Does mindfulness affect participants' response to a vocational rehabilitation program?

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ABSTRACT

Objective: The study aims were to investigate whether mindfulness predicts improved work ability after a multifactorial vocational rehabilitation program in Norway and to examine the mediating influence of mindfulness in the relationship between personal health factors and changes in work ability in response to the program. Methods: Seventy-four participants on long-term sick leave completed questionnaires assessing mindfulness, work ability, functional health, psychological functioning, and demographics before and after a 4–6-week multidisciplinary vocational rehabilitation program. In addition to a standard logistic regression analysis, a bias-corrected bootstrapping technique was used to test the hypothesized indirect effects. Results: Enhanced mindfulness over the course of the program significantly predicted a positive change in work ability. Furthermore, decreased personal burnout and enhanced self-esteem were both unique predictors of such positive change. Mindfulness mediated the effects of personal burnout and self-esteem on participants' work ability. Increased body responsiveness and sense of mastery, and decreased pain consequences and subjective health complaints, were indirectly related to positive changes in work ability through increased mindfulness. Conclusion: Enhancing mindfulness skills is useful for improving the work ability of Norwegians on long-term sick leave.

Introduction

Long-term sick leave rates have increased in industrialized countries (Gabbay et al., 2011). Musculoskeletal disorders and mild-to-moderate mental health problems cause the majority of long-term sick leave in Norway (Brage, Ihlebaek, Natvig, & Bruusgaard, 2010; Ihlebaek, Brage, & Eriksen, 2007; OECD, 2013) and in other European countries (Gabbay et al., 2011). In addition, other unspecific health complaints often co-occur, increasing the risk of disability and long-term sick leave (Linder, Ekholm, Jansen, Lundh, & Ekholm, 2009; Øyeflaten, Hysing, & Eriksen, 2008; Salmi et al., 2009). The diagnostic basis for conditions resulting in long-term sick leave is therefore often very diffuse, with no or few objective medical explanations (Hagen, 2006; Øyeflaten et al., 2008; Salmi et al., 2009).
et al., 2009). It is also often difficult to differentiate medical issues from the individual’s social life or overall life situation and thus difficult to identify the main reason for reduced ability to work (Brage & Hernes, 2010). Vocational rehabilitation targets this heterogeneous group of participants on long-term sick leave. Strengthened effort has been made in Norway to enhance return to work (RTW) rates for people on long-term sick leave. A large array of vocational rehabilitation measures have been developed and the number of participants in vocational rehabilitation increased 33% from 2000 to 2011; from around 40,000 to around 60,000 (OECD, 2013). The main goal of vocational rehabilitation is to enhance work ability (WA) and RTW rates (Braathen, Veiersted, & Heggenes, 2007; Escorpizo et al., 2011; Kuoppala & Lamminpää, 2008). Thus, WA has become a key concept in RTW rehabilitation and there is general agreement in the literature that WA must be understood as a dynamic relational concept between the individual, organizational, and societal factors (Lederer, Loisel, Rivard, & Champagne, 2014). Multidisciplinary vocational rehabilitation programs (MVRPs) are effective at increasing WA and RTW (Braathen et al., 2007; Gabbay et al., 2011). Unfortunately, we lack knowledge about what works for whom, and when, in vocational rehabilitation (Waddell, Burton, & Kendall, 2008). Risk factors for poor WA, unsuccessful RTW, and long-term sick leave have been studied extensively (Dekkers-Sánchez, Hoving, Sluiter, & Frings-Dresen, 2008; Lagerveld et al., 2010; Øyeflaten et al., 2008), while factors that may improve WA and RTW have unfortunately not been studied with the same intensity (Airila, Hakanen, Punakallio, Lusa, & Luukkonen, 2012; Gard & Sandberg, 1998). However, it is difficult to understand factors that promote positive health, balance, and meaningful lives through investigating ill health, sick leave, and suffering alone (Snyder, Lopez, & Pedrotti, 2011); factors that may actually improve WA are needed (Airila et al., 2012). Some MVRPs pay considerable attention to and suggest mindfulness as a potential tool for improving WA. Unfortunately, very few studies have investigated the connection between mindfulness and WA (De Vibe, Bjørndal, Tipton, Hammerstrøm, & Kowalski, 2012).

Mindfulness generally enhances both physical and mental health (Brown, Ryan, & Creswell, 2007), and mindfulness-based interventions are effective for treating clinical disorders such as depression and anxiety (De Vibe et al., 2012), chronic pain (Esmer, Blum, Rulf, & Pier, 2010; Grossman, Tiefenthaler-Gilmer, Raysz, & Kesper, 2007), and stress and burnout (Cohen-Katz et al., 2005). In addition, mindfulness training increases quality of life (De Vibe et al., 2012), cognitive functioning (Jha, Krompinger, & Baieme, 2007), and autonomous regulation and self-esteem (Brown & Ryan, 2003) and plays a major role in the shaping of body awareness (Mehling et al., 2009). The origin of mindfulness is rooted in ancient Buddhist practice and philosophy (Kabat-Zinn, 2003). In the 1970s mindfulness was introduced to Western medicine and has become an acknowledged method for health promotion in Western culture. Efforts have been made to define and operationalize mindfulness, and one widely recognized definition is paying attention on purpose, in the present moment, nonjudgmentally (Kabat-Zinn, 1990). Mindfulness is the capacity to be fully conscious, from moment to moment, of all intrapersonal experiences, including body and mind, as well as the capacity to be conscious of all interpersonal experiences, including people, surroundings, and events. When people are mindful they are more capable of acting purposefully and are more openly attentive to and aware of themselves and the situations in which they find themselves (Brown et al., 2007). Thus,
mindfulness provides individuals a quality of consciousness characterized by the clarity and vividness of current experience and functioning and therefore contributes directly to well-being and vitality (Brown & Ryan, 2003). Hölzel et al. (2011) reviewed existing theoretical literature and suggested that mindfulness practice comprises a process of self-regulation differentiated by distinct but interrelated components: (1) attention regulation (i.e., an especially important mechanism of mindfulness, the basis of all meditation techniques, and which appears to be a prerequisite for other effects); (2) body awareness (i.e., the ability to notice subtle body sensations); (3) emotion regulation (i.e., regulating for nonreactivity); and (4) changes in perspective on the self (i.e., awareness of the transitory nature of the self, diminished self-referential processes, and enhancement of first-person experiences). This process leads to enhanced self-regulation, which is a process that enables individuals to guide their goal-directed activities by modulation of thought, affect, behavior, or attention via deliberate or automated use of specific mechanisms (Karoly, 1993).

In contrast, mindlessness is a state of consciousness that is limited in various ways, such as the limitation of rumination, absorption in the past, or fantasies and anxieties about the future (Deci & Ryan, 1980). Mindlessness can be defensively motivated, for example through nonacceptance of a thought, emotion, motive, or object of perception (Brown & Ryan, 2003), or signals can be ignored or suppressed by self-medication (e.g., painkillers, alcohol, or drugs). When this kind of dysregulation occurs, attention is required to reestablish communication between elements of a system (e.g., mind and body or thought and behavior) before wellness can be restored (Schwartz, 1984). Mindfulness is typically cultivated by formal meditation exercises, such as sitting meditation, walking meditation, or mindful movements, or informal meditation exercises, such as being present in everyday activities such as drinking tea, washing dishes, talking to friends, or washing hands (Kabat-Zinn, 1990).

The MVRP investigated here was carried out in a vocational rehabilitation enterprise setting located in South Norway. The intervention aims targeting individuals on sick leave and other users of the local Norwegian Labour and Welfare Administration (NLWA) who report poor WA (i.e., reduced by at least 50%). The program is funded by the NLWA, which also assigns individuals to the program. The MVRP aims to improve the participant’s WA by facilitating more autonomous and inner-directed behaviors (Haavorsen et al., 2009). Mindfulness-based stress reduction is a core MVRP component. Previous research on this particular MVRP has reported that mindfulness may enhance RTW and WA through quality of life and that mindfulness significantly predicts RTW for highly educated individuals (Vindholmen, Høigaard, Espnes, & Seiler, 2014). However, very few studies have explored the connection between mindfulness and WA (De Vibe et al., 2012). The purpose of this study was therefore to examine: (1) whether changes in mindfulness levels from pretest to posttest predict a successful WA response; (2) whether changes in personal health factors (Figure 1) from pretest to posttest predict a successful WA response; and (3) how mindfulness mediates the relationship between changes in personal health factors from pretest to posttest and WA response, controlling for age and gender (see Figure 1). To the best of our knowledge, this is the first prospective, quantitative study investigating the association between WA and mindfulness in an MVRP.
Materials and methods

Participants

In this prospective cohort study, the study sample comprised 74 individuals aged 23–59 years, 14 men and 60 women, (mean = 41, SD = 9) who completed a 4- or 6-week MVRP at a vocational enterprise in South Norway. Participants were typically nurses, auxiliary nurses, teachers, milieu therapists, preschool teachers or kindergarten assistants, secretaries, and blue-collar workers. Their common diagnoses were musculoskeletal disorders, depression, anxiety, burnout, stress, chronic fatigue syndrome, fibromyalgia, and various combinations of these diagnoses.

The vocational rehabilitation program

Subjects participated in an MVRP including both group-based treatment and individual counseling. The program was managed by an interdisciplinary team (e.g. nurses, physiotherapists, teachers, and occupational therapists) skilled in teaching mindfulness and the Vitality Training Program (Haugli & Steen, 2001; Steen & Haugli, 2000). All participants attended about 6 hours per day, 3 days per week. Program duration was 6 weeks ($N = 62$), and 4 weeks ($N = 14$). The NLWA assigned participants to the MVRP, and
determined program duration based on the participant’s motivation to carry on in the program. The MVRP content included the following three categories:

**Educational program**
The present educational program is built on a mindfulness-based intervention for individuals with chronic musculoskeletal pain, named Vitality Training Program, developed by Haugli and Steen (Haugli & Steen, 2001; Steen & Haugli, 2000) and based on: (1) mindfulness (Kabat-Zinn, 1990); (2) phenomenological understanding of the body (Merleau-Ponty, 2002); (3) gestalt theory (Pearls, 1969) and confluent education methods (Brown, 1971), and (4) the psychology of personal constructs (Kelly, 1991; Nygard & Kunszenti, 1999). The focus in the group learning program is to help participants become aware of the close relationship between their body, emotions, and mind; to help them shift their focus from pain and disability to their personal resources and potentials; to teach them new coping strategies; and to help them become more self-confident (Steen & Haugli, 2000).

Mindfulness training was instructed both as informal meditation exercises (e.g., everyday activities presence) and formal meditation exercises lasting from 5 to 20 minutes (e.g., body scan, sitting meditation). Confluent education methods (Brown, 1971) are used to create experiential learning situations. “Confluence” refers to the integration of cognition, affect, and bodily sensations. The concept of “awareness” is essential in confluent education and refers to “what is happening in the present moment”, as opposed to “thinking about” (Brown, 1998). Participants were encouraged to view their body from the first-person perspective and to become aware of the experience-based knowledge embedded in their body. The educational methods used to enhance awareness and the meaning construction process included, among others, use of metaphors, language, guided imagery and drawings as images (Steen & Haugli, 2000). Topics such as physical activity, lifestyle and work-related issues were also covered in the educational program.

**Physical activity**
The physical activities applied in the program prioritized the development of core stability, functional strength, body awareness, balance, and overall endurance and strength. Participants were introduced to hatha yoga, cycle ergometer spinning, basic strength and endurance training, and psychomotor physiotherapy. Participants were encouraged to discover new experiences and become more aware of themselves and their body, their limits and possibilities. Physical activity was used in a methodical manner to facilitate the participants’ belief of their own ability to gradually extend their physical, psychological, and social limits and capacity.

**Individual counseling**
Every second week the participants were given individual counseling based on Cognitive Behavior Therapy (CBT) (Farmer & Chapman, 2008), and they were also given one individual counseling session in psychomotor physiotherapy (Braatøy, 1947; Thornquist & Bunkan, 1991). Participants were offered help with communicating their special needs to the NLWA (for unemployed participants), or to their employer (for employed participants).
Procedure

All MVRP participants from August 2011 to August 2012 (N = 119) were invited to participate in the study; 83 individuals accepted and 74 completed both the pretest and posttest (9% dropout). Participants and nonparticipants (6 male and 30 female aged 28–59 years, mean age = 41, SD = 8) did not differ significantly in basic demographic characteristics. The Norwegian Social Science Data Service and the National Ethics Committee – Health Region South approved the study. Confidentiality was assured, and all participants were volunteers and gave their written informed consent to participate in the study. Each participant answered a self-report questionnaire before and after the MVRP. The questionnaire could be answered using pen and paper or the Internet (www.surveyxact.com).

Instruments

Work ability

Work ability was measured using the single-item Work Ability Score (WAS) (Tuomi, Ilmarinen, Jahkola, Katajarinne, & Tullki, 1998): “Current work ability compared with the lifetime best” ranging from 0 (completely incapable to work) to 10 (my best work ability ever). WAS is the first item in the Work Ability Index (WAI) (Tuomi et al., 1998) and the convergent validity between WAS and WAI is statistically significant (El Fassi et al., 2013). A strong association between the complete WAI and WAS has also been identified by Ahlstrom, Grimby-Ekman, Hagberg, and Dellve (2010). WAS has been reported to validly measure WA among both active workers (El Fassi et al., 2013), and individuals on long-term sick leave (Ahlstrom et al., 2010). The WAS is further subcategorized as excellent (10 points), good (8–9 points), moderate (6–7 points), and poor (0–5 points) (El Fassi et al., 2013; Gould, Ilmarinen, & Jarvisalo, 2008).

Mindfulness

Mindfulness was assessed using the Norwegian version (Dundas, Vøllestad, Binder, & Sivertsen, 2013) of the Five Facet Mindfulness Questionnaire, FFMQ (Baer et al., 2008), which measure five facets of a general tendency to be mindful in everyday life. The observing scale’s eight items assess the degree of attending to or noticing internal and external stimuli such as sensations, emotions, cognitions, sights, sounds, and smells. An item example follows: “I notice the smells and aromas of things”. The describing scale’s eight items measure the degree of noting or mentally labeling these stimuli with words. An item example follows: “I am good at finding words to describe my feelings”. The acting with awareness scale’s eight items assess the tendency to attending to one’s current actions, as opposed to behaving automatically or absentmindedly. An item example follows: “I find myself doing things without paying attention” (item reversed). The nonjudging of inner feelings scale’s eight items measure the tendency to refraining from evaluation of one’s sensations, cognitions, and emotions. An item example follows: “I think some of my emotions are bad or inappropriate and I should not feel them” (item reversed). And the nonreactivity to inner experience scale’s seven-item measure the tendency to allowing thoughts and feelings to come and go without catching one’s attention. An item example follows: “I perceive my feelings and emotions without having to react to them”. All items were measured using a 5-point Likert scale ranging from one (never or
very rarely true) to five (very often or always true). Psychometric support for the measure is derived from the analysis in the 2013 study by Dundas et al. (2013).

**Personal burnout**

One subscale from the Copenhagen Burnout Inventory (Kristensen, Borritz, Villadsen, & Christensen, 2005) was used to assess personal burnout, defined as “the degree of physical and psychological fatigue and exhaustion experienced by the person” (p. 197). The subscale personal burnout was designed to measure burnout regardless of occupational status (i.e. unemployed, pensioners, and young people were included). The personal burnout subscale consists of six items, an item example “How often do you feel weak and susceptible to illness?”. Each question is scaled on a 5-point scale from 1 (never or almost never) to 5 (always or to a very high degree). These responses were rescaled to a 1–100 metric, with high scores (≥50) indicating high levels of burnout. Kristensen et al. (2005) found satisfactory estimates of the Copenhagen Burnout Inventory’s validity and reliability.

**Pain intensity/pain consequences**

Pain intensity and pain consequences were measured using items from the Norwegian version (Klepstad et al., 2002) of the Brief Pain Inventory (Cleeland, 2009). Four items assessed pain intensity (pain now, average pain, worst pain, and least pain) using a scale ranging from 0 (no pain) to 10 (pain as bad as you can imagine). Seven items assessed the level of interference with functioning caused by pain (general activity, mood, walking ability, normal work, relations with other persons, sleep, and enjoyment of life) with rating scales from 0 (no interference) to 10 (complete interference). The items were divided into two subscales: (1) a pain severity index (i.e. pain intensity), using the total of the four pain intensity items; and (2) a function interference index (i.e. pain consequences), using the total of the seven items on pain interference. The scale has good psychometric properties (Klepstad et al., 2002; Tan, Jensen, Thornby, & Shanti, 2004).

**Body responsiveness**

A 7-item scale developed by Daubenmier (2005) was used to measure responsiveness to bodily sensations. Item examples are “I suppress my bodily feelings and sensations” (reverse coded) and “I listen to my body to advise me about what to do”. Responses were measured on a 7-point scale ranging from 1 (not at all true about me) to 7 (very true about me). Higher scores reflect greater body responsiveness, and Daubenmier reported the Cronbach’s alpha among items to be .83 (Daubenmier, 2005). The questionnaire was translated into Norwegian using standardized methods (Kvamme et al., 1998).

**Subjective health complaints**

Twelve items from the Subjective Health Complaints Inventory (SHC) (Eriksen, Ihlebæk, & Ursin, 1999) were used to measure how subjective somatic and psychological health complaints were experienced: low back pain, upper back pain, leg pain, shoulder pain, arm pain, neck pain, headache, anxiety, depression/sadness, dizziness, stomach discomfort/digestive trouble, and chest pain. To cover more rare complaints, one item was added, “other complaints”. Using a 4-point Likert-type scale ranging from 0 (none) to 3 (severe) the participants rated the severity of each complaint during the past month.
Items were summed for a total score. The scale has been found to have good validity and reliability (Eriksen et al., 1999).

**Sense of mastery**

A 5-item Norwegian version (Dalgard, Mykletun, Rognerud, Johansen, & Zahl, 2007) of a scale developed by Pearlin, Lieberman, Menaghan, and Mullan (1981) measured the sense of mastery. An item example is “I have little control over the things that happen to me”. All items were rated on a 5-point scale ranging from 5 (strongly disagree) to 1 (strongly agree). Items were summed for a sense of mastery score, where higher scores indicate higher levels of mastery. Dalgard et al. (2007) analyzed the psychometric properties of the Norwegian version of the scale and obtained satisfactory estimates of the instrument’s reliability and validity.

**Global self-esteem**

The Norwegian version (von Soest, 2005) of Rosenberg’s self-esteem scale (Rosenberg, 1965) was used to measure global self-esteem. The scale consists of 10 items on which participants were asked to make judgments about their own self-worth (e.g. “on the whole, I am satisfied with myself”) using 4-point scales from 1 (strongly disagree) to 4 (strongly agree). The scale sum score ranges from 10 to 40, where a higher sum score indicates higher self-esteem. Psychometric support for this measure was derived from von Soest (von Soest, 2005).

**Covariates**

Baseline data on potential effect modifiers were assessed, including age and gender.

**Statistical analysis**

Statistical Package for the Social Sciences (SPSS) for Windows (version 19, IBM Corporation, Armonk, NY, USA) was used for data analyses.

WAS was rated at intake and in the final intervention week. WA response was measured by the WAS variable, dichotomized as WA-responders and WA-nonresponders. To identify WA-responders and WA-nonresponders, the change in WAS between the two time points was determined by conducting a dependent t-test on the WAS variable (Tuomi et al., 1998). Participants with an improved WAS from pretest to posttest were defined as WA-responders; those who did not improve at all or whose WAS score decreased were defined as WA-nonresponders.

To test for statistically significant differences between the two groups’ characteristics at baseline, an independent-samples t-test was conducted for the variable “age” and chi-square tests were performed for the categorical variables. To test for changes between the two time points for all other study measures, paired-samples t-tests were conducted. For variables on which both groups changed significantly from pretest to posttest, independent-samples t-tests were conducted to test whether the changes differed significantly between the groups.

Mediation refers to situations in which the significant relationship between independent and dependent (outcome) variables is accounted for by a third, or mediator, variable (Mathieu & Taylor, 2006). In the present study, conceptual model number 4 in Hayes’
(2013) macro application “Process” for SPSS (see Appendix A in Hayes’ “Process” (Hayes, 2013)), was used to test the hypothesized simple mediator model (Figure 1) while also controlling for covariates. “Process” (Hayes, 2013) uses a regression-based approach for estimating indirect, direct, and total effects in mediation, moderation, and conditional process analyses. Moreover, “Process” produces bootstrap estimates and bias-corrected confidence intervals (CIs) for indirect effects. Bootstrapping refers to a nonparametric resampling procedure to test the null hypothesis for indirect effects and involves repeated extraction with replacement of samples from the data set. In the present study, a 95% CI was constructed on the basis of 50,000 bootstrap estimates. A bias-corrected CI that does not include zero indicates a statistically significant indirect effect. Preacher and Hayes’ (2008) technique tolerates that X can exert an indirect effect on Y through M in the absence of an association between X and Y. In this case, Preacher and Hayes (2004) recommend to refer to X’s indirect effect on Y through M, and avoid the term “mediator”. Moreover, Hayes (2009) encourage proceeding with analysis of indirect effects also in the absence of a total effect, to ensure that potentially interesting and important information will not be missed.

Instead of including several X variables in one model, in the present study several models were estimated, each focusing on a single X variable at a time. According to Hayes (2013), this procedure is legitimate and recommended in studies with highly correlated X variables.

There were no missing data for the dependent WA variable. In addition, there were no missing data for the majority of the independent variables; missingness was only present for the independent variables pain intensity (2.7%), pain consequences (1.4%), and body responsiveness (1.4%). Missing data were found to be missing completely at random using Little’s test (p = .993). Before computing the scales, mean estimates were calculated from available data and inserted in place of the missing values. In cases where more than two items in a scale were missing, the case was considered missing.

Results

The two groups did not differ significantly for any basic characteristics. Moreover, independent t-tests did not detect a significant difference between groups at baseline on any facets of the FFMQ. As shown in Table 1, WA-responders improved significantly from pretest to posttest on all mindfulness variables, except those in the nonreactivity facet. The effect size (Hedges’g) for FFMQ global improvement for WA-responders was 0.51, CI = 0.08 to 0.94, a medium effect size according to Cohen (1988). Moreover, WA-responders improved significantly on personal burnout, pain consequences, SHC, body responsiveness, sense of mastery, and global self-esteem. WA-nonresponders did not improve significantly on any of the mindfulness variables, whereas they improved significantly on personal burnout, SHC, and body responsiveness.

Since both groups decreased significantly on personal burnout and SHC and increased significantly on body responsiveness, independent t-tests were performed to test whether changes were significantly different between groups. WA-responders improved significantly more than WA-nonresponders on personal burnout (p < .05).

Correlation coefficients at baseline on all study measures are reported in Table 2. Correlation between WAS and burnout and WAS and pain consequences was negative.
Mindfulness (FFMQ-G) was positively correlated with body responsiveness, sense of mastery and self-esteem.

Correlation coefficients for change scores on all study measures are reported in Table 3. The correlations between WAS and the mindfulness facets were positive. By contrast, the correlation between WAS and burnout was negative. Change in the mindfulness score was positively correlated with change in self-esteem and body responsiveness and negatively correlated with change in SHC, pain consequences, and burnout.

The mediator model – predicting mindfulness

Data concerning the effect of rehabilitation outcome on WA response through mindfulness are shown in Table 4. When investigating the mediator model (i.e. the effect of the
Table 2. Correlations at baseline among all study measures (N = 74).

|        | 2  | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14   |
|--------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| 1. WAS | -0.09 | -0.06 | -0.03 | -0.19 | -0.19 | -0.17 | -0.32<sup>a</sup> | -0.18 | -0.28<sup>b</sup> | -0.08 | -0.15 | 0.08 | -0.10 |
| 2. FFMQ-O | 0.51<sup>a</sup> | 0.24<sup>b</sup> | 0.18 | 0.27<sup>b</sup> | 0.71<sup>a</sup> | -0.11 | -0.21 | -0.13 | 0.35<sup>a</sup> | -0.09 | 0.37<sup>a</sup> | 0.14 |
| 3. FFMQ-D | 0.35<sup>a</sup> | 0.24<sup>b</sup> | 0.06 | 0.73<sup>a</sup> | -0.12 | -0.03 | -0.01 | 0.20 | 0.03 | 0.15 | 0.15 | 0.23<sup>b</sup> |
| 4. FFMQ-AA | 0.49<sup>a</sup> | 0.01 | 0.67<sup>a</sup> | -0.35<sup>a</sup> | 0.05 | -0.04 | 0.32<sup>a</sup> | -0.16 | 0.36<sup>a</sup> | 0.20 |
| 5. FFMQ-NJ | 0.08 | 0.65<sup>a</sup> | -0.18 | 0.13 | -0.03 | 0.15 | -0.02 | 0.43<sup>a</sup> | 0.57<sup>a</sup> |
| 6. FFMQ-NR | 0.36<sup>a</sup> | 0.29<sup>b</sup> | 0.11 | 0.14 | 0.09 | 0.05 | 0.12 | 0.18 |
| 7. FFMQ-G | -0.18 | 0.00 | -0.04 | 0.35<sup>a</sup> | -0.06 | 0.45<sup>a</sup> | 0.43<sup>a</sup> |
| 8. PBO | 0.24<sup>b</sup> | 0.57<sup>a</sup> | -0.37<sup>a</sup> | 0.42<sup>a</sup> | -0.29<sup>b</sup> | -0.20 |
| 9. PI | 0.70<sup>a</sup> | -0.09 | 0.59<sup>a</sup> | -0.27<sup>b</sup> | -0.10 |
| 10. PC | -0.19 | 0.63<sup>a</sup> | -0.39<sup>a</sup> | -0.29<sup>b</sup> |
| 11. BR | -0.07 | 0.23<sup>b</sup> | 0.06 |
| 12. SHC | -0.35<sup>a</sup> | -0.20 |
| 13. SOM | -0.44<sup>a</sup> |
| 14. S-E | -0.44<sup>a</sup> |

Note: WAS, Work Ability Score; FFMQ, Five Facet Mindfulness Questionnaire; FFMQ-O, FFMQ-Observe; FFMQ-D, FFMQ-Describe; FFMQ-AA, FFMQ-Act Aware; FFMQ-NJ, FFMQ-Nonjudge; FFMQ-NR, FFMQ-Nonreact; FFMQ-G, FFMQ-Global; PBO, personal burn out; PI, pain intensity; PC, pain consequences; SHC, subjective health complaints; SOM, sense of mastery; BR, body responsiveness; S-E, self-esteem.

<sup>a</sup>Correlation is significant at the p < .01 level (two-tailed).
<sup>b</sup>Correlation is significant at the p < .05 level (two-tailed).
predictors on the mediator; a path in Figure 1), all predictors, except for pain intensity, independently predicted change in the mindfulness score. More explicitly, burnout, pain consequences, and subjective health complaints were inversely related to change in mindfulness, whereas body responsiveness, sense of mastery, and self-esteem were positively related to change in mindfulness.

The outcome model – predicting WA response

When investigating the total effects (i.e. before considering the mediator; “c path” in Figure 1) of the predictors of WA response, decreased personal burnout and enhanced self-esteem were both unique predictors of a positive WA response. After including the mediator, however, no direct effect (c’ path in Figure 1) remained statistically significant. Mindfulness predicted a positive WA response. Increased self-esteem explained 38% of the variation in WA response, whereas decreased personal burnout explained 34% of the variation in WA response.

Indirect effects on WA response through mindfulness

The possible indirect effects of multiple predictors on WA response through mindfulness were investigated. All indirect paths were significant (bias-corrected CI did not include zero) except for pain intensity (Table 4). In other words, higher sense of mastery and self-esteem predicted higher WA through enhanced mindfulness. Furthermore, decreased personal burnout, pain consequences, and SHC predicted higher mindfulness, which in turn predicted higher WA.

Discussion

The study aim was to investigate whether changes in mindfulness level predict a successful WA response and to examine the effects of an MVRP on WA response through
mindfulness. Our data indicate that WA-responders improved significantly on all facets of mindfulness except for the facet of nonreactivity, while WA-nonresponders did not improve on any of the five facets of mindfulness. Mindfulness stands out as a strong predictor of WA response in our tests (see Table 4). This is consistent with previous research on the effects of mindfulness on depression and anxiety (De Vibe et al., 2012), stress and burnout (Cohen-Katz et al., 2005), and pain (Esmer et al., 2010), all of which are health conditions associated with poor WA and responsible for most long-term sick leave

| Table 4. Investigating indirect effects. Dependent variable: WA response. |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
|                             | Mediator model              | Outcome model               |                             |
|                             | Total                       | Direct                      | Indirect                    | BC 95% CI                   |
|                             | PE(SE)                      | PE(SE)                      | PE(SE)                      | LL                          |
|                             |                             |                             |                             | UL                          |
| Model 1                     | PBO (X)                     | −.091 (.016)***             | −.037 (.016)*               | −.014 (.019)                | .028 (.018)                | −.071 | −.003 |
|                             | FFMQ-G (M)                  | .309 (.130)*                |                             |                             |                             |       |
|                             | Age                         | −.045 (.029)                |                             |                             |                             |       |
|                             | Sex                         | 1.329 (.755)                |                             |                             |                             |       |
| Model 2                     | PI (X)                      | −.064 (.058)                | .024 (.041)                 | .054 (.050)                 | .358 (.119)*                | −.023 (.036) | −.116 | .116 |
|                             | FFMQ-G (M)                  |                             |                             |                             |                             |       |
|                             | Age                         |                             |                             |                             |                             |       |
|                             | Sex                         | 1.350 (.745)                |                             |                             |                             |       |
| Model 3                     | PC (X)                      | −.077 (.018)**              | −.022 (.015)                | .0002 (.017)                | .342 (.127)**               | −.026 (.015) | −.062 | −.006 |
|                             | FFMQ-G (M)                  |                             |                             |                             |                             |       |
|                             | Age                         |                             |                             |                             |                             |       |
|                             | Sex                         | 1.196 (.735)                |                             |                             |                             |       |
| Model 4                     | BR (X)                      | .243 (.049)**               | .015 (.040)                 | −.088 (.054)                | .460 (.142)**               | .112 (.053) | .041 | .235 |
|                             | FFMQ-G (M)                  |                             |                             |                             |                             |       |
|                             | Age                         |                             |                             |                             |                             |       |
|                             | Sex                         | 1.091 (.755)                |                             |                             |                             |       |
| Model 5                     | SHC (X)                     | −.268 (.059)**              | −.044 (.047)                | .045 (.061)                 | .386 (.129)**               | −.103 (.061) | −.251 | −.026 |
|                             | FFMQ-G (M)                  |                             |                             |                             |                             |       |
|                             | Age                         |                             |                             |                             |                             |       |
|                             | Sex                         | 1.221 (.733)                |                             |                             |                             |       |
| Model 6                     | SOM (X)                     | .406 (.079)**               | .104 (.070)                 | −.034 (.087)                | .376 (.137)**               | .153 (.076) | .046 | .334 |
|                             | FFMQ-G (M)                  |                             |                             |                             |                             |       |
|                             | Age                         |                             |                             |                             |                             |       |
|                             | Sex                         | 1.215 (.734)                |                             |                             |                             |       |
| Model 7                     | S-E (X)                     | .302 (.042)**               | .097 (.047)**               | .009 (.059)                 | .339 (.137)**               | .103 (.070) | .016 | .263 |
|                             | FFMQ-G (M)                  |                             |                             |                             |                             |       |
|                             | Age                         | −.046 (.029)                |                             |                             |                             |       |
|                             | Sex                         | 1.235 (.736)                |                             |                             |                             |       |

Note: Dependent variable (DV): WA response (1 = WA-responders, 0 = WA-nonresponders); X, independent variable (IV); M, mediator; PBO, personal burn out; PI, pain intensity; PC, pain consequences; BR, body responsiveness; SHC, subjective health complaints; SOM, sense of mastery; S-E, self-esteem; FFMQ-G, Five Facet Mindfulness Questionnaire-Global; mediator model, effect of IV on M, "a path"; outcome model, effect of IV and M on DV; PE(SE), bootstrapped point estimate (standard deviation); total effect, effect of IV on DV (before considering the M, "c path"); direct effect, effect of IV on DV (not via the M, "c path"); indirect effect, effect of IV on DV through M, "ab path"; BC 95% CI, bias-corrected 95% confidence interval (BC confidence interval not including zero in bold). Model 1: $R^2 = .34$, $F = 12.27$, $p < .01$. Model 2: $R^2 = .06$, $F = 1.35$, $p > .05$. Model 3: $R^2 = .24$, $F = 7.11$, $p < .01$. Model 4: $R^2 = .29$, $F = 9.57$, $p < .01$. Model 5: $R^2 = .26$, $F = 8.15$, $p < .01$. Model 6: $R^2 = .30$, $F = 10.19$, $p < .01$. Model 7: $R^2 = .38$, $F = 14.01$, $p < .01$.

**Statistically significant ($p < .01$) point estimate.

*Statistically significant ($p < .05$) point estimate.
Moreover, the present findings expand on previous work by identifying the direct effect of mindfulness on WA response.

As shown in Table 1, WA-nonresponders did not enhance their mindfulness over the course of the program as measured by any facet of the FFMQ. A recently published study on this sample (Vindholmen, Haugen, Høigaard, & Seiler, 2015), revealed that, at baseline, the WA-nonresponders demonstrated significantly higher pain intensity level and lower sense of mastery than WA-responders. Therefore, it is possible that high pain intensity, low sense of mastery, or the combination of these two factors in the WA-nonresponder group at baseline made them less capable of learning and practicing mindfulness. Previous research has identified cognitive impairment associated with pain as a major obstacle to rehabilitation (Moriarty, McGuire, & Finn, 2011). Furthermore, perceived control or sense of mastery is associated with a variety of successful outcomes (e.g. vocational rehabilitation, health, motivation, self-esteem, and achievement) (Millet, 2005; Selander, Mar, netoft, & Åsell, 2007; Skinner, 1996). Unfortunately, there is a lack of knowledge about the relationship between pain intensity, sense of mastery/control, mindfulness, and WA. A longitudinal controlled cohort study is needed to broaden knowledge about this relationship.

When testing whether changes in personal health factors predict WA response, as shown in Table 4, both self-esteem and personal burnout were significant, independent predictors of WA response; a significant total effect on WA was also identified. An examination of the indirect effect of rehabilitation outcome on WA response through mindfulness found that mindfulness mediated the effect of both personal burnout and self-esteem on WA response. In other words, WA was positively affected through mindfulness when individuals experienced decreased personal burnout and/or enhanced self-esteem. The important effect of mindfulness training on burnout and self-esteem has previously been documented (Brown & Ryan, 2003; Cohen-Katz et al., 2005). Furthermore, the results of the present research add to the literature showing that both decreased personal burnout and increased self-esteem significantly and independently predict WA response during an MVRP. Changes in the independent variables burnout and self-esteem showed negative correlations in our sample (Table 3), underlining the intertwined nature of these concepts, or that one aspect of burnout may be diminished self-esteem (Gold & Roth, 1993).

In the present study, the effect of decreased personal burnout and/or increased self-esteem on WA response was mediated by mindfulness (Table 4). One explanation for how mindfulness mediates the relationship between personal burnout and WA response may be the strong focus on experiencing and accepting what was taking place in the present moment, both inside and outside the person, and this shift in focus may have released positive energy and decreased burnout. Brown and Ryan (2003) argue that individuals with greater mindfulness experience less stress and greater subjective well-being. In the present study, the results in Table 3 show that the personal burnout variable correlated negatively with the FFMQ-observe variable, which refers to giving one’s attention to internal and external experiences such as sensations, cognitions, emotions, sights, sounds, and smells. In other words, decreased personal burnout is related to enhanced attention to internal and external experiences. This agrees with several researchers (Hölzel et al., 2011).
who have highlighted attention regulation as an especially important mechanism of mindfulness.

Furthermore, the results in Table 4 show that mindfulness mediates the relationship between self-esteem and WA response. These results are in accordance with Ryan and Brown (2003), who argue that when provided mindfulness training and teaching, individuals will become more attentive to what is taking place in the present moment and in turn less concerned in esteeming the self. Furthermore, self-esteem will increase in such circumstances and, in turn, when esteeming the self is not a concern, individuals can more easily release their attention and energy to focus on the right responses, all things considered. Taking a closer look, the correlations between change variables in the present study (see Table 3) show that self-esteem is positively correlated with all FFMQ facets (i.e. observe, describe, act aware, nonreact, and nonjudge) and positively correlated with WAS.

The present study identified an indirect effect of body responsiveness on WA through mindfulness; that is, a higher level of body responsiveness predicted a higher level of mindfulness, which in turn predicted a higher level of WA. We are hopeful that these results will encourage further, prospective studies exploring these connections. Many mechanisms may cooperate in this process. In the present study a high negative correlation was found between changes in body responsiveness and changes in personal burnout (see Table 3). More specifically, enhanced body responsiveness is related to decreased burnout. Moreover, body responsiveness correlates positively with self-esteem. That is, enhanced body responsiveness is related to enhanced self-esteem. This finding is in line with Hölzel et al. (2011), who suggest that enhanced body awareness may be closely related to changes in one’s perspective on oneself and may replace a narrative form of self-reference. Additionally, enhancement of body awareness may have relevance for affect regulation. Further research in this area should emphasize and explore the role of body awareness and body responsiveness in vocational rehabilitation.

Furthermore, an indirect effect of sense of mastery on WA response through mindfulness was identified; that is, an enhanced sense of mastery predicted an enhanced mindfulness level, which in turn predicted higher WA. Only tentative conclusions can be drawn, and hopefully this finding will encourage further exploration of the constructs of control, mindfulness, and WA in a prospective study. Lack of control is regarded as a hindrance in vocational rehabilitation (Millet, 2005), and knowledge about mechanisms by which control may be enhanced is needed to optimize vocational rehabilitation. A positive correlation was observed between changes in sense of mastery and changes in WAS (Table 3). More explicitly, an enhanced sense of mastery is related to an increased WA. Furthermore, a positive correlation was found between changes in sense of mastery and changes in body responsiveness, indicating that enhanced body responsiveness is related to enhanced sense of mastery. This finding may indicate that by learning to value their body’s feedback and being trained in “listening” to the sensations of their bodies for guidance, individuals experience a greater ability to control and influence their life situation. Changes in sense of mastery also correlated positively with changes in self-esteem. In other words, enhanced sense of mastery is related to enhanced self-esteem. Enhancing these two dimensions of self-concept might buffer against stress; Pearlin et al. (1981) argue that life events and chronic strains are more likely to cause stress when they also result in a diminishment of self (e.g. sense of mastery and self-esteem).
Only change in pain intensity had a nonsignificant indirect effect on WA response. Whether pain intensity moderates both the direct effect and the mediating effect of mindfulness on WA response should be investigated in a prospective, longitudinal study.

**Strengths and limitations**

A major strength of the study is its ecological validity. This study builds on data from individuals referred to an existing governmental program, funded by the NLWA. However, the present study must also be seen in light of its limitations. Assessing the change in the independent variables, the change in the mediator and the change in the outcome (WA-response) took place simultaneously. Therefore, the mediation analyses have the limitations associated with cross-sectional studies. A prospective, controlled design is needed to establish clear indices of direction of causality. However, in accordance with Hayes’ (Hayes, 2013) recommendations, limitations in the data collection efforts did not constrain the statistic tools chosen to analyze what the data revealed about the process studied. Therefore, a major strength of this work is the statistical tools utilized. The bootstrapping technique has higher power while maintaining acceptable control over type I errors and is therefore recommended over the Sobel test (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002).

In the present study, the outcome variable (WAS change) was dichotomized between WA-responders and WA-nonresponders in order to answer our research question. When conducting the mediation analyses using the continuous WAS change as the dependent variable, the results supported similar conclusions (see appendix). All indirect effects were the same, but when investigating the total effects, sense of mastery was a unique predictor of WAS change, and self-esteem not (Table A1). This should be considered when interpreting the results because dichotomization of continuous variables may yield misleading conclusions (Babyak, 2004). However, in the present sample, an important assumption underlying linear regression, normal distribution of the WAS change variable, was violated. As such, we argue that also from a statistical point of view, logistic regression was preferable. Additionally, bootstrapping is considered most appropriate to test mediation with small samples and dichotomous variables (Preacher & Hayes, 2004; Shrout & Bolger, 2002). Moreover, in the present sample self-esteem and sense of mastery display a positive correlation (Tables 2 and 3), and researchers have suggested that the concept of self-esteem and the concept of perceived control or sense of mastery perhaps are indicators of a common core construct (Judge, Erez, Thoresen, & Bono, 2002; Skinner, 1996).

Because there are few data available within the research literature providing insight into the relationship between mindfulness and WA, the theoretical foundation for the causal order between these two variables might be limited. Mathieu and Taylor (2006) argue that without an experimental or longitudinal design, one might test a mediation model on the basis of the theoretical ordering of variables, and that specification of the causal order of variables in mediational relationships is first and foremost a theoretical exercise.

A key limitation of the present study is that we have not controlled for multiple independent variables, for example, personal health factors, in testing the main effects. This is because multiple mediation analyses were performed, and thus it is not possible to estimate the portion of one predictor X’s effect on outcome Y (directly or indirectly
through M) that is unique to that X relative to the other Xs in the model. In the present study the independent variables canceled each other out when included in one model, and therefore multiple mediation analyses, each with a single X, were preferred. As shown in Table 3, the independent variables for personal health factors (Xs) were highly correlated in our sample. This, according to Hayes (2013), is the danger in including multiple Xs in a mediation model: highly correlated Xs may cancel out each other’s effects. However, when several models are estimated, each focusing on a single independent variable, the results then yield an estimate of X’s direct and indirect effects on Y and, potentially, the effects of other Xs which are not included and controlled for in the model. Either approach is legitimate, yet both sets of results should be interpreted with caution (Hayes, 2013).

The study lacked strict randomization because we did not have the opportunity to influence the assignment of individuals to the program. However, the individuals represent all participants seen over a period of time. Since the population sampled in this study were all on long-term sick leave, generalization to other settings is limited.

Conclusion

A better understanding of the mechanisms that may induce a positive WA response is important for the development of optimal intervention programs in vocational rehabilitation. These results suggest that enhancing mindfulness skills may be important for improving WA. Enhanced mindfulness over the course of the program significantly predicted a successful WA response. Furthermore, decreased burnout and enhanced self-esteem were both unique predictors of a positive WA response. Mindfulness mediated the effects of personal burnout and self-esteem on participants’ WA response. Both enhanced body awareness and sense of mastery, and decreased pain consequences and SHC, are indirectly related to successful WA response through increased mindfulness. This study provides empirical justification for longitudinal studies and randomized controlled trials to assess the causal direction of these relationships.

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Appendix

Table A1. Investigating indirect effects. Dependent variable: WAS change (N = 74).

| Model | Mediator model | Total | Direct | Indirect | BC 95% CI |
|-------|----------------|-------|--------|----------|-----------|
|       | PE(SE)         | PE(SE) | PE(SE) | PE(SE)   | LL        | UL        |
| Model 1 | PBO (X)        | −.091 (.022)** | −.053 (.017)** | −.032 (.021) | −.021 (.011) | −.048 | −.004 |
|        | FFMQ-G (M)     |        |        |          |           |          |          |
|        | Age            |        |        |          | .234 (.109)** |           |          |
|        | Sex            |        |        | .012 (.029) |           |          |          |
|        | 1.045 (.710)   |        |        |          |           |          |          |
| Model 2 | PI (X)         | −.064 (.080) | .085 (.054) | .108 (.054) | −.023 (.031) | −.098 | .015 |
|        | FFMQ-G (M)     |        |        |          | .368 (.093)** |           |          |
|        | Age            |        |        | .001 (.031) |           |          |          |
|        | Sex            |        |        | 1.084 (.745) |           |          |          |
| Model 3 | PC (X)         | −.077 (.020)** | −.028 (.017) | .003 (.017) | −.026 (.010) | −.049 | −.010 |
|        | FFMQ-G (M)     |        |        |          | .342 (.127)** |           |          |
|        | Age            |        |        | −.045 (.029) |           |          |          |
|        | Sex            |        |        | 1.196 (.735) |           |          |          |
| Model 4 | BR (X)         | .243 (.077)** | .031 (.059) | −.073 (.055) | .104 (.053) | .045 | .206 |
|        | FFMQ-G (M)     |        |        | .428 (.112) |           |          |          |
|        | Age            |        |        | −.030 (.032) |           |          |          |
|        | Sex            |        |        | .704 (.745) |           |          |          |
| Model 5 | SHC (X)        | −.268 (.082)** | −.023 (.072) | .090 (.072) | −.113 (.041) | −.213 | −.046 |
|        | FFMQ-G (M)     |        |        | .423 (.125)** |           |          |          |
|        | Age            |        |        | −.015 (.031) |           |          |          |
|        | Sex            |        |        | .857 (.730) |           |          |          |
| Model 6 | SOM (X)        | .406 (.104)** | .253 (.071)** | −.156 (.079) | .097 (.052) | .021 | .199 |
|        | FFMQ-G (M)     |        |        | .376 (.137)** |           |          |          |
|        | Age            |        |        | −.047 (.029) |           |          |          |
|        | Sex            |        |        | 1.215 (.734) |           |          |          |
| Model 7 | S-E (X)        | .302 (.063)** | .093 (.066) | .017 (.082) | .110 (.046) | .037 | .216 |
|        | FFMQ-G (M)     |        |        | .365 (.128)** |           |          |          |
|        | Age            |        |        | −.014 (.031) |           |          |          |
|        | Sex            |        |        | .889 (.738) |           |          |          |

Notes: Dependent variable (DV): WAS change; X, independent variable (IV); M, Mediator; PBO, Personal Burn Out; PI, Pain Intensity; PC, Pain Consequences; BR, Body Responsiveness; SHC, Subjective Health Complaints; SOM, Sense of Mastery; S-E, Self-Esteem; FFMQ-G, Five Facet Mindfulness Questionnaire-Global; mediator model, effect of IV on M, “a path”; outcome model, effect of IV and M on DV; PE(SE), bootstrapped point estimate (standard deviation); total effect, effect of IV on DV (before considering the M, “c path”); direct effect, effect of IV on DV (not via the M, “c path”); indirect effect, effect of IV on DV through M, “ab path”; BC 95% CI, bias-corrected 95% confidence interval (BC confidence interval not including zero in bold). Model 1: $R^2 = .34$, $F = 7.32, p < .01$. Model 2: $R^2 = .06$, $F = 1.46, p > .05$. Model 3: $R^2 = .24$, $F = 5.87, p < .01$. Model 4: $R^2 = .29$, $F = 4.31, p < .01$. Model 5: $R^2 = .26$, $F = 4.54, p < .01$. Model 6: $R^2 = .30$, $F = 5.94, p < .01$. Model 7: $R^2 = .38$, $F = 8.56, p < .01$.

**Statistically significant ($p < .01$) point estimate.
*Statistically significant ($p < .05$) point estimate.

The mediator model – predicting mindfulness

In Table A1 data concerning the effect of rehabilitation outcome on WAS change through mindfulness are shown. When assessing the mediator model (i.e. the effect of the predictors on the
mediator; a path in Figure 1), all predictors, except for pain intensity, independently predicted change in the mindfulness score. More specifically, sense of mastery, self-esteem, and body responsiveness were positively related to change in mindfulness, whereas burnout, pain consequences, and subjective health complaints were inversely related to change in mindfulness.

**The outcome model – predicting WAS change**

When analyzing the total effects (i.e. before considering the mediator; c-path in Figure 1) of the predictor on the WAS change variable, decreased personal burnout and enhanced sense of mastery were both unique predictors of a positive WAS change response. However, after including the mediator, no direct effect (c' path in Figure 1) remained statistically significant. Mindfulness predicted a positive WAS change response. Increased sense of mastery explained 30% of the variation in WAS change, whereas personal burnout explained 34% of the variation in WAS change.

**Indirect effects on WAS change through mindfulness**

The potential indirect effects of multiple predictors on WAS change through mindfulness were analyzed. All indirect paths were significant (bias-corrected CI did not include zero) except for pain intensity (Table A1). In other words, decreased personal burnout, pain consequences, and SHC predicted higher mindfulness, which in turn predicted higher WAS change. Furthermore, higher sense of mastery and self-esteem predicted higher WAS change through enhanced mindfulness.