Daily Zen meditation and quality of life and work among employees

Abstract

In this paper we examine whether two weeks of Zen meditation practice leads to improved quality of life and work among employees of two different firms. A group of 46 employees of communications company Nokia and computer technology company IBM that followed an introduction training in Zen, was compared to a group of 17 employees that did not undergo any training and did not have any prior experience with Zen meditation. The results suggest that two weeks of Zen meditation practice leads to improved physical and psychological health, increased mindfulness and reduced fatigue. Furthermore, mindfulness – as measured with the MAAS - partially explains the correlation between Zen meditation practice and positive outcomes.

Introduction

In this research we would like to contribute to debates concerning the potential effects of Zen meditation practice on the life and work of an employee population. Whereas research usually examines the effects of meditation in reducing adverse psychological symptoms and disease among patient populations, the aim of this research is to examine whether mentally healthy employees can benefit from meditation practice in their daily life and work, and how possible benefits can be explained. To measure this we use widely applied tests for the following characteristics: quality of life, mood states, job satisfaction and general happiness, and investigate whether changes in these outcome measures can be explained by changes in mindfulness skills (attention and awareness in daily life).

Mindfulness

Why might mediation work? Many different explanations are given for the benefits that may result from meditation practice, either in spiritual traditions or in western science. The explanation is mainly given only verbally, by theories about transcendence of reality, disengaging from the ego etc, while underlying explaining processes have not been examined using empirical methods. Recently, serious and successful efforts have been made to empirically find a construct that explains why meditation works. *Mindfulness* is currently regarded as such a working mechanism. Mindfulness is most commonly defined as the state of being attentive to and aware of what is taking place in the present, and encompasses aspects of both awareness and attention (Brown & Ryan 2003). In previous research, several measures of mindfulness were found to be closely correlated to different aspects of psychological wellbeing (Brown and Ryan 2003), Moreover, mindfulness seemed to partially mediate the relation between meditation practice and improved wellbeing (Shapiro et al. 2008, Nyklicek and Kuijpers 2008).

Meditation at work

Over the years, some studies have been conducted concerning the effects of meditation on work-related indicators.

Firstly, retrospective and prospective research, and case studies about the Transcendental Meditation program demonstrated substantial benefits in output, productivity, and job

satisfaction, among employees that practiced the Transcendental Meditation technique (see Smidt-Wilk 1996 for an overview).

Secondly, Shapiro and colleagues (2005) conducted a randomized, controlled study to analyze the effects of the Mindfulness Based Stress Reduction (MBSR) program among health care professionals. After following the 8-week program, the 18 participants experienced an improved (perceived) coping with the work stress they faced in their jobs, as compared to a control group of 20 subjects on the program's waiting list. The authors conclude that the 8-week MBSR intervention appears to be effective in reducing stress and increasing quality of life for this group.

Thirdly, Grepmair et al. (2007) analyzed the performance of psychotherapists that had practiced Zen meditation for 20 minutes directly before starting therapy sessions. The 18 therapists that participated in the research all practiced Zen meditation, but the intervention group of 9 people meditated just before therapy sessions, while 9 other therapists meditated at another time that day. Patients were not informed of changes in the routines of their psychotherapist. The authors found significantly greater psychological symptom reduction among the 63 patients of psychotherapists that had practiced just before the therapy session, in comparison with the 61 patients of psychotherapists meditating at another time. The results suggest Zen meditation practice by a therapist may have a positive influence on the effectiveness of the treatment.

Quality of life and mood state

Besides work-related indicators, recent work in the study of meditation practice has also investigated effects on quality of life and mood state.

Fernos et al. (2008) studied 83 participants in an intensive 7-day course of compound mind-body therapies, including meditation. Six months after the course, they found that the participants had significantly improved emotional wellbeing and quality of life-related indicators such as sleep quality and satisfaction with health, relative to a control group of 69 people that had not previously attended the course.

In a randomized controlled study of the effects of MBSR on quality of life among 58 people with symptoms of distress, 29 were assigned to the MBSR intervention and 28 to a waiting

list control group (Nycklicek and Kuijpers, 2008). This study demonstrated participation in the MBSR program leads to significant improvements in psychological wellbeing, and reductions in perceived stress and vital exhaustion.

Tang et al. (2007) studied effects of meditation on mood state among Chinese University students. During one week, 40 students participated in five daily sessions of integrative body-mind training (IBMT): IBMT involves several body–mind techniques including: (i) body relaxation, (ii) breath adjustment, (iii) mental imagery, and (iv) mindfulness meditation training. A second group of 40 students followed five daily sessions of a commonly used relaxation training without meditation practice. After five days of training, the IBMT group had a significantly improved mood state as compared to the relaxation control group.

Research design and hypothesis

Results of these studies suggest the practice of meditation and participation in programs with meditative techniques could lead to an improved quality of life and work, and some research among employee populations demonstrated that employees experienced benefits of meditation practice in the workplace. Our research is about quality of life and work in a population of employees, and we hypothesize the employees will experience an improved quality of life and work as they start practicing Zen meditation. More specifically, we hypothesized that their quality of life, job satisfaction, mood states, and general happiness would be elevated after two weeks of Zen meditation practice, compared to colleagues that did not undergo any training.

Based on the relationships that previous research had found between meditation practice and mindfulness, and between mindfulness and well-being (Brown & Ryan 2003; Nyklicek and Kuijpers 2008), we expect that differences in quality of life, job satisfaction, mood states, and general happiness, will be at least partially attributable to changes in mindfulness skills.

In-company Zen training

We studied a group of employees from multinational communication cooperation NOKIA (unit Copenhagen) and multinational computer technology company IBM (unit Amsterdam).

Participating employees held various positions in the company, from support staff to general managers. Employees started practicing Zen meditation on a daily basis by following an in-company voluntary Zen meditation training, for which they had to register. Training was given during work hours, and paid for by the firms.

The in-company Zen training is a two day program with a full training day, and a follow-up training day two weeks later. The training was given by Zen Management: a Dutch Zen-training, management, and coaching organization, with more than 20 years of experience. Meditation instructions and background information about Zen in daily life, were provided by an experienced and certified Zen teacher from Zen Management. In addition to receiving instructions and further information, the participants practice Zen meditation twice in periods of twenty minutes during the training day and the come-back day. Following the first training-day, participants are asked to continue practicing at home twice a day for twenty minutes until the follow-up training day two weeks later: during the first training day meditation cushions for home use were provided. At the same time, we identified a number of their colleagues with no prior experience with Zen meditation as a control group.

Groups and procedures

Training participants completed questionnaires during the first training day (1st point of measurement), and the follow-up-day (2nd point of measurement). They filled in the questionnaires at the start of the first training day, before starting the first period of meditation. Training participants comprised three different groups: IBM employees that started the training in March 2008 (n = 10), IBM employees that started the training in September 2008 (n = 18), and Nokia employees that also started the training in September 2008 (n = 18). Nine respondents that failed to attend the second training day due to illness or practical reasons, were excluded from our analyses.

For the control group, questionnaires were sent and returned by post. We randomly selected 40 individuals, of whom 34 (85% - half at IBM - and half at Nokia) returned the questionnaires. Of these 17 (50 %) also completed the questionnaire during the second point measurement. Although the follow-up measurements slightly differ between the groups (for IBM it was conducted one week later), we combined these to form one control group of 17 individuals. The intervention group (n = 46) and the control group (n = 17) are closely

comparable in terms of demographic characteristics. The demographic composition and baseline values of the outcome measures of the 9 people that opted out of the intervention are similar to these of the intervention group ($p > 0.10$). Except for job satisfaction ($p = 0.046$), no significant differences were found between the 17 respondents that had opted out and the and the other 17 respondents (8 IBM employees, 9 Nokia employees) that formed the control group, in terms of demographic composition and baseline values on the outcome measures ($p > 0.10$). See table A in appendix for details.

Measurements

Five different kinds of measurements were taken. Firstly we used the short form of the Profile of Mood States (POMS-SF), a reliable and valid measure of subjective mood state (Shacham, 1983). We used the Dutch version of 32-items (Wald and Mellenbergh, 1995). In this test, the respondents are asked to what extent 32 different mood states such as active, bad-tempered, or blue describe their present mood. Answers are given on a 5-point scale (1 = not at all, 5 = extremely). This version of the POMS has five subscales: tension-anxiety (6 items), depression-dejection (8 items), anger-hostility (7 items), fatigue-inertia (6 items), and vigor-activity (5 items).

Second, the Quality Of Life measure from the World Health Organization (WHOQoL-BREF; Dutch version by De Vries and Van Heck, 1996) was used to measure general quality of life. The WHOQoL-BREF is a brief version of the WHOQoL-100 quality of life questionnaire. We computed three of its standard domains: physical health (6 items), psychological health (6 items), and social relationships (3 items) (WHOQOL_Group, 1998). The internal consistencies for these scales have been tested by the WHOQoL-group (1998) and yielded good Cronbach's alpha values (0.82 for physical health, 0.75 for psychological health, and 0.66 for social relationships). The domains have also been shown to display good discriminant validity, content validity and test-retest reliability (WHOQol group 1998).

Third, for the measurement of mindfulness, we used the Mindfulness Attention Awareness Scale (MAAS). (Brown and Ryan, 2003; Dutch version by Schroevers, Nyklicek and Topman, 2008). The MAAS is a scale with 15 statements about attention and awareness during daily life activities, such as: 'I do jobs or tasks automatically, without being aware of what I'm doing,' and, 'I break or spill things because of carelessness, not paying attention, or

thinking of something else'. Its Cronbach's alpha for internal consistency varies between 0.80 and 0.87 and the MAAS was shown to have a good convergent and discriminant validity (Brown and Ryan 2003).

Fourth, we measured job satisfaction with the 9-item Warr-Cook-Wall (WCW) scale (Warr, Cook and Wall, 1979; Dutch version by Janssen, De Jonge & Bakker,1999.). The Warr–Cook–Wall scale covers overall job satisfaction and satisfaction with nine aspects of work, each rated on a seven-point Likert-scale with higher scores representing greater satisfaction. Reliability and validity data for this measure are available (Warr Cook Wall, 1979).

Lastly, a question from the world database of happiness was used to measure general happiness: Taking all things together, on a scale from one to ten, how happy would you say you are? (1 = very unhappy, 10 = very happy) This way of measuring general happiness is widely applied, including in the calculation of national happiness levels. (Veenhoven 2008, 10-step numeral Happiness).

Analyses

The analyses included several steps. Initially we compared the baseline differences between the intervention group and the control group. Subsequently, we analyzed the differences between the intervention group and the control group (ANOVA). We studied a potential meditating effect of mindfulness by adding the mindfulness differences score to the ANOVAs. Finally, we visually present these latter results as path models. One-sided tests have been applied because we had clear predictions about the directions of the expected effects.

Results

Meditation practice

As mentioned, participants in Zen training were asked to practice 40 minutes of Zen meditation every day (20 minutes, twice a day). This is regarded as the optimal amount for coping with daily life experience, and development of consciousness quality (TM-program). The average daily time spent meditating during the intervention period was 21.0 minutes (SD, 11.8). Three of the 46 employees did not practice at all, seven employees practiced 1-10 minutes, and 36 employees practiced at least 10 minutes.

Baseline differences

Because the intervention was conducted on a voluntary basis and involved registration by the participants, the expectation was that the employees in the intervention group would score relatively low on quality of life and work before they started meditating, compared to the controls. This is indeed what we found. On psychological health, general happiness, mindfulness, and tension their baseline scores are indeed significantly ($p < 0.01$) lower compared to their colleagues in the control group, see table 3. Their low baseline scores indicate that participation in an in-company Zen-training is associated with challenges in quality of life and work.

Table 3. Baseline differences employee group and control group.

T0 scores	**Employee group (n = 45) Mean t0 (SD)**	**Control group (n = 17) Mean t0 (SD)**	**P-value of difference**
Physical health	3.58 (0.55)	3.98 (0.37)	0.010*
Psychological health	3.37 (0.48)	3.80 (0.38)	0.002**
Social relationships	3.50 (0.60)	3.67 (0.77)	0.315
Job satisfaction	5.41 (0.60)	5.46 (0.45)	0.818
Happiness	6.96 (1.34)	7.65 (0.99)	0.062
Tension-anxiety	1.88 (0.64)	1.37 (0.37)	0.004**
Depression-dejection	1.40 (0.56)	1.21 (0.83)	0.242
Anger-hostility	1.32 (0.48)	1.28 (0.39)	0.885
Fatigue-inertia	1.85 (0.95)	1.33 (0.74)	0.055
Vigor-activity	3.07 (0.81)	3.20 (0.67)	0.595
Mindfulness	3.57 (0.69)	4.34 (0.86)	0.000**

** $P < 0.01$ * $P < 0.05$

ANOVAs

Table 4 presents the group effects on the outcome measures. The group effects were computed with ANOVA-tests using baseline-follow-up differences as outcome variables.

A positive group effect (+) indicates that more positive change occurred in the intervention group compared to the control group, while a negative group effect (-) means that the reduction in the outcome is greater in the intervention group compared to the control group. The magnitude of the group effect is given by the group-coefficient F and its statistical significance by the P-value. One-sided tests were conducted.

Table 4. ANOVA analyses of Zen training group (N = 46), and control group (n = 17).

Variable	*Direction*	*Int. Group Baseline (n = 46)*	*Int. Group Follow-up (n =46)*	*Controls baseline (n = 17)*	*Controls follow-up (n = 17)*	*F-test (group) of difference*	*P-value*	*F-test when corrected for # med. minutes*	*P-value*
Physical health	+	3.58	3.94	3.98	4.05	6.99**	0.005	5.22*	0.013
Psychological health	+	3.37	3.76	3.80	3.80	10.35**	0.001	5.47*	0.012
Social relationships	+	3.50	3.67	3.67	3.59	2.32	0.067	0.07	0.39
Job satisfaction (scale)	+	5.41	5.58	5.46	5.51	0.74	0.20	1.55	0.11
Job satisfaction (item)	+	5.50	5.68	5.47	5.61	0.00	0.49	0.52	0.24
Happiness	+	6.96	7.67	7.65	7.76	2.99*	0.044	3.31*	0.037
Mindfulness	+	3.57	4.15	4.34	4.23	17.4**	0.000	8.20**	0.003
Tension-anxiety	-	1.88	1.53	1.37	1.29	3.95*	0.026	1.62	0.11
Depression-Dejection	-	1.40	1.20	1.21	1.24	2.86*	0.043	2.01	0.08
Anger-Hostility	-	1.32	1.27	1.28	1.33	0.75	0.19	1.87	0.083
Fatigue-Inertia	-	1.85	1.41	1.85	1.41	7.22**	0.005	4.21*	0.027
Vigor-Activity	+	3.05	3.47	3.05	3.47	2.60	0.057	0.86	0.18

** $p < 0.01$ * $p < 0.05$ (one-sided test)

Four of the 12 group effects are highly significant ($p<0.01$): physical health (positive), psychological health (positive), mindfulness (positive), and fatigue (negative = less fatigue in the intervention group). There also were significantly ($p<0.05$) higher happiness scores , lower tension, and lower depression scores. Compared to the control group, participation in Zen training was thus significantly associated with increases in quality of life, mood state, mindfulness, and general happiness.

Correlates of mindfulness

In this section we examine whether changes in the outcome measures can be explained by changes in mindfulness skills. Table 5 presents the correlations between baseline and follow-up difference in mindfulness with the difference scores on the other outcome measures for the total sample (n = 62). The difference in mindfulness correlates significantly with differences in physical health (positive), psychological health (positive), satisfaction with social relationships (positive), tension level (negative), depression level (negative), fatigue (negative) and vigor (positive). Thus eight of the 10 baseline follow-up difference scores are significantly associated with the change in mindfulness skills, in the expected direction: more positive change in mindfulness is associated with higher increase in quality of life, higher increase in positive mood states, and greater reduction in negative mood states.

Table 5. Bivariate correlations with mindfulness at t0 employee group (n = 62).

Difference score	**Correlation with Mindfulness difference for total group (n = 62)**
Physical health	0.555**
Psychological health	0.438**
Social relationships	0.316**
Job satisfaction	-0.051
Happiness	0.392**
Tension-anxiety	-0.313*
Depression-dejection	-0.268*
Anger-hostility	-0.225
Fatigue-inertia	-0.346*
Vigor-activity	0.304*

** $p < 0.01$ * $p < 0.05$ ^ $p < 0.10$

Mindfulness as a mediating construct

As demonstrated by the data in tables 4 and 5, statistical criteria for mediation (Baron and Kenny, 1986) were met for change in mindfulness and its relation to changes in physical health, psychological health and fatigue, and its relation with general happiness, tension-anxiety and depression-dejection.

We tested the potential mediating effect of mindfulness by adding mindfulness as a covariate to the ANOVA analyses. When mindfulness was added to the model the significant ($P < 0.01$) group effects, psychological health, and general happiness disappeared ($p > 0.20$), and the group effect on physical health almost ($p = 0.05$), see table 4. Also the group effects ($p < 0.05$) on happiness, tension and depression disappeared ($p > 0.20$) (see table B in appendix for effect parameters).

Zen meditation practice, mindfulness enhancement, and improvements in quality of life and mood, are thus closely correlated. Moreover, mindfulness can be viewed as mediating the connection between Zen meditation practice and these outcomes.

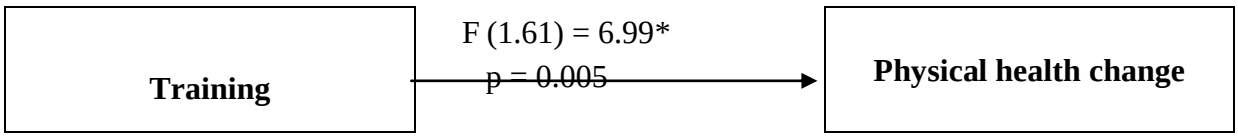
Path diagrams

For the group effects on physical health, psychological health, and fatigue, we illustrated the relations between Zen training, mindfulness enhancement, and the outcome measures with path diagrams. The path diagrams (figures 1a-1c) demonstrate that the significant effects of Zen meditation practice on mindfulness ($P < 0.001$) and the significant correlations between change in mindfulness and changes in the outcome measures ($P < 0.05$), result in mediation of the group effects on physical health, psychological health, and fatigue. When controlled for difference in mindfulness, the difference between the Zen trainees and the controls disappears, suggesting that positive changes in the intervention group are caused by their improvements in mindfulness.

Figure 1.

Figure 1a. Mediation of group effects on physical health by mindfulness change.

Group effect



Group effect mediated by mindfulness

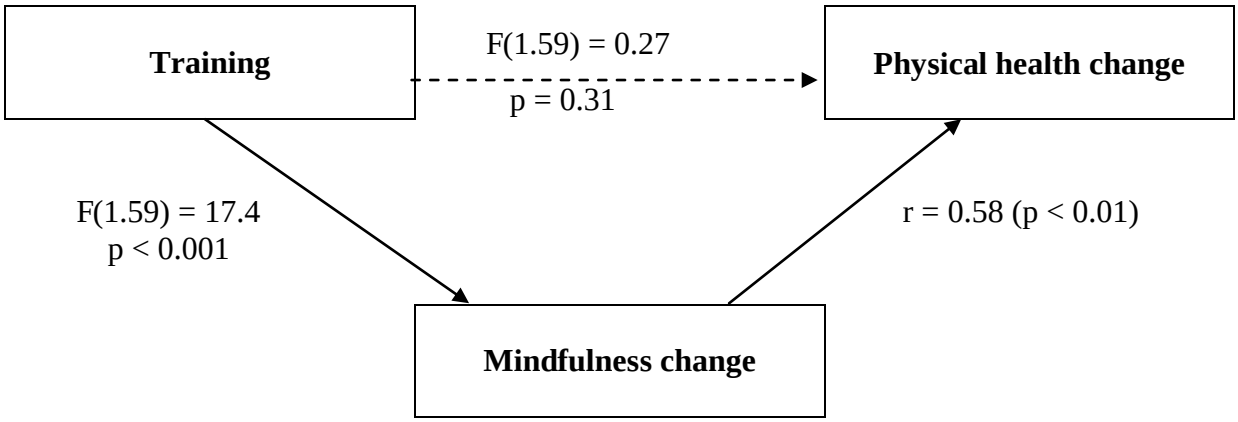
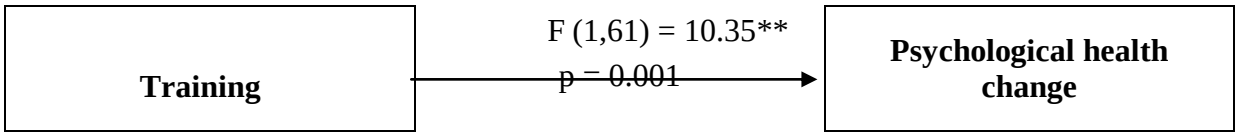


Figure 1b. Mediation of group effects on psychological health by mindfulness change.

Group effect



Group effect mediated by mindfulness

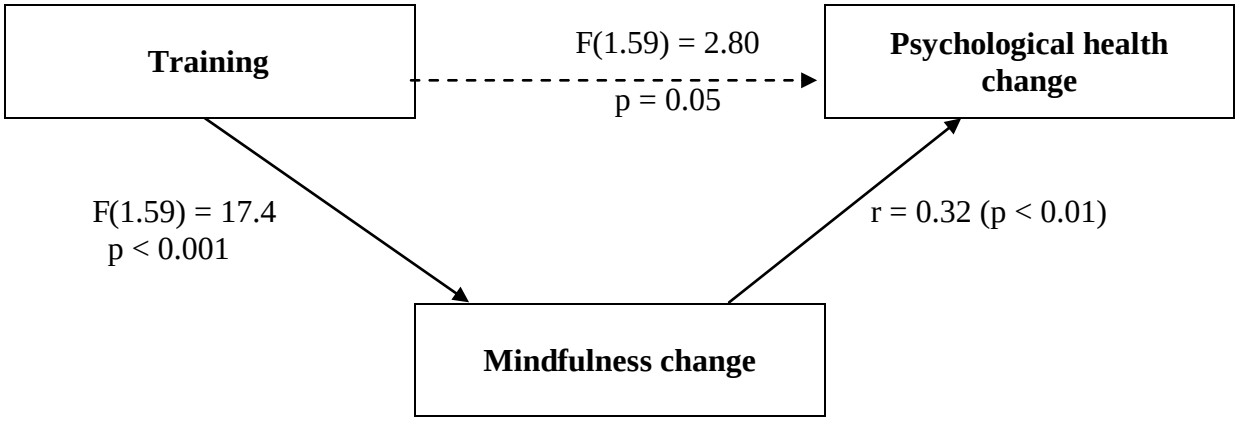
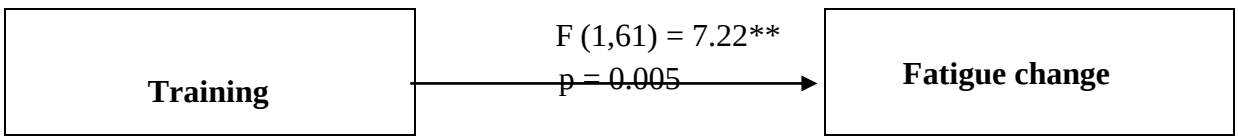
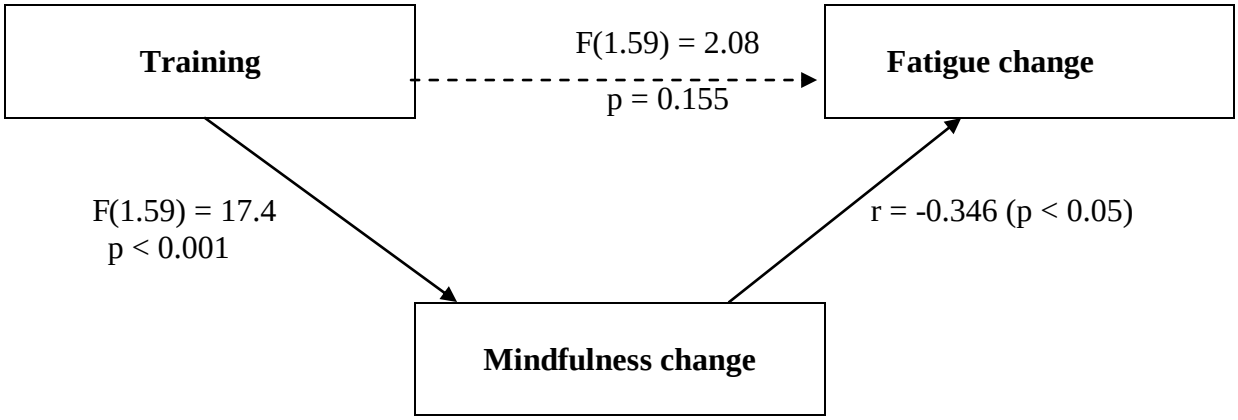


Figure 1c. Mediation of group effects on fatigue-inertia by mindfulness change.

Group effect



Group effect mediated by mindfulness



Discussion

The baseline measures among the training participants were lower than among the controls. Participation in the training thus seems to be associated with certain challenges employees face with in their life and work. A similar difference in baseline values between the intervention and the control group was found in the study of Fernos et al. (2008). Training participants may thus be more motivated to practice meditation and be willing to work on certain problems . The success of their efforts was reflected in substantial improvements: after two weeks of Zen meditation practice, participants in the training were on average at the same quality level as their non-meditating co-workers.

When we compare the baseline scores on quality of life and mindfulness of our Zen training participants with the baseline scores of MBSR participants with symptoms of distress in the study of Nyklicek and Kuijpers (2008), our intervention group scored relatively high (our baseline scores were 3.58 on physical health, 3.37 on psychological health, 3.50 on social relationships, while average baseline scores are around 3.0 on all QOL scales; mindfulness = 3.57 versus 3.38). Nevertheless our intervention group improved significantly and in some cases were able to achieve similar scores to their non-meditating colleagues who had better baseline standards on quality of life and mindfulness.

After two weeks of Zen meditation, the participants had a job satisfaction and happiness that was higher than the national average. In the Netherlands, the average of job satisfaction is 7.2

on a 10-pt scale, while the baseline score of our group was 5.68 out of 7, equivalent to 8.1 on a 10-pt scale; the baseline score for happiness was 7.67 (national average is 7.4). These results imply that the training contributed to the participants achieving scores comparable to national averages.

Our research design is based on defined populations and is non-randomized. Generalizations are therefore limited to people who are motivated to follow an in-company Zen training. But within this limitation we can conclude that two weeks of Zen meditation practice at home was associated with improved physical health, psychological health and mindfulness and reduced fatigue. Furthermore, there were positive effects on general happiness, and reduction in mood states tension and depression in the Zen meditation group as compared to the controls.

The group effect on mindfulness was relatively strong, indicating that short-term Zen meditation practice is very useful for the enhancement of mindfulness. For physical health, psychological health, and fatigue, positive changes correlated with change in mindfulness, and mindfulness mediated the group effects of these outcome measures. Mindfulness also mediated the significant group effects on tension, depression, and general happiness.

The results are in line with the mediating effect of MAAS mindfulness that Shapiro et al. (2008) found for the relation between MBSR / EPP training and stress and between MBSR/EPP training and rumination, and are similar to the mediating effect of MAAS mindfulness that Nyklicek and Kuijpers (2008) found when studying effects of MBSR on perceived stress and general quality of life.

APPENDIX

Table A. Demographic composition.

Variable	Intervention group (n = 46)	Drop-out intervention group (n = 9)	p-value difference	Control group (n = 17)	Drop-out control group (n = 19)	p-value for difference	p-value for difference intervention group (n = 46) and control group (n = 17)
% Female	15.2	11.1	0.76	17.6	18.8	0.94	0.81
Mean Age (SD)	40.8	43.4	0.38	36.9	36.7	0.95	0.09
Education level							
% low	6.5	11.1		13.5	5.3		
% Medium	15.2	11.1	0.89(chi2)	23.5	15.8	0.34(chi2)	0.15
% High	78.3	77.8		53.0	78.9		
Household composition							
% Partner and children	54.3	66.7		64.7	47.4		
% Partner no children	23.9	11.1		17.7	26.3		
% Single and children	6.5	0.00	0.48(chi2)	11.8	0.00	0.19(chi2)	0.86
% Single no children	13.0	11.1		5.9	26.3		
% Other	2.2	11.1		0.0	0.00		
Employment status							
% Does paid	100	100	1.00	100	100	1.00	1.00

work							
When having a job: weekly hours of paid work	39.8	39.4	0.89	41.3	42.2	0.73	0.47
Physical health	3.58	3.70	0.53	3.98	4.00	0.86	0.010*
Psychological health	3.37	3.56	0.30	3.80	3.90	0.46	0.002**
Social relationships	3.50	3.37	0.59	3.68	3.85	0.47	0.315
Job satisfaction	5.42	5.36	0.85	5.46	5.02	0.046*	0.818
Happiness	6.96	7.11	0.76	7.65	7.87	0.49	0.062
Tension-anxiety	1.88	1.80	0.73	1.37	1.52	0.35	0.004**
Depression-dejection	1.40	1.53	0.59	1.21	1.52	0.69	0.242
Anger-hostility	1.33	1.21	0.51	1.29	1.48	0.18	0.885
Fatigue-inertia	1.85	1.61	0.55	1.33	1.47	0.32	0.055
Vigor-activity	3.06	3.18	0.68	3.20	3.62	0.10	0.595
Mindfulness	3.57	3.87	0.28	4.34	4.52	0.35	0.000**

Table B. Effect parameters when mindfulness difference is added to the model.

Variable	**No covariates added**			**Change in mindfulness Added as covariate**		
	F-test	*p-value*	*R square*	*F-test*	*p-value*	*R square*
Physical health	6.99*	0.005	0.103	0.27	0.31	0.311
Psychological health	10.35**	0.001	0.145	2.80	0.050*	0.228
Happiness	2.99*	0.039	0.047	0.070	0.39	0.154
Tension-anxiety	3.95*	0.026	0.063	0.650	0.21	0.108
Depression-dejection	2.86*	0.043	0.096	0.412	0.26	0.079

Fatigue-inertia	7.22*	0.005	0.124	2.08	0.0.078	0.156

** $p < 0.01$ * $p < 0.05$ (one-sided test)

Table. Demographic composition of intervention and control group, and drop-out.

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