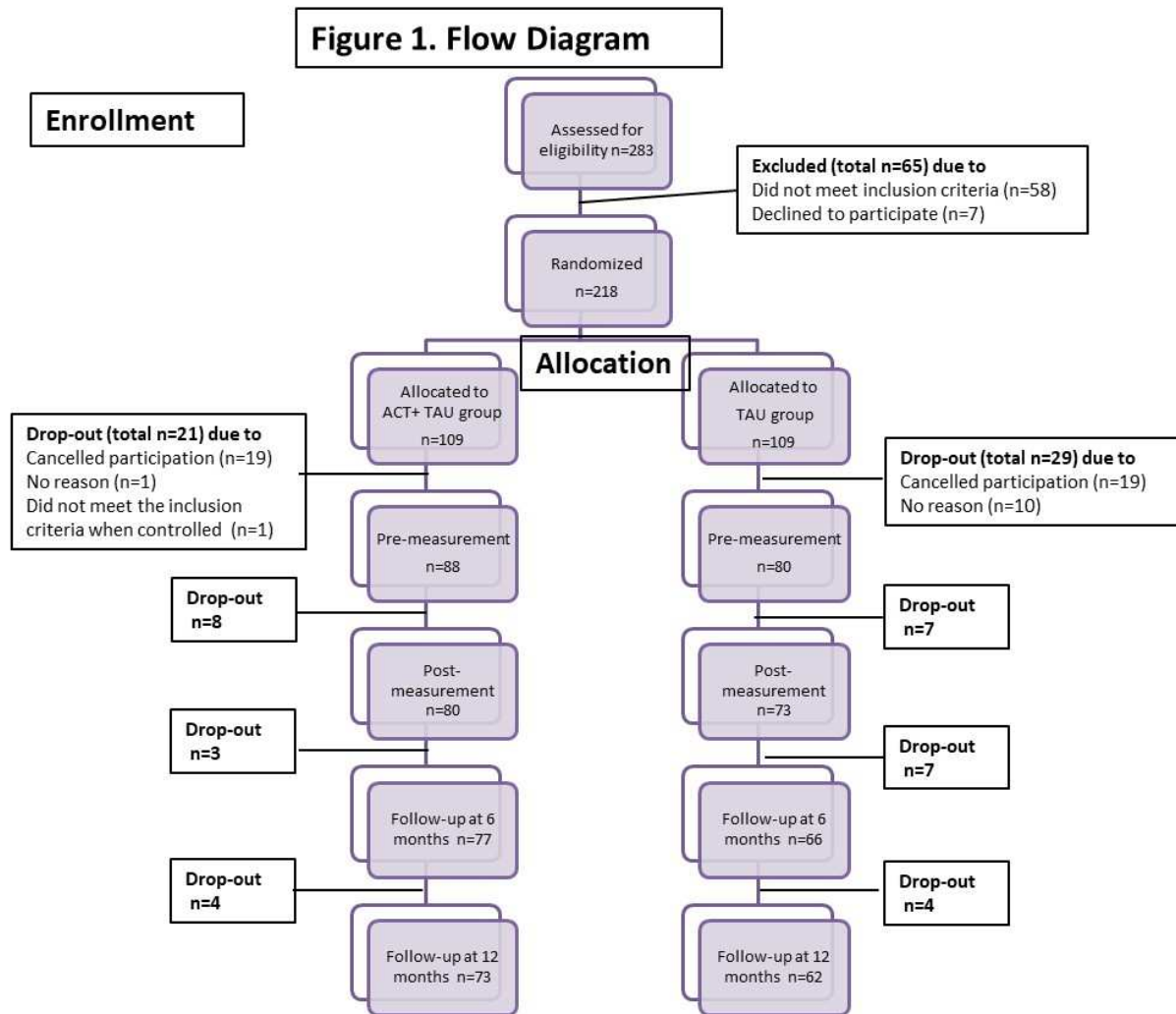


Figure 1. Flow of participants in the different study phases

Note. The analyses were based on the data of 168 participants who completed the pre-assessment and who belonged to the intervention (ACT+TAU; $n = 88$) or the control (TAU: $n = 80$) group.

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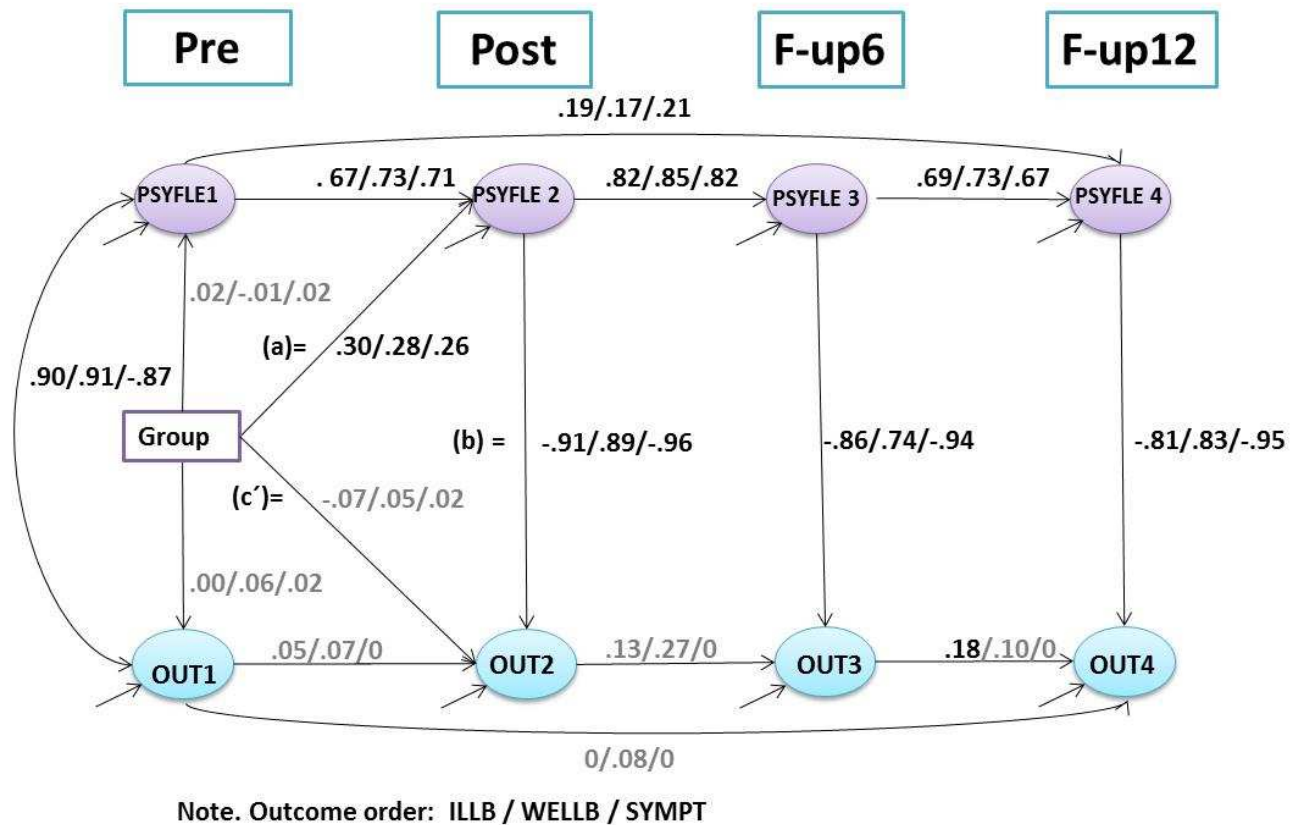


Figure 2. Mediation effects of PSYFLE factor on ILLB, WELLB, and SYMPT outcomes (OUT) – a generalized picture illustrating all three outcome models simultaneously

Three models were produced to explore how PSYFLE skills mediated different outcomes (OUT; i.e., ill-being at work [ILLB], well-being in life [WELLB], and psychological symptoms [SYMPT]). All measures were assessed four times (pre, post, f-up6, and f-up12) during the study year ($n = 88$, ACT+TAU; $n = 80$, TAU). Standardized beta coefficients between the paths are presented in the figure in the order ILLB/WELLB/SYMPT: The black numbers indicate statistically significant connections ($p < .01$), and the gray numbers indicate non-significant connections ($p > .05$). The “path a” from Group to change in psychological flexibility (PSYFLE 2–4), as well as the path from the change of PSYFLE skills to change in outcome variables (path b) at the post-assessment phase, were always statistically significant, whereas the direct path (c’) from Group to (change in) post-assessment OUT factor was always non-significant (after controlling “a × b”) in the three models. All three models were similar and showed full mediation effects. Thus, changes in PSYFLE skills led to changes in the outcome factors, that is, decreased ILLB and SYMPT, and increased WELLB.

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Appendix A: Description of the intervention program**Table A1. Contents of the Intervention Program**

Theme of the Week	Contents of the Group Meeting	Homework
(0) Providing information about the study (voluntary meeting and mailed information)	Presentation of the intervention Introduction to mindfulness practices Practical instructions and technology	
(1) Differentiating oneself from one's thoughts and emotions and evaluating one's resources and the use of one's time. Core process: conceptualized self, introduction to values	Opening the group – MF (eating chocolate with awareness) Mindfulness skills as disrupters of automatic behavior Factors increasing and decreasing personal resources (T)	<i>Mindfulness meditation of the body and breath</i> MFACT, HABIT RELEASER Own reflection of the week
(2) Practicing observing without evaluation, defining one's values, and forming individual intervention objectives. Core process: mindfulness, acceptance, clarification of values, value-based actions	Non-judgmental perception of the mind and finding observer Toward good life through values Formulating one's own goals for the intervention (T)	<i>Body scan meditation</i> MFACT, HABIT RELEASER, CARE Own reflection of the week
(3) Experiencing the connection between mind and body and familiarizing oneself with reactions that emerge in difficult situations. Core process: mindfulness, defusion, acceptance, conceptualized self	Connection between mind and body How mindfulness practices change the way mind operates Facing difficulties: avoidance or approaching (T)	<i>Mindful movement meditation</i> <i>Three-minute breathing space</i> MFACT, HABIT RELEASER, CARE Own reflection of the week
(4) Recognizing the automaticity of thinking, distancing oneself from one's mind (own thoughts), and letting go of control efforts. Core process: defusion, acceptance	The mind and its solution attempts Resistance of the mind and coping strategies Letting go of the control of the mind (T)	<i>Sounds and thoughts meditation</i> <i>Three-minute breathing space</i> MFACT, HABIT RELEASER, CARE

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		Own reflection of the week
(5) Learning to face difficulties with openness, empathy, and curiosity. Core process: acceptance, value-based actions	Acceptance and facing difficulties	<i>Exploring difficulties meditation</i>
	Acting according to own values when facing difficulties	<i>Three-minute breathing space</i>
	Acting differently and accepting and facing challenges (T)	MFACT, HABIT RELEASER, CARE, EXP
		Own reflection of the week
(6) Power of practicing compassion and acceptance, clarifying one's own life and work values, and increasing value-based actions. Core process: mindfulness, acceptance, values, value-based actions	Development of burnout and how to free oneself from the burnout process	<i>Befriending meditation</i>
	Life and work values and acting according to them (T)	<i>Three-minute breathing space</i>
	Listening with awareness (T)	MFACT, HABIT RELEASER, CARE, EXP
		Own reflection of the week
(7) Investigating the connection between mood and daily routines and recognizing the sources of joy and gratitude. Core process: mindfulness, defusion, acceptance, values, value-based actions	Mind patterns hindering a good life vs. mindful acceptance	Choosing one preferable and one undesirable meditation from the previous weeks and completing them alternately
	Resource balance	
	Ways to promote a good life and value-aligned work (T)	<i>Three-minute breathing space</i>
	Sources of joy and gratefulness (T)	MFACT, HABIT RELEASER, CARE, EXP
	Walking with awareness (T)	Own reflection of the week
(8) Recognizing workable strategies for future use and defining reminders of being present in different contexts. Core process: conceptualized self, values	Ways to gather resources	Web program with all its practices was available 1 week after the group meetings ended
	Mindfulness reminders in everyday life (T)	
	Changes during the Muupu program (T)	
	Closing the group	

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Note. The ACT program is novel, but its main structure and most homework assignments are based on the intervention by Williams and Penman (2011), whereas the content of group meetings and tasks (T) are influenced mainly by ideas based on psychological flexibility and ACT (Hayes & Smith, 2005; Lappalainen et al., 2009).

Group meetings: The structure of the group meetings always consisted of the following six phases: 1) the experiences of the previous week's exercises were discussed (in the first meeting, this part was dedicated to introducing oneself); 2) the recorded main mindfulness practice of the week was presented to the group via audiotape; 3) the theme of the week was introduced with a PowerPoint presentation; 4) a value- or acceptance-related exercise and discussion related to the exercise were completed; 5) another mindfulness practice was conducted; and 6) homework exercises were presented via the program's website. Discussions in the groups started with individual reflection, which was then broadened to pair and group conversations (especially relevant in phases 1 and 4). The purpose of these different levels of discussion was to assist participants in better observing their inner processes (such as their thoughts and emotions) and to enable them to recognize how they react and function in different situations.

Homework: Instructions were given for each week's meditation (the line in italics in the homework section) to be completed twice a day, 6 days a week, MFACT (mindful awareness of a routine daily activity) once a day, HABIT RELEASER (practices aiming to break down routines and to illustrate automatized mind and behavioral patterns) at least once a week, as well as other practices such as CARE (practices to choose actions according to own values) and EXP (Exploring difficulties).

Voluntary information and additional practices were also provided each week.

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Table A2 Examples of Different Types of Practice

Type of Practice	Instruction	Notices
Formal Mindfulness Practices		
Mindfulness meditation practices	“Now, bring your awareness to physical sensations by focusing your attention on the sensations in the body when it is in contact with the chair... , now bring your awareness to the movement of the abdomen during breathing...”	The formal mindfulness practices are presented in Table A1 and are similar to those presented by Williams and Penman (2011). There were other mindfulness practices during group meetings, such as Eating Chocolate with Awareness and Thoughts About Me, and practices such as Listening with Awareness and Walking with Awareness.
Informal Practices Aiming to Increase Psychological Flexibility		
MFACT (Mindful awareness of a routine daily activity)	“Choose one daily routine and pay attention to all sensations while doing it. You do not have to change anything. See what you notice!”	Participants were asked to pay attention to eating or some other daily routine (such as brushing their teeth, drinking tea, loading the washing machine, etc.) and to change the target each week (see Williams & Penman, 2011).
HABIT RELEASER (Practices aimed at breaking down routines and illustrating automatized mind and behavioral patterns)	“You probably have a specific place where you like to sit. Choose another place and see what you notice! Breaking down old routines may give you exciting new insights into your mind and life!”	Participants were asked to change (1) their place at a table, (2) their route to their workplace, (3) their typical style of dressing, (4) to go to a cinema or theatre without planning for it, and (5–7) to choose different personal habit releaser tasks (see Williams & Penman, 2011).
EXP (Exploring difficulties)	“Notice and stop when some painful thought, emotion or feeling pulls you away from your focused attention (while practicing). Allow the thought or feeling to remain in a workbench of the mind. Become aware of all sensations around it. Try to face it with acceptance.”	Participants were asked to explore their minds (5–7) while noticing disturbing emotions, thoughts, and sensations during ordinary life situations. The exploration was to be done while using the following three steps: (1) allow the thought or feeling to remain in a workbench of the mind; (2) become aware of all sensations; and (3) do not identify with what the mind produces, but rather try to face with acceptance (see Williams & Penman, 2011).
Own Reflection of the Week		
Participants were asked to evaluate the practices of the previous week and to write down the most important things they noticed about themselves and their minds (weeks 1, 4, 7). They were asked also to evaluate their learning in the program using a specific questionnaire (3, 7), to specify personal avoidance-related situations (3), to challenge their own control behavior habits by acting differently (4), and to write down sources of joy		

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and gratitude (6) (Lappalainen et al., 2009; Hayes & Smith, 2005).

Value Clarification and Valued Actions

CARE (Practices to choose actions according to own values)	“Think about the important values in your life. Choose one and take a simple action toward it (e.g., children are important – go and play with them).”	Value clarification began with exploring factors that increased and decreased personal resources (T) (1), followed by the exploration of personal goals (2), and CARE home practices (3–7), and closer evaluation of valued life and work-life (T) (7).
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Additional Information and Voluntary Practices

Additional information included written or recorded information supporting the weekly theme as well as some additional practices such as metaphors (e.g., Passengers in a Bus) (Hayes & Smith, 2005; Lappalainen et al., 2009) that aimed to enhance the core processes connected to psychological flexibility.

Appendix B: Detailed Information of the Used Statistics

The Procedure and Results of Exploration of Invariance of Factors

Invariance in measurement structure should remain similar (at least partially) to be sure that the construct is equal across measurement phases. Models M1–M4 testing invariances across measurement were as follows:

- M1: Freely estimated measurement model without constraints;
- M2: Factor loadings across measurements were set equally across measurements;
- M3: Intercepts of observed variables were set equally across measurements; and
- M4: Residual variances were set equally across measurements.

Models were estimated using the MLR estimator and scale-corrected chi-square test values in Mplus version 7.3. Nested models were tested using the Satorra-Bentler scale corrected chi-square difference test. The difference tests were carried out for successive models: M1 versus M2, M2 versus M3, and M3 versus M4. Modification indices were used to find a theoretical

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model M1 to discover the additional parameters and to achieve a reasonably good fit. If the difference test showed non-invariances across time (models M2–M4), the modification indices helped to find a partially invariant model.

The final model (M5) included paths between successive measurements explaining the correlation structure among latent factors in the measurement model M4. Model M5 was tested against model M4. Additional paths were added according to the modification indices when the difference test was significant. After ending with an invariant or partially invariant model, the skills related to psychological flexibility (PSYFLE) as mediator was estimated for ILLB, SYMPT, and WELLB. Models were specified according to the usage of model M5. At the beginning of estimating the mediator model, the factors PSYFLE1, PSYFLE2, and the first two factors of ILLB, SYMPT, or WELLB were regressed in a group (dummy coded variable). According to the modification indices, some additional parameters were added to the models.

The fit of the models at the second stage was evaluated using the Tucker-Lewis index (TLI), comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). For a good fit, it was necessary to obtain TLI and CFI $> .95$, RMSEA $< .06$, and SRMR $< .08$.

Results of the Analyses of Invariance

Before testing the mediator effect, the invariance test was carried out for ILLB, PSYFLE, WELLB, and SYMPT. In the measurement model, specific level factors were added for all subscales, capturing the variation between individuals specific to the subscale and stable across time. In addition, such variation was independent of all other sources of variation. This kind of measurement model was specified for ILLB, PSYFLE, and WELLB, whereas for the SYMPT factor and SCL scale, the variance of the factor was not significant; these were, therefore,

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dropped from the model. In the SYMPT factor, the specific level factors of DASS-A and DASS-D were allowed to correlate. In model M1, some residual correlations were allowed to be freely estimated, guided by large modification indices. After that, models M2–M5 were specified and tested, as suggested in the statistical analysis section.

Table 4 shows that all the factors achieved (partial) invariance in model M4, which fits well the data and required only a few modifications for the invariance expectation in factor loadings, intercepts, or residual variances. The covariance structure of repeated measurement with the successive paths (model 5) fit the data well for ILLB and WELLB, whereas for PSYFLE and SYMPT, paths from the first assessment to the last assessment were added.

	χ^2	<i>df</i>	<i>sig</i>	$\Delta\chi^2$	Δdf	Δsig	<i>TLI</i>	<i>CFI</i>	<i>RMSEA</i>	<i>SRMR</i>
							> .95	> .95	< .06	< .08
Ill-being at Work (ILLB)										
M1	40.94	45	.645	-	-	-	1.0	1.0	< .001	.045
M2	54.51	51	.343	14.02	6	.029	.996	.997	.020	.072
M3	63.06	57	.271	8.67	6	.193	.994	.995	.025	.079
M4	72.28	66	.278	9.24	9	.416	.995	.995	.024	.081
M5	77.885	69	.217	5.92	3	.116	.993	.993	.028	.085
Symptoms (SYMPT)										
M1	127.55	94	.012	-	-	-	.983	.979	.046	.053
M2	137.75	103	.013	10.78	9	.291	.980	.983	.045	.056
M3	147.86	110	.009	10.26	7	.174	.979	.981	.045	.057
M4	164.04	121	.006	15.70	11	.153	.979	.979	.046	.067
M5	169.90	123	.003	6.00	2	.050	.977	.977	.048	.065
Well-being in Life (WB)										

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M1	49.97	45	.282	-	-	-	.994	.996	.026	.061
M2	55.35	51	.314	5.36	6	.498	.995	.996	.023	.074
M3	59.52	56	.349	4.09	5	.536	.996	.997	.019	.074
M4	70.08	65	.311	10.60	9	.304	.996	.996	.022	.100
M5	76.07	68	.235	7.33	3	.062	.993	.993	.027	.102
Skills related to psychological Flexibility (PSYFLE)										
M1	106.33	89	.102	-	-	-	.984	.988	.034	.078
M2	118.54	98	.078	11.92	9	.218	.983	.986	.035	.107
M3	129.48	106	.060	11.06 ⁵	8	.198	.982	.984	.036	.113
M4	133.20	115	.118	7.30 ⁶	9	.606	.987	.988	.031	.113
M5	137.50	117	.095	3.73 ⁷	2	.155	.986	.986	.032	.112

Note. Factor loadings were accepted being invariant in all four factors; even for ILLB, the difference test was significant. In this case, three modification indices were found for factor loadings, but they all were lower than 6, and, therefore, the invariance of factor loadings was accepted. Intercepts were accepted to be invariant for ILLB and partially invariant for PSYFLE (FFMQ in the first assessment was estimated freely), SYMPT (DASS-A and DASS-D in the first assessment were estimated freely), and WELLB (RYFF in the first assessment was estimated freely). Residual variances of observed variables were invariant for ILLB and WELLB and partially invariant for PSYFLE (ATQ_B and FFMQ in the first assessment and ATQ_B in the second assessment were estimated freely) and SYMPT (SCL in the first assessment was estimated freely). Finally, the covariance structure of repeated measurement with successive paths (Model 5), the chi-square difference test accepted the model for ILLB and WELLB, whereas, for PSYFLE and SYMPT, paths from the first assessment to the last assessment were added to achieve a non-significant chi-square difference test value. For further explanation, see Statistical Analysis in this paper.

Table B2 *The Observed Measures and Their Standardized Factor Loadings (λ): Values Connected to the Underlying Latent Factors at Four Measurement Phases*

1st latent factors:	ILLB1	ILLB2	ILLB3	ILLB4
BBI-15	-0.78 ^a	-0.83 ^a	-0.85 ^a	-0.86 ^a
PSS-10	-0.76 ^a	-0.82 ^a	-0.83 ^a	-0.85 ^a
WAQ	0.72 ^a	0.78 ^a	0.80 ^a	0.82 ^a
2nd latent factors:	SYMPT1	SYMPT2	SYMPT3	SYMPT4

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SCL-90	0.94 ^a	0.91 ^a	0.97 ^a	0.93 ^a
DASS-D	0.87 ^a	0.82 ^a	0.85 ^a	0.86 ^a
DASS-A	0.82 ^a	0.75 ^a	0.79 ^a	0.80 ^a
DASS-S	0.86 ^a	0.80 ^a	0.84 ^a	0.84 ^a
3rd latent factors: WELLB4	WELLB1	WELLB2	WELLB3	
LSQ	0.54 ^a	0.56 ^a	0.62 ^a	0.63 ^a
RYFF	0.75 ^a	0.78 ^a	0.81 ^a	0.82 ^a
KEYES	0.66 ^a	0.70 ^a	0.74 ^a	0.75 ^a
Latent mediator factors: PSYFLE4	PSYFLE1	PSYFLE2	PSYFLE3	
FFMQ	0.59 ^a	0.60 ^a	0.62 ^a	0.65 ^a
ATQ-B	-0.73 ^a	-0.63 ^a	-0.85 ^a	-0.87 ^a
ATQ-F	-0.90 ^a	-0.89 ^a	-0.90 ^a	-0.92 ^a
AAQ-II	0.80 ^a	0.77 ^a	0.79 ^a	0.81 ^a

Note. $N = 168$. The results were based on the invariance test results and model M5 shown in Table B1. The statistical significance of the standardized factor loadings (λ -value): ^a $p < .001$.

Appendix C: Detailed Results of Preliminary Analyses

Drop-out Cases and Missing Data Analyses

Before any further analyses, the drop-out cases were compared to the participants to see if they differed. In the first phase, the investigated participants ($n = 168$) were compared to the cases who had dropped out before completing pre-assessment ($n = 50$) in terms of age, sex, education, income, and BBI-15 scores (derived from the application phase). A significant difference was found in the BBI-15 scores, $t(215) = -2.134$, $p = 0.034$, indicating that those who left had higher burnout scores ($M = 66.7$; $SD = 9.6$) than those who remained ($M = 63.4$; $SD =$

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8.8). In the following phases, drop-outs during the intervention period (from pre- to post-assessment) were compared with participants who completed the interventions. Analyses were conducted using both the background measures (age, sex, education) and the pre-assessment scales (Table 2). There were no significant differences between the groups in any measure, but it was observed that in the third phase (between the post- and f-up6 assessments), those who had left the study were less stressed (DASS-S: $M = 0.54$; $SD = 0.29$) than those who remained (DASS-S: $M = 0.78$; $SD = 0.51$), $F(17.1) = 2.49$, $p = 0.023$. In addition, they had fewer psychological symptoms (SCL-90: $M = 0.52$; $SD = 0.28$) than those who remained (SCL-90: $M = 0.71$; $SD = 0.42$), $F(15.7) = 2.16$, $p = 0.046$.

The drop-out cases also tended to have higher mindfulness skills (FFMQ: $M = 3.40$; $SD = 0.28$) than those who remained (FFMQ: $M = 3.21$; $SD = 0.43$), $F(17.0) = -2.34$, $p = 0.032$, and they tended to have greater psychological (RYFF: $M = 3.12$; $SD = 0.22$) and psychosocial well-being (KEYES: $M = 3.00$; $SD = 0.21$) than those who remained (RYFF: $M = 2.95$; $SD = 0.29$; KEYES: $M = 2.86$; $SD = 0.34$), $F(14.5) = -2.54$, $p = 0.023$ and $F(16.4) = -2.13$, $p = 0.049$, respectively. In the fourth phase (between the F-up6 and F-up12 assessments), drop-out analysis was not carried out because there were only two cases. Thus, it appeared that during the initial phase, before attending interventions, the drop-out cases had higher burnout scores, while those who left during the follow-up period had higher levels of well-being.

Other Support Reported

Since no formal, structured intervention was provided to persons with burnout, the actual difference between the ACT+TAU and TAU groups in terms of received support is explored in the results section. It is notable that according to the International Classification of Diseases (ICD-10), burnout is not categorized as a medical condition in Finland (or in other Western

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countries), and, therefore, it is not treated as such. Rather the related symptoms, such as depression and anxiety, are the formal causes for treatment. Participants in both the TAU group and the ACT+TAU group reported using some other support provided by their workplace or occupational health care services. Of these participants, 28% received support provided by their employers, and 43% reported that the occupational health services had supported them in different ways in their current work. Occupational health care services organized joint meetings with employers' representatives for 8% of the participants. Overall, almost half (46%) of the participants reported having received some kind of support related to their employment. Occupational health care services provided the following: 26% of participants were offered individual support sessions delivered by either psychologists or nurses; about 12% of the employees in the TAU group participated in rehabilitation interventions, including group-based interventions (provided by rehabilitation centers); and only a few participants (about 2%) were provided individual psychotherapeutic interventions delivered by professionals.

There were no significant differences between the groups, in terms of the number of participants who had received psychological (TAU: 25% vs. ACT+TAU: 23%; not including the current intervention) or work-related support (TAU: 46% vs. ACT+TAU: 54%) during the study year. In addition, the number of participants who reported changes in medication (TAU: 25% vs. ACT+TAU: 20%) during the last 6 months of the study and participants who had had at least one sick leave week during the study year were equal (TAU: 46% and ACT+TAU: 54%). In addition, an equal number of participants (TAU: 17% vs. ACT+TAU: 13%) had changed their workplace. A majority (and equivalent) number of participants in both groups reported that they had increased their usage of self-help methods (TAU: 73% vs. ACT+TAU: 80%), such as physical activities and healthy food consumption (TAU 48% vs. ACT+TAU: 46%). The

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ACT+TAU and TAU groups did not differ in these variables during the study period (χ^2 or t -tests' p values > 0.05). Interestingly, 19% of the participants in the TAU group reported that they had increased their voluntary activities during the study year with the intention to develop mindfulness-based skills, although they were not instructed in this direction. However, significant differences ($p < 0.01$) in favor of the ACT+TAU group were reported in the practice and application of mindfulness skills, value work, and value-based actions.

Adherence to the Intervention Protocol

Adherence to intervention protocol was high. Of the 81 participants who completed pre-assessment in the ACT+TAU group, 89% completed at least five of the eight group sessions. More precisely, 23 (25%) completed all eight group sessions, 36 (40%) attended seven sessions, 17 (19%) attended six sessions, 5 (6%) attended five sessions, and 8 (9%) completed between two and four sessions. Independent practice (not during the session) of mindfulness and applied exercises was assessed using a home diary that was available from 76 (85%) participants. According to these self-reports, formal mindfulness practices (e.g., breathing meditation, body scanning, loving-kindness meditation available through the intervention platform) were conducted weekly an average of 5.9 times ($SD = 2.2$); informal applied practices (e.g., applying the skills in everyday life, such as mindful cooking, walking, or doing valued actions) were carried out 5.1 times ($SD = 4.2$); and voluntary, web-based audio or video recordings were utilized 2.4 ($SD = 3.7$) times. Overall, the average number of exercises completed every week was 14.6 ($SD = 4.2$).

Highlights

A novel eight-week program based on ACT was created to alleviate burnout

The intervention was a combined face-to-face group and web-based program

The intervention group outperformed the control group in all 14 scales used

The intervention had significant, broad, and long-lasting effects on burnout

Changes in psychological flexibility mediated the intervention's results

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Conflict of Interest

The authors declare that they do not have any financial nor personal conflicts of interest.

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