Mindfulness, Mindful Coping, Burnout, and Work Engagement

Student: M.F. Bus

Student number: 4221451

Supervisor 1: Dr. T. G. E. Damen

Supervisor 2: Dr. M. D. den Ouden

Utrecht University

Samenvatting

In dit onderzoek zijn data verzameld bij 160 werknemers van de Radboud Universiteit en de Hogeschool van Arnhem en Nijmegen die een *mindfulness-based stress reduction* training (MBSR) hebben gevolgd. Het doel was om het effect van mindfulness op werk gerelateerde psychologische uitkomsten te verklaren. De resultaten laten zien dat mindfulness geen personal resource is in het JD-R model; alleen bij hoge waarden van mindfulness verklaard mindfulness een deel van de relatie tussen werkbronnen en bevlogenheid. Daarnaast bewijst deze studie het effect van MBSR op verschillende uitkomstmaten en de rol van mindfulness hierin. De training blijkt effect te hebben. Verder blijkt uit de studie dat mindful coping een werkend bestanddeel is van de MBSR training. Beperkingen van dit onderzoek en de noodzaak van verder onderzoek worden bediscussieerd.

Abstract

A study was carried out among 160 employees of Radboud University and the University of Applied Sciences in Nijmegen, all following a *mindfulness-based stress reduction* (MBSR) training. The aim of this research was to clarify the effect mindfulness has on work-related psychological outcomes. The results demonstrate that mindfulness does not work as a personal resource according to the JD-R model, only when mindfulness is high does it mediate the relationship between job resources on work engagement. There is evidence for the effect of the MBSR training on several outcomes and the vital role of mindfulness. Lastly, mindfulness is linked to the mindful coping model, and evidence is found that mindful coping is a functional mechanism in the MBSR training. Limitations and further research are discussed.

Mindfulness, Mindful Coping, Burnout, and Work Engagement

In the Dutch working population, 11.6 percent suffers from burnout-related complaints (CBS, 2013). Therefore, *burnout* is the number one work-related disease in the Netherlands Unsurprisingly, helping people prevent burnout and forming a positive fulfilling work-related state of mind called *work engagement* (Schaufeli & Bakker, 2010) are growing research topics. A popular element of interventions to prevent burnout is *mindfulness*. Mindfulness is a non-judgmental state of mind in which attention to experiences in the present moment predominates (Kabat-Zinn, 1990). Mindfulness has been proven capable of both preventing and curing burnout-related complaints (van Dijk, van Ravenstein, & Speckens, 2010) and can even boost work engagement (Leroy, Dimitrova, & Sels, 2013). However the mechanisms are unclear. The current research is composed of two studies with the following aim: understanding how and why mindfulness can have a positive effect on *work-related psychological outcomes* (e.g. burnout, work engagement). The first study investigates whether the Job Demands Resources model (JD-R model) (Bakker & Demerouti, 2007; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Schaufeli & Bakker, 2004) can clarify the role of mindfulness in the exhaustion process that leads to burnout and in the motivational process that leads to work engagement. Everyone is mindful to some degree, and thus mindfulness is a trait (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). Therefore, mindfulness may be a *personal resource* as in the JD-R model. If mindfulness acts as a personal resource, it may diminish the positive relationship between job demands (JD) and exhaustion. Furthermore, mindfulness may partially explain the positive relationship between job resources (JR) and work engagement; see Figure 1.

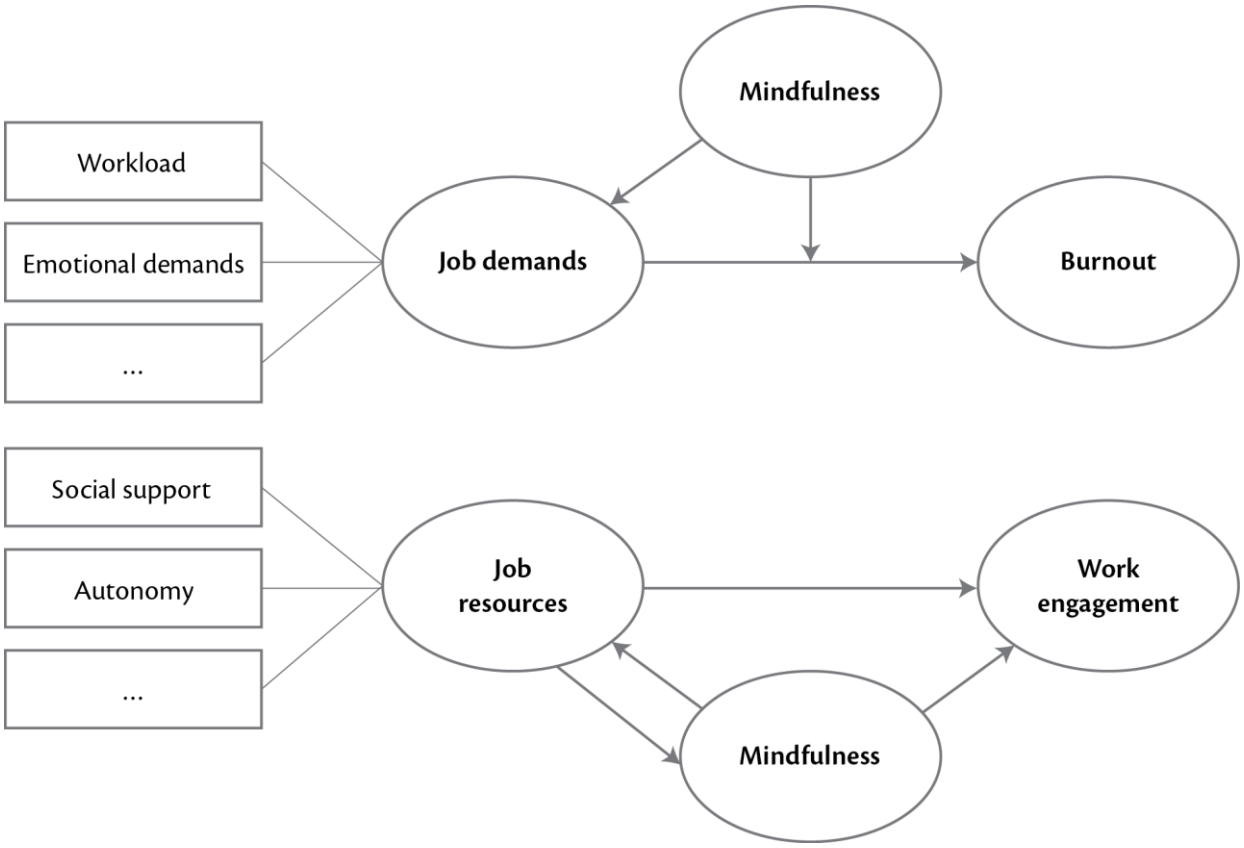

Figure 1. The JD-R-model with mindfulness as a personal resource.

The first study investigates whether mindfulness acts as a personal resource in the JD-R model. The second study explores the effect of enhancing mindfulness by a popular mindfulness training program called *mindfulness-based stress reduction* (MBSR), as well as the role of an operationalization of mindfulness, *mindful coping*. To address the effect of mindfulness on burnout and work engagement, this part of the research investigates whether an increase in mindfulness can enable people to better cope with stressors and thereby reduce exhaustion. Secondly, it is studied whether an increase in mindfulness can increase work engagement. Lastly, the role of mindful coping is examined.

Burnout and work engagement

There is no unequivocal definition of burnout, though it certainly is a work-related health impairment. Burnout evolves through exhaustion as a consequence of depleting energy sources due to chronic exposure to job stress (Maslach, Schaufeli, & Leiter, 2001). Work engagement is a widely used term, and has various definitions. This paper uses the definition from Schaufeli and Bakker (2010), as it is the most scientifically accepted definition of work engagement: "… a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption." Burnout and work engagement may look like opposites but are related constructs. People with a burn-out have a lack of energy, while work-engaged people seem to be brimming over with energy. However, burnout and work engagement are not mutually exclusive; an unengaged worker does not necessarily suffer from burnout, and a worker who does not suffer from a burnout is not necessarily engaged. Schaufeli, and Bakker (2010) therefore state that burnout and work engagement are two different constructs and should be measured independently. Nonetheless, both constructs influence work-related health: burnout is a work-related health impairment, and engaged workers suffer fewer health-related complaints (Shimazu & Schaufeli, 2009). Enhancing work-related health is beneficial for both employee and employer when it comes to improving self-rated health (Hakanen, Bakker, & Schaufeli, 2006) and enhancing work achievement (Schaufeli & al, 2001; Airila, Hakanen, Schaufeli, Luukkonen, Punakallio, & Lusa, 2014; Bakker & Bal, 2010; Halbesleben & Wheeler, 2008). It is therefore necessary to investigate which factors influence these psychological work-related outcomes.

Mindfulness as a personal resource

How can the JD-R model help to explain what the role of mindfulness and its beneficial effects are on psychological work-related outcomes? To answer this question, the constructs mindfulness and *personal resources* are first explained. Mindfulness is described as a "non-

elaborative, non-judgmental, present-centered awareness in which each thought, feeling, or sensation that arises in the attentional field is acknowledged and accepted as it is" (Kabat-Zinn, 1990; Segal, Williams, & Teasdale, 2002). If someone is in a mindful state of mind, one focuses only on his or her senses in relation to the present situation, without making a value judgement. For example, someone can eat an apple mindfully by deliberately focusing on his or her sense of taste, the sensations it produces, and his or her responses to those sensations. When the mind wanders off, out of the present situation, again the person tries to stay focused on the senses, sensations, and reactions of oneself. On the other hand, a person can be aware of eating an apple while thinking about the chores he or she has to do after eating the apple, an example of non-mindful behavior. By focusing on the task at hand, one controls his or her senses. Eating an apple is a simple activity, but mindfulness may also apply to more serious challenges. For example Monshat, et al. (2013) found that mindful people gained greater confidence in their ability to deal with life challenges. Therefore, mindfulness is a trait of oneself that can give people the feeling that they can control their environment successfully. With that in mind, a connection can be made with personal resources. Because personal resources are aspects of the self that refer to "an individual's sense of his or her ability to control and impact their environment successfully" (Hobfoll, Johnson, Ennis, & Jackson, 2003), mindfulness seems to be compatible with this definition. Therefore, it is essential to determine whether mindfulness acts as a personal resource.

As proposed by the JD-R model (Bakker et al., 2007; Demerouti et al., 2001; Schaufeli et al., 2004), exhaustion (in the long-term leading to burnout) and work engagement are outcomes of job demands (JD)(e.g. work pressure, emotional demands, etc.) and job resources (JR) (e.g. autonomy, social support, etc.). Personal resources (e.g. optimism, self-efficacy, and organization-based self-esteem) are found to explain a part of the relationship between JR and

work engagement: these constructs partially mediate that relationship (Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2007). Some specific personal resources (e.g. self-esteem and optimism) were proven to negatively moderate the relationship between JD and exhaustion (Makikangas & Kinnunen, 2003; Pierce & Gardner, 2004; Van Yperen & Snijders, 2000). The precise role of personal resources and their characteristics is a current research topic, and mindfulness has not yet been explored as a personal resource. The first study examines whether mindfulness acts as a personal resource in the JD-R model. Based on earlier findings (Xanthopoulou, et al., 2007; Makikangas & Kinnunen, 2003; Pierce & Gardner, 2004; Van Yperen & Snijders, 2000), the expectation was that mindfulness mediates the positive relationship between JR and work engagement (hypothesis 1). Furthermore, it was expected that mindfulness negatively moderates the positive relationship between JD and exhaustion (hypothesis 2).

Enhancing mindfulness

There are specific training programs to enhance mindfulness, such as mindfulness-based cognitive therapy (MBCT) and mindfulness-based stress reduction (MBSR). These programs are designed to enhance mindfulness and thereby improve psychological wellbeing. As the program's name implies, MBSR is especially designed to help people effectively regulate the impact of stress on their psychological wellbeing. MBSR training has been shown to effectively decrease stress and burnout-related complaints in several settings and populations (for meta-analytic review, see Khoury, Sharma, Rush, & Fournier, 2015; Bohlmeijer, Prenger, Taal, & Cuijpers, 2010; Collard, Avny, & Boniwell, 2008; Irving, Dobkin, & Park, 2009; Bishop, 2002; Proulx, 2003; Praissman, 2008; Chiesa & Serretti, 2009). MBSR has also proven to have a beneficial effect on several wellbeing-related outcomes, such as the experience of positive

emotions, coping capabilities, and purposefulness in life (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008). In a study from Nyklíček and Kuijpers (2008), mindfulness mediates the negative effect of MBSR on perceived stress and exhaustion. These studies show that a training of mindfulness has a positive effect on several psychological outcomes, but how does the training achieve these positive effects?

The mindful coping model

There are several proposed mechanisms to explain the effects of mindfulness. One of them is the *mindful coping model* (Garland, Gaylord, & Fredrickson, 2011). In this model, the stress-reducing effects of mindfulness are explained in two ways, see figures 2 and 3.

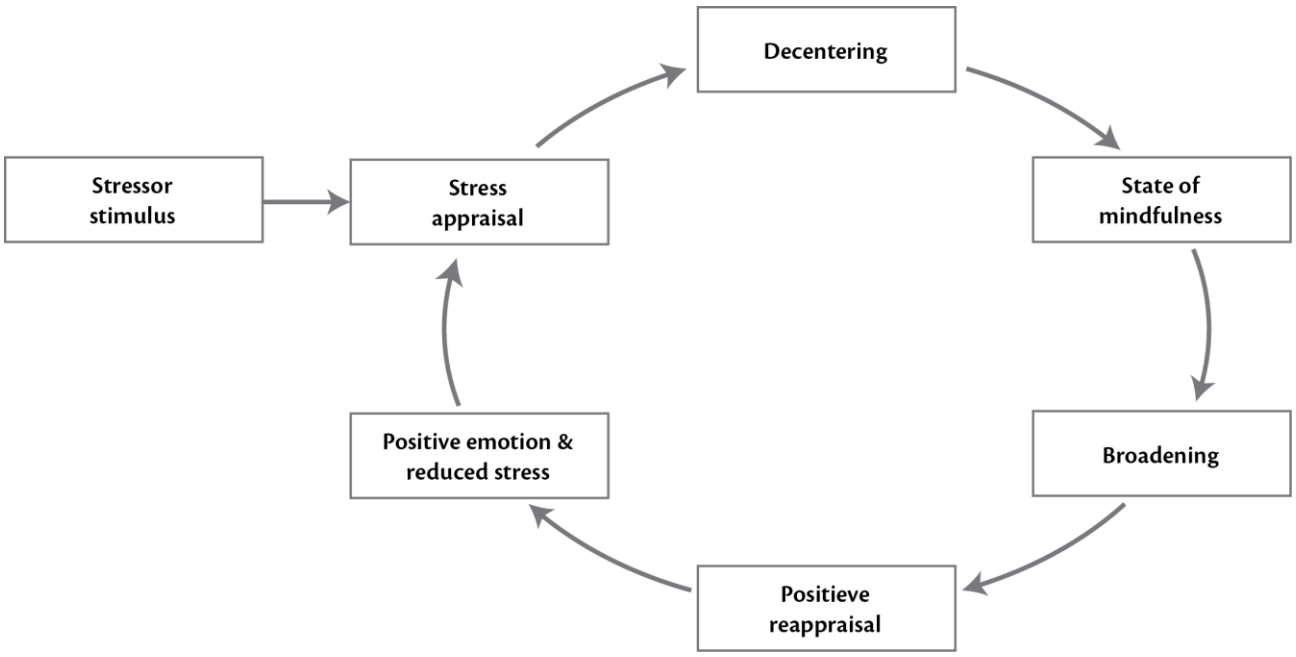

Figure 2. Part 1 of the mindful coping model (Garland, Gaylord, & Fredrickson, 2011)

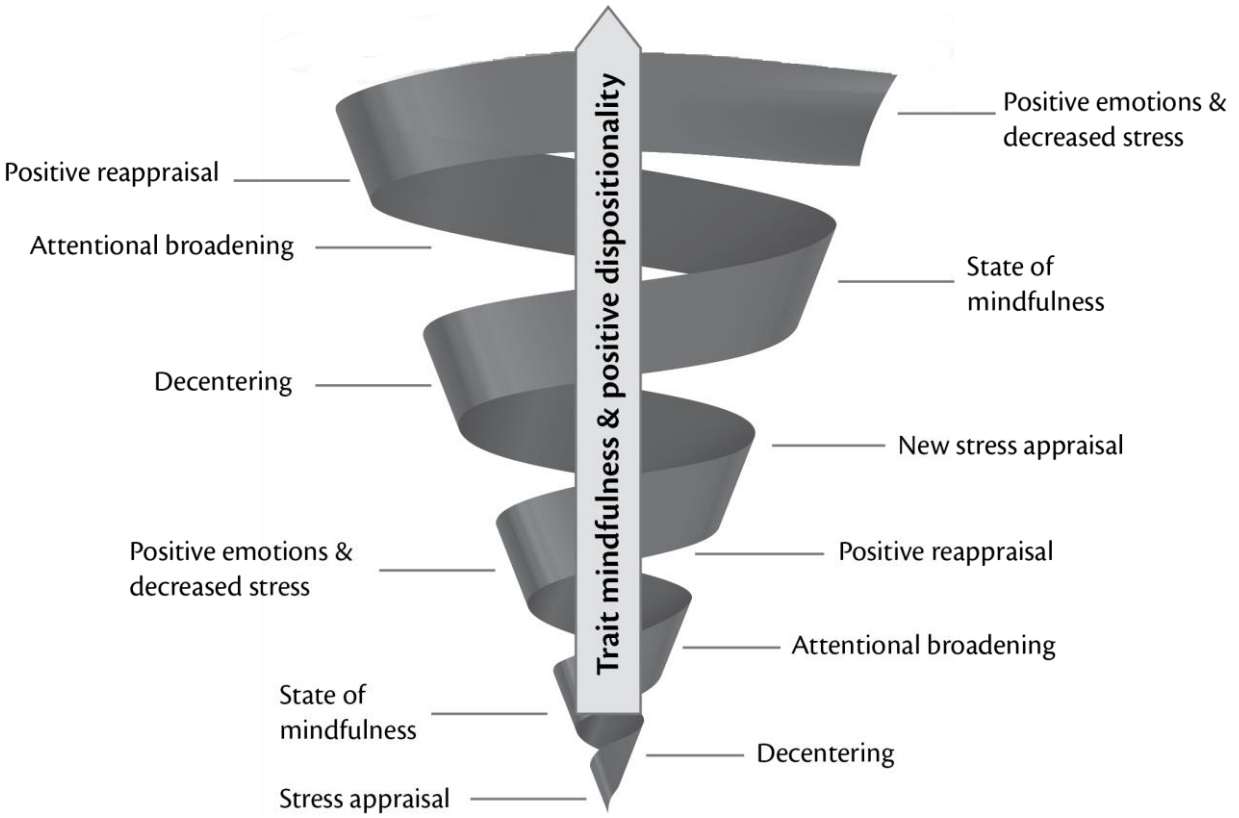

Figure 3. Part two of the mindful coping model (Garland, Gaylord, & Fredrickson, 2011)

The first process is called mindful coping and has a cross-sectional perspective. It shows how a stressor stimulus is appraised as a threat, harm, or loss that one is not capable of dealing with. Then the individual may use another more adapted response called *decentering*, in which one distances oneself from the initial stress appraisal. The individual then enters the *state of mindfulness*, wherein he or she attends to the dynamic process of consciousness itself rather than its contents. This mode increases attentional flexibility and broadens awareness, and thereby takes into account more information and other possible explanations for the given situation. This expanded, metacognitive awareness can then lead to a reappraisal of the initially as stressful experienced situation in a positive manner. This new attribution may arise either through a conscious process of reflection or a more automatic process, based on spontaneous insight. The

reappraisal of the event then results in positive emotions such as compassion, trust, confidence, and equanimity, that may reduce stress and affect subsequent appraisal processes. Mindful coping may lead to the second process, *trait mindfulness*, which has a longitudinal effect. By repeatedly going through the process of mindful coping, this ability improves (consciously and sub-consciously) and trait mindfulness increases, thereby reducing the impact of stressors with positive reappraisals. This is in line with recent research from Kiken, Garland, Bluth, Palsson, and Gaylord (2015). They found that state mindfulness, "the immediate experience of being mindful," eventually leads to something more lasting: being more mindful in life, so-called trait mindfulness.

The current research explores the effect of mindful coping with a newly developed questionnaire, thereby deepening the explanation for the mechanism by which mindfulness works. This questionnaire is called the *Three Situations Mindful Coping Questionnaire* and was developed to measure mindful coping. The respondents were asked to recall and describe three stressful events that they recently encountered and answer questions about those events. The questionnaire measures emotional, cognitive, and behavioral reactions to the stressful situations, and consists of three subscales: *decentering*, *awareness*, and *acknowledgment*. This subdivision matches with parts of the mindful coping model. Acknowledgement corresponds to the process of recognizing the first (non-mindful) stress appraisal. Decentering is similar to the decentering phase in the state of mindfulness. Awareness is a state of mindfulness that leads to broadening the awareness. Thus the Three Situations Mindful Coping Questionnaire is intended to measure the operational effect behind mindfulness. This research examines whether this questionnaire is a reliable and valid instrument for measuring mindfulness. Moreover a research aim is to determine whether mindful coping can explain the beneficial effects of MBSR. The effects of mindfulness and mindful coping are researched by investigating whether the difference in

mindfulness/mindful coping mediates the negative effect of MBSR on exhaustion and the positive effect of MBSR on work engagement. It is expected that both the gain in mindfulness and the gain in mindful coping mediate the negative relation between MBSR and exhaustion (hypotheses 3a and 3b). Furthermore, it is expected that both the gain in mindfulness and the gain in mindful coping mediate the positive relation of MBSR on work engagement (hypotheses 4a and 4b).

Present research

In this research, a group of workers of the Radboud University (RU) and the University of Applied Sciences Nijmegen (HAN) participated in an MBSR training and filled in a questionnaire before (pre-training) and after (post-training) MBSR. This questionnaire measures exhaustion, work engagement, JD, JR, mindfulness, and mindful coping. My hypotheses were:

1. Mindfulness mediates the positive relationship between JR and work engagement.
2. Mindfulness negatively moderates the positive relationship between JD and exhaustion.
3a. The gain in mindfulness mediates the negative relation between MBSR and exhaustion.
3b. The gain mindful coping mediates the negative relation between MBSR and exhaustion.
4a. The gain in mindfulness mediates the positive relation of MBSR on work engagement.
4b. The gain in mindful coping mediates the positive relation of MBSR on work engagement.

The cross-sectional data is used to examine hypotheses 1 and 2 and a combination of pre-training and post-training data is used to examine hypotheses 3 and 4.

Method

Participants

The data were collected at the Radboud University Centre for Mindfulness, part of the Radboud Medical Center in Nijmegen. In total 160 participants, all employees of the Radboud University (RU) and the University of Applied Sciences Nijmegen (HAN) participated in the research between February 2013 and December 2014.

The average age of the participants was 44.9 years old (*SD* = 12.13), with a range of 24 to 75 years. Seventy-three percent were female, and the average participant worked for 31.5 hours a week. The most common profession among the participants was medical specialists (10.6%) and the second largest profession was teachers (8.1%, of which 3.1% taught at the university). Furthermore, 6.8% were PhD students, 6.8% consultants, 5.6% nurses (of which 2.5% were specialists), and 4.4% psychologists. The rest of the participants had a variety of occupations (57.7%).

Design

The MBSR training was offered on a voluntary basis to the staff of RU and HAN. They could apply for the training via the website of the Radboud University, Centre for Mindfulness (https://www.radboudcentrumvoormindfulness.nl/). The costs for the training were €445. Some participants were able to use their training budget to pay for the training. Respondents completed a questionnaire before the eight-week MBSR training and a post-training questionnaire.

The MBSR training

The mindfulness training was modelled after the well-established and manualized MBSR programs developed by Kabat-Zinn (2003). The training took place over eight consecutive weeks, with weekly sessions of 2.5 hours after work. After the last session there was a silent retreat day. Groups had a minimum of 8 and a maximum of 16 participants. Certified mindfulness trainers guided the MBSR-training in facilities of the Radboud University. To deal more effectively with stress the training promoted: 1) to adopt an accepting attitude towards their own thoughts, feelings, and emotions; 2) to be more aware of experiences in the here and now; and 3) to learn not to judge their thoughts, feelings, and emotions. The sessions included meditation practices, and participants were encouraged to continue these meditation practices daily at home or work, during the training period and after the training had ended. Meditation practices typically took 30 to 90 minutes. Examples of meditation practices were: a mindful body scan, sitting meditation, walking meditation, mindful yoga, a mindful breathing meditation, and mindful awareness of thoughts, feelings, and emotions. Moreover, there was room for exchanging personal experiences with other participants and the trainer about the exercises and the training in general. Participants were given the personal responsibility for cultivating their own awareness during and after the training.

Procedure

All 160 participants completed the pre-training questionnaire, while 101 participants (63%) filled in the post-training questionnaire. This is a reasonably good response rate. Three follow-up emails were sent to remind the people that they did not fill in the post-training

questionnaire. The most frequently mentioned reason for not filling in the post-training questionnaire was the length of the questionnaire.

Measures

Job resources

JR were measured using two scales of the Vragenlijst Beleving en Beoordeling van Arbeid (VBBA), a Dutch questionnaire from Veldhoven and Meijman (1994) (see also De Jonge, Bosma, Peter, & Siegrist, 2000). The questionnaire has several subscales; for this research the subscales regulation options and social support were used to determine the JR. The JR scale consisted of 10 items and showed good reliability before (Cronbach's alpha = .76) and after the training (Cronbach's alpha = .81). A typical item was: "Are you able to regulate your own working pace?" All the items of the subscales were scored on a five-point scale, ranging from (1) *"never"* to (5) *"always"*. The scores were then recorded and added up to scale scores in accordance with the manual from Veldhoven and Meijman (1994). High scores referred to high JR.

Job demands

JD were assessed with three other subscales from the VBBA: workload, emotional demands, and cognitive demands. They also showed good reliability before (Cronbach's alpha = .91) and after training (Cronbach's alpha = .84). A typical item was: "Is your work emotionally demanding?" The items of the subscales were scored on the same five-point scale described

above. The scores were also coded in the same manner (Veldhoven & Meijman, 1994). High scores referred to high JD.

Exhaustion

Exhaustion was measured with the five-item subscale of the Dutch version (Schaufeli & Van Dierendonck, 2000; Schaufeli, & Bakker, 2004) of the Maslach Burnout Inventory General Survey (Schaufeli, Leiter, Maslach, & Jackson, 1996). This subscale includes five items, such as "I feel frustrated by my job." The internal consistency of the scale was very good before (Cronbach's alpha = .91) and after the training (Cronbach's alpha = .92). The items of the exhaustion scale were scored on a six-point scale, ranging from (0) *"never"* to (6) *"always*". All negatively keyed items were recoded so that higher scores referred to a higher score on the construct.

Work engagement

Work engagement was measured with the nine-item version of the Utrecht Work Engagement Scale (UWES; Schaufeli, & Bakker, 2003). The UWES has three underlying dimensions, which are measured with three items each: vigor (e.g. ''When I work, I feel fit and strong"), dedication (e.g. ''I am enthusiastic about my job"), and absorption (e.g. ''I get carried away when I am working"). High scores on all three dimensions indicate high work engagement. Items were scored on a scale ranging from (0) *"never"* to (6*) "always"*. The internal consistency of the scale was very good before (Cronbach's alpha = .92) and after (Cronbach's alpha = .93).

Mindfulness

Mindfulness was measured with the 24-item short Dutch version of the Five Facet Mindfulness Questionnaire (FFMQ-SF) (Bohlmeijer, ten Klooster, Flederus, Veehof, & Baer, 2011). The FFMQ-SF has five underlying dimensions, which are measured with five items each, except for the subscale "observing" (e.g. "I experience bodily sensations, like the wind in my hair or the sun on my face") which includes four items. The other scales are "describing" (e.g. "I master the skill to describe my feelings in words"), "conscious acting" (e.g. "It appears as if I am doing things automatically, without being conscious of what I am doing"), "non-judging" (e.g. "I tell myself not to think what I am thinking"), "non-reactive" (e.g. "I observe my feelings, without getting carried away by them"). Items were scored on a Likert scale ranging from (1) *"never"* to (5*) "always*." The scale showed good internal consistency before (Cronbach's alpha = .80) and after training (Cronbach's alpha = .82). Higher scores indicate that individuals are more mindful.

Mindful coping

Mindful coping was measured using a scale that is still in development, the Three Situations Mindful Coping Questionnaire. This scale is a self-rating questionnaire that measures the cognitive, emotional, and behavioral reaction to stressful situations. The respondent is asked to recall three stressful situations that he or she encountered recently and to answer nine questions about these situations. Items were scored on a scale ranging from (1*) "not at all"* to (10) *"very much*." The three underlying constructs it intends to measure were *decentering* (e.g. "I felt overwhelmed by emotions"), *awareness* (e.g., "I was aware of my emotions as they were at that moment"), and *recognition* (e.g. "I tried to ignore my emotions"). The scale showed good internal consistency before (Cronbach's alpha = .87). Higher scores indicate that people were more skilled in mindful coping. To explore the dimensionality of the three situations questionnaire, factor analysis was performed. The analysis was performed on the data of the first

situation with the pre-training data. To explore the dimensionality, principal component analysis (PCA) was performed. The PCA analysis showed that based on the Kaiser criterion, the Three Situations Mindful Coping Questionnaire consisted of three factors (see Table 1).

Table 1. Eigenvalues for the situation 1 data.

Component	Initial Eigenvalues	% of Variance	Cumulative %
1	2.79	31.03	31.03
2	1.97	21.84	52.87
3	1.15	12.78	65.66
4	0.83	9.24	74.90
5	0.67	7.46	82.35

$N = 151$

Table 2. Chi-square test of fit Three Situations Mindful Coping Questionnaire, situation 1 at time 1.

	χ^2	df
Two factor model	81.41*	19
Three factor model	32.50*	12
Four factor model	13.32	6

*$p < .10$

According to the Kaiser criterion only factors with an eigenvalue higher than 1 should be included. To see if a three-factor model fits the data best, factor analysis was performed with maximum likelihood and an Oblim rotation. Bartlett's test of sphericity was significant, $\chi^2(36) = 370.24$, $p < .001$. The results in Table 2 show that a three-factor model fitted the data best, a four-factor model was no longer significant. The factor loadings are displayed in Table 3; loadings of .30 are highlighted.

Table 3. Rotated factor loadings for factor analyses with Oblim rotation.

Intends to measure	Factor 1	Factor 2	Factor 3
Behavior acknowledgement	**0.87***	-0.06	0.05
Emotional acknowledgement	**0.73***	-0.04	-0.08
Behavioral decentering	**0.49***	0.07	0.17
Emotional awareness	0.06	**0.75***	-0.11
Cognitive awareness	0.14	**0.68***	-0.25
Behavioral awareness	-0.14	**0.66***	0.24
Cognitive decentering	0.17	0.15	**0.83***
Behavioral acknowledgement	**0.33***	0.12	**0.37***
Emotional decentering	0.01	-0.17	**0.37***

*factor loading > .30

This table shows that the items "behavioral recognition," and "emotional recognition," "behavioral decentering" loaded on factor 1. Factor 1 has three items which intend to measure acknowledgement and one measuring decentering; this seems to prove that factor 1 measures acknowledgement. Furthermore, the items "emotional awareness," "cognitive awareness," and "behavioral" awareness loaded on factor 2. The high loadings of awareness items on factor 2 seem to confirm that factor 2 measures awareness. Lastly, the items "cognitive decentering," "behavioral acknowledgement," and "emotional decentering" loaded on factor 3. This seems to verify that factor 3 measured decentering. To assess the convergent validity, the sum score of the Three Situations Mindful Coping Questionnaire was correlated with the sum score of the Five Facet Mindfulness Scale. The divergent validity was tested by correlating with the sum score of the JD scale. The results are shown in Table 4. The results show that mindfulness related positively to mindful coping, while JD did not. This confirms both the convergent and the divergent validity of the Three Situations Mindful Coping Questionnaire.

Table 4. Means, standard deviations, Cronbach's alphas (on the diagonal), and correlations among the pre-training-measure study variables.

		M	SD	1	2	3	4	5	6	7	8
1	Age	44.79	11.50	1							
2	Gender	1.30	0.46	0.26**	1						
3	Overtime	5.14	8.60	0.04	0.02	1					
4	Exhaustion	2.10	1.27	0.01	-0.14	0.26**	1				
5	W. Engagement	3.39	1.15	0.05	-0.11	0.05	-0.38**	1			
6	Mindfulness	73.28	9.14	0.26**	0.05	0.04	-0.31**	0.31**	1		
7	Job demands	58.23	13.53	-0.12	-0.01	0.32	0.46**	0.07	-0.05	1	
8	Job resources	59.86	12.49	-0.11	0.06	-0.04	-0.32**	0.27**	0.14	-0.08	1
9	Mindful coping	48.90	11.91	-0.18*	0.07	0.03	-0.25**	0.18*	0.52**	-0.14	

*p<.05 **p<.01, N = 115, *mindful coping* N = 147

Statistical analyses

Study 1

Descriptive analyses were conducted for the demographic variables, and a preliminary analysis was performed to verify whether the assumptions were met in order to test the hypotheses. To test whether mindfulness moderated the relation between JD and exhaustion, hierarchical regression was performed (with both the pre-training and post-training data). Prior to forming a product term to represent an interaction between mindfulness and JD, scores on both variables were centered by subtracting the sample mean. The predictor variables were entered step-by-step into the regression in an order that was determined by the researcher. The order was

as follows: step 1, gender, age, overtime; step 2, job demands and mindfulness; and step 3, the interaction variable of mindfulness and job demands. The rationale for this order of entry was that covariates were entered first. Then the main effects were entered and finally the interaction.

To examine whether mindfulness mediated the effect of JR on work engagement a mediation analysis was performed using a bootstrapped confidence interval for the *ab* indirect effect using the procedure described by Preacher and Hayes (2008). The initial causal variable was JR, the outcome variable was work engagement, and the proposed mediating variable was mindfulness. Using the SPSS script for the indirect procedure (Preacher & Hayes, 2008), bootstrapping was performed; 1000 samples were requested.

Study 2

To assess the effect of MBSR on exhaustion, work engagement, mindfulness, and mindful coping, four paired sample t-tests were performed. In this analysis the pre-training and post-training means on the four constructs were compared and tested for significant differences (α =.05). To investigate the proposed mediation of the difference in mindfulness and the difference in mindful coping on the relation between MBSR and the difference in exhaustion/work engagement, the procedure described by Judd, Kenny, and McClelland (2001) was used. The difference scores in exhaustion (pre-training and post-training) were regressed on both the sum scores and difference scores of mindfulness and mindful coping. In this analysis, a significant regression coefficient for the effort sum scores would indicate moderation, while a significant regression coefficient for the difference scores would indicate mediation (see Judd, Kenny, & McClelland, 2001 for further details).

Results

This research includes two studies with different study designs: the first is cross-sectional and the second is based on time series data. However, they have a joint aim: to expand knowledge about the mechanism by which mindfulness affects work-related psychological outcomes. First, the cross-sectional data were analyzed to test hypotheses 1 and 2, then for the second part of this study the within-subject data were analyzed to test hypotheses 3 and 4.

Study 1: Results

Preliminary analysis

Descriptive statistics and intercorrelations of all measured variables before and after the MBSR training are presented in Table 4 (pre-training) and Table 5 (post-training). Nearly all the correlations were in the expected direction and significant. In the pre-training data sample, exhaustion correlated positively with JD and negatively with mindfulness, mindful coping, work engagement, and JR. Work engagement further correlated positively with mindfulness, JR, and mindful coping. In the post-training data sample, exhaustion positively correlated with JD and negatively correlated with mindfulness, work engagement, and JR. Work engagement correlated positively with mindfulness, though the correlation between JR and work engagement was not significant in the post-training measure. There was a positive correlation between age and mindfulness and mindful coping in the pre-training data and between age and JR in the post-training data. Further there was a positive correlation between gender and mindfulness and mindful coping in the pre-training data and gender and exhaustion and JD in the post-training data. The number of hours of overtime per week was positively correlated to exhaustion in the

pre-training data and to JD in the post-training data. Therefore, age, gender, and overtime were included in the analysis to control for their possible confounding effect. Univariate distributions were reasonably normal with no extreme outliers; bivariate relations were fairly linear, all slopes had the expected signs, and there were no bivariate outliers.

Table 5. Means, standard deviations, Cronbach's alphas (on the diagonal), and correlations among the post-training study variables.

		M	*SD*	1	2	3	4	5	6	7	8
1	Age	44.68	12.30	1							
2	Gender	1.34	0.48	0.26*	1						
3	Overtime	7.30	13.11	-0.06	-0.14	1					
4	Exhaustion	1.85	1.13	0.20	-0.27*	0.14	-1				
5	W. Engagement	3.25	1.13	-0.21	-0.11	0.07	-0.49**	1			
6	Mindfulness	81.29	7.95	-0.03	0.15	0.03	-0.30*	0.33**	1		
7	Job demands	57.03	13.64	-0.05	-0.36**	0.26*	0.59**	-0.16	-0.10	1	
8	Job resources	58.46	13.08	-0.26*	0.03	0.22	-0.28*	0.18	0.30*	-0.24	1

*p<.05 **p<.01, N = 65

Mindfulness as a personal resource in the exhaustion process

A regression analysis was performed to assess whether mindfulness negatively moderated the relation between JD and exhaustion. Hierarchical regression was performed. The overall regression, including all predictors, was statistically significant, R = .60, R^2 = .36, adjusted R^2 =

.33, F (1, 108) = 10.28, p<.001. Regression coefficients are shown in Table 6. The table shows that the model including only the control variables was statistically significant and accounted for a small part of the variability in exhaustion (9%). Furthermore, the model including the main effects was significant and explained a larger part of the variability (33%). The model including the interaction did not explain a significant additional proportion of the variability in exhaustion. There was no significant mindfulness x job demands interaction, b = .013, t(112) = .152, p = .88. There was a significant effect of age, b = .017, t(112) = 2.238, p<.05; gender, b = -.39, t(112) = -2.136, p<.05; job demands, b = .441, t(112) = 5.187, p<001; and mindfulness, b = -.361, t(112) = -4.225, p<.001.

Table 6. Summary of hierarchical regression analysis for variables predicting exhaustion.

	Model 1			Model 2			Model 3		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Gender	-0.35	0.21	-0.16	-0.39	0.18	-0.17*	-0.36	0.18	-0.17*
Age	0.00	0.00	0.04	0.02	0.00	0.19*	0.02	0.00	0.19*
Overtime	0.03	0.01	0.26**	0.02	0.01	0.14	0.02	0.01	0.14
JD				0.44	0.08	0.43**	0.44	0.09	0.43**
Mindfulness				-0.36	0.08	-0.34**	-0.36	0.09	-0.34**
JD x mindfulness							0.01	0.09	0.01
R^2		0.09			0.33			0.33	
F for change in R^2		3.65*			23.40**			0.02	

*p<.05 **p<.01, N = 115

The analysis shows that there was no negative moderation of mindfulness on the relation between JD and exhaustion. Instead, there was a main effect for mindfulness. Furthermore, mindfulness and JD explained 33% of the variability in exhaustion scores. For the post-training data sample the same analyses were performed. The findings were in line with those in the pre-training data sample.

Mindfulness mediating as a personal resource in the engagement process

A mediation analysis was performed using a bootstrapped confidence interval for the *ab* indirect effect using the procedure described by Preacher and Hayes (2008) to examine whether

mindfulness mediated the effect of JR on work engagement. The results revealed that the total effect of job resources on work engagement (total effect = .03, $p<.01$) was still significant when mindfulness was included in the model (direct effect of JR on work engagement = .02, $p<.01$). A bias-corrected and accelerated confidence interval (CI) was created for *ab*. For this 95% CI with a point estimate of .15, the lower limit was -.00 and the upper limit was .01. Thus the total indirect effect was not significant and mindfulness did not mediate the relation between JR and work engagement.

The same analysis was performed on the post-training sample. The results revealed that the total effect of JR on work engagement (total effect = .19, $p = .14$) was not significant, and remained so when mindfulness was included in the model (direct effect of JR on work engagement = .10, p = .46). A bias-corrected and accelerated CI was created for *ab*. For this 95% CI with a point estimate of .12, the lower limit was .02 and the upper limit was .30. Thus the total indirect effect was significant and mindfulness did mediate the relation between JR and work engagement in the post-training sample.

Study 1: Discussion

The first study aims to clarify the role of mindfulness in the JD-R model. It was expected that mindfulness acts as a personal resource in the JD-R model (Bakker & Demerouti, 2007) and hence mediates the positive relationship between JR and work engagement (hypothesis 1) and negatively moderates the positive relationship between JD and exhaustion (hypothesis 2). The findings show that there was no negative moderation of mindfulness on the relation between JD and exhaustion in either the pre-training or the post-training sample. The findings for hypothesis

2 showed mixed results. In the pre-training sample mindfulness did not mediate the relation between JR and work engagement. But this did occur in the post-training sample. This means that under certain conditions, part of the effect of JR on work engagement is explained by mindfulness.

Mindfulness as a personal resource

This study is one of the first to show how mindfulness functions in the JD-R-model (Bakker & Demerouti, 2007). The results show that mindfulness does not act as a personal resource. Only when mindfulness is high does it mediate the effect of JR on work engagement. In line with previous research (Leroy et al., 2013), a relationship was found between mindfulness and exhaustion, and mindfulness and work engagement. Mindfulness does not interact with JD in its effect on exhaustion and does not mediate the relationship between JR and work engagement. A possible conclusion could be that only highly mindful individuals use mindfulness as an aspect of oneself that allows them to control and impact their environment successfully, which is in line with the definition of a personal resource from Hobfoll et al. (2003). This would mean that only people with high mindfulness obtain a sense of control over situations and are therefore able to use their JR more effectively to make their work more fulfilling. If this is the case, one could state that people with lower mindfulness presumably do not have this sense of control. It would be interesting to investigate whether this is true, for example by comparing individuals with different levels of mindfulness and how much sense of control they have over their stress, comparing people with different levels of mindfulness to determine whether there is an optimum in mindfulness.

Study 2: Results

After analyzing the cross-sectional data, the within-subject analyses were conducted. First the general effect of MBSR on several outcome variables was investigated. Then, the proposed mediation of mindfulness/mindful coping on the relation between MBSR and exhaustion/work engagement was investigated.

Effects of MBSR training

Four paired sample t-tests were performed to compare the means of exhaustion, work engagement, mindfulness, and mindful coping in the pre-training and post-training samples. The results are shown in Table 7. This table suggests that people report significant lower exhaustion after the MBSR training and significantly higher mindfulness and mindful coping. Reported work engagement scores did not change after the MBSR training.

Table 7. Mean difference scores for pre- and post- MBSR training.

Outcome measure	MBSR											
	Exhaustion			Work engagement			Mindfulness			Mindful coping		
	M	SD	*N*	M	SD	*N*	M	SD	*N*	M	SD	*N*
Pre-training	2.25	1.25	88	3.16	1.07	88	73.74	9.69	101	49.14	11.85	89
Post-training	1.90	1.14	88	3.24	1.08	88	80.62	8.70	101	59.26	13.14	89

Difference *t* statistic	4.21**	-1.25	-8.60**	-7.55**
(df)	(87)	(87)	(100)	(88)

**$p<.01$

The effect of MBSR training through mindfulness and mindful coping

To test whether the difference in mindfulness mediated the difference in exhaustion between the pre-training and the post-training in this within subject design, the procedure described by Judd, Kenny, and McClelland (2001) was used. The analysis showed a significant regression coefficient for the difference in mindfulness, B = .-.53, p <.001, but not for the sum scores (p = .43), thereby suggesting that the difference in mindfulness negatively mediated the difference in exhaustion. The same analysis was performed to test whether the difference in mindful coping mediated the difference in exhaustion between the pre-training and the post-training data sample. The analysis showed a significant regression coefficient for the difference in mindfulness, B = -.03, p <.05, but not for the sum scores (p = .86), thereby suggesting that the difference in mindful coping negatively mediated the difference in exhaustion.

To test whether the difference in mindfulness mediated the difference in work engagement between the pre-training and the post-training data, the same analysis was performed, but both the sum (p = .82) and difference (p = .20) regression coefficients were non-significant, indicating there was neither a mediation nor a moderation effect. This was also true for the sum (p = .31) and difference (p = .21) of mindful coping, indicating there was neither a mediation nor a moderation effect on work engagement.

Study 2: Discussion

The second study aims to evaluate whether MBSR has an effect on mindfulness and psychological work-related outcomes and, if so, how the effect is established. This was researched by examining the effect of MBSR on exhaustion and work engagement and the proposed mechanisms behind it (mindfulness and mindful coping). It was expected that both the gain in mindfulness and the gain in mindful coping mediate the negative relation between MBSR and the decrease in exhaustion (hypotheses 3a and 3b). Furthermore, it was expected that both the gain in mindfulness and the gain in mindful coping mediate the positive relation of MBSR on increased work engagement (hypotheses 4a and 4b). The findings show that while there was an overall effect of MBSR on exhaustion, mindfulness, and mindful coping, there was no significant change in work engagement. In addition, it was found that the difference in mindfulness and mindful coping negatively mediated the relation between MBSR and the difference in exhaustion (hypotheses 3a and 3b). This means that part of the effect of MBSR on exhaustion can be attributed to mindfulness and mindful coping. However, mindfulness is responsible for the majority of this effect. There was no mediation found for the difference in mindfulness/mindful coping in the relation between MBSR and work engagement (hypotheses 4a and 4b).

The effect of mindfulness

The findings in the second study corroborate the expected positive effect of MBSR on mindfulness and mindful coping. The same goes for the negative effect of MBSR on exhaustion, in line with earlier research (Grossman et al., 2004). These findings contributes to the large body of research demonstrating the beneficial effect of MBSR on exhaustion. However, there was no significant change in work engagement after the MBSR training. This contradicts earlier

research from Leroy et al. (2013). It could be that the MBSR training is only capable of improving coping with stress, which is not part of the motivational process leading to work engagement. There was no mediation of mindfulness on the relation between MBSR and work engagement. It seems as if the findings of other researchers on the effect of MBSR on experiences of positive emotions and purposefulness in life (Fredrickson et al., 2008) do not mean that there is an effect on positive psychological work-related outcomes.

Mindful coping as a mechanism of mindfulness

Hypotheses 4a and 4b were found to be true. Both the difference in mindfulness and the difference in mindful coping mediated the effect of MBSR on exhaustion. This means that the negative effect of MBSR training on exhaustion can be partially explained by the increase in mindfulness and mindful coping. The mediating effect for mindfulness has already been proven (Nyklíček & Kuijpers, 2008), but the effect of mindful coping is a new finding because it was measured with a newly developed questionnaire. It is a promising result that mindful coping seems to play a role in the effect of MBSR training. It contributes to the theory of the mindful coping model from Garland et al. (2011). The validation of the mindful coping questionnaire lends additional support. This finding offers a new lead in research on the effects of MBSR and the mechanism behind the effects of mindfulness. The questionnaire can be used in further research.

Limitations and further research

This research shows promising results, though there were a few limitations. First, there was no control group to compare the effects of the MBSR group. This means that causal

relations cannot be proven in this research. It could be that there are other factors in the lives of the participants that influenced the outcome variables used in this research. Therefore, the findings in this study should be interpreted cautiously. Secondly, the sample used in this research was fairly homogeneous. For example, the average level of education was high. Therefore, caution should be used in generalizing the findings in this research to the entire population. Thirdly, this study was solely based on self-reports. This is common in this line of research, though more objective instruments could have been used to assess several variables. For instance, observations or interviews could have been used to assess the JD and JR, and thus they would not have been affected by the subjectivity of the participant.

There are several possible directions for future research. The most interesting one is to answer the question of how mindfulness produces its beneficial effects (Khoury et al., 2015). Another subject for future research could be mindful coping and its role in stress reduction. For instance, an experimental setting could be used to test mindful coping. In this setting, a stressor could be presented to a participant in a controlled environment. After the stressor is taken away, the participant could fill in the Three Situations Mindful Coping Questionnaire. This way, the instrument could be used closer in time to the situation it measures. This fits the operational level in which mindful coping was measured and could potentially give more insight into the mechanism by which mindful coping works. It would also be interesting to perform further research into the effect mindfulness can have on work engagement. In the cross-sectional part of this research, it was shown that there is a relationship between mindfulness and work engagement. However, it did not interact with JR as a personal resource is expected to (Xanthopoulou et al., 2007). In the second study it was shown that an increase in mindfulness did not necessarily ensure an increase in work engagement. It would be interesting, for example,

to compare people with different levels of mindfulness and determine whether there is a level of mindfulness that has an optimal effect on work engagement.

Practical implications

This research shows that MBSR training can be a useful tool to prevent people from developing burnout and to help people cope with burnout-related complaints. It can be effective in teaching/training people to cope with daily stressors and thereby make them more resilient to exhaustion. Offering MBSR trainings in organizations with a high burnout percentage or as a prevention method is recommended.

Conclusion

This research successfully expands the knowledge about mindfulness and its mechanisms. It shows that mindfulness does not work as a personal resource in the JD-R model (Bakker & Demerouti, 2007) except when mindfulness is high does mindfulness mediate the relationship between job resources on work engagement. Secondly, it proves the effect of MBSR training on several outcomes, and the role of mindfulness in this training. Thirdly, mindfulness was linked to the mindful coping model and evidence was found that mindful coping is a mechanism behind the effects of MBSR training. For practitioners, it is once again proven that MBSR training effectively influences work-related psychological outcomes.

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