

**The Contribution of Work Engagement to Self-Perceived
Health, Work Ability, and Sickness Absence Beyond Health
Behaviors and Work-Related Factors**

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ABSTRACT

Objective: To investigate whether work engagement influences self-perceived health, work ability, and sickness absence beyond health behaviors and work-related characteristics.

Methods: Employees of two organizations participated in a six-month longitudinal study (n=733). Using questionnaires, information was collected on health behaviors, work-related characteristics, and work engagement at baseline, and self-perceived health, work ability, and sickness absence at six-month follow-up. Associations between baseline and follow-up variables were studied using multivariate and multinomial logistic regression analyses and changes in R^2 were calculated.

Results: Low work engagement was related with low work ability (OR:3.68, 95%CI:2.15-6.30) and long-term sickness absence (OR:1.84, 95%CI:1.04-3.27). Work engagement increased the explained variance in work ability and sickness absence with 4.1% and 0.5%, respectively.

Conclusion: Work engagement contributes to work ability beyond known health behaviors and work-related characteristics.

Keywords: work engagement, work ability, sickness absence, health status, lifestyle, longitudinal design, workforce

INTRODUCTION

The rapidly ageing workforce forces employers and policy makers to think about how to keep the workforce healthy and productive. Several studies indicate that unhealthy behaviors and unfavorable work-related characteristics affect sustainable employability. In research, sustainable employability is often operationalized by measuring health status, work ability – defined as the balance between employees' resources and work demands¹ –, sickness absence, and premature exit from the labor force. These studies revealed that obese employees, those with insufficient vigorous physical activity, and smokers are at increased risk of ill health, poor or moderate work ability, and sickness absence.²⁻⁸ Furthermore, high work demands, low skill discretion, low decision authority, and physically demanding jobs seem to be associated with ill health, a decreased work ability, sickness absence, and a higher risk of premature labor force exit.^{2, 3, 6, 9-13}

Work engagement, defined as “a positive, fulfilling work-related state of mind that is characterized by vigor, dedication, and absorption”, has emerged in the field of occupational psychology as a potentially important independent risk factor for ill health and a low work ability.¹⁴⁻¹⁶ Engaged employees have “high levels of energy, are enthusiastic about their work and are often fully immersed in their job so that time appears to fly by”.¹⁷ These employees are also more likely to experience their working conditions positively, to have a higher work productivity, and to have less sickness absence.¹⁸⁻²²

Research on how work engagement influences sustainable employability is scarce and evidence on the explanatory contribution of work engagement for sustainable employability beyond health behaviors and work-related characteristics is lacking.^{14, 23} This insight may increase our knowledge on how to maintain a healthy and productive workforce. This study aimed to investigate (1) the influence of work engagement, health behaviors, and work-related characteristics on self-perceived health status, work ability, and sickness absence, and (2) whether work engagement contributes to explaining self-perceived health status, work ability, and sickness absence beyond employees' health behaviors and work-related characteristics.

METHODS

Study population

The population of this longitudinal study consisted of employees of a plastics manufacturer (organization 1, n=874) and a paint manufacturer (organization 2, n=1281).

Between 2010 and 2012, all employees were invited by e-mail to fill in two online questionnaires: a baseline questionnaire and a follow-up questionnaire six months later. For this study, we included all employees who completed both the baseline and follow-up questionnaires.

Of the 2155 employees invited, 1128 (52%) completed the baseline questionnaire. Of this group, 761 (68%) also completed the follow-up questionnaire after six months and 748 employees (98%) provided informed consent. Four employees were excluded due to implausible or missing data on height, weight or physical activity, and 11 employees because they missed information on self-perceived health at follow-up. The final study sample comprised 733 employees (organization 1, n=268; organization 2, n= 465).

Informed consent was requested at the start of the questionnaire. The Medical Ethical Committee of the University declared that the Medical Research Involving Human Subjects Act did not apply to the current study and the committee had no objection to the execution of this study.

Data collection

Health behaviors, work-related characteristics, and work engagement were assessed at baseline. Self-perceived health, work ability, and sickness absence were questioned at six-month follow-up.

Self-perceived health

At six-month follow-up, self-perceived health was measured using the first question of the Short Form-12 (SF-12) questionnaire (“Overall, how would you rate your health during the past 4 weeks?”). The five possible answers were dichotomized into ‘poor or fair’ and ‘good, very good or excellent’.²⁴

Work ability

Work ability assesses the self-perceived capability to fulfil the mental and physical demands of the job and was measured at six-month follow-up using the short version of the Work Ability Index (WAI). The WAI consists of nine questions and consists of seven dimensions: general work ability, work ability in relation to physical and mental demands, diagnosed diseases, impairment due to illness, sickness absence, prognoses of work ability, and psychological resources. The WAI is derived as the sum of the rating on these seven dimensions. The range of the summative index is 7 to 49 and categorizes work ability into poor (7-27), moderate (28-36), good (37-43), or excellent (44-49). A decreased work ability was defined as a WAI score lower than 37 (poor and moderate).¹

Sickness absence

At six-month follow-up, sickness absence was determined using the fifth dimension of the WAI (“How many whole days have you been off work because of a health problem (disease, health care,

or for examination) during the past year?”). Employees were asked to indicate this on a five-point ordinal scale. Sickness absence was classified into three categories: no sickness absence, short-term sickness absence (1-9 days), and long-term sickness absence (10 or more days).¹

Work engagement

Work engagement was measured using the nine-item Utrecht Work Engagement Scale (UWES) (Cronbach's $\alpha=0.94$) and comprises three dimensions: vigor, absorption, and dedication. Each dimension was assessed using three statements (Cronbach's $\alpha = 0.89, 0.87, \text{ and } 0.95$, respectively).¹⁶ Per statement, an employee had to rate the degree to which one had ever felt the feeling stated. Answer possibilities ranged on a six-point scale from never to always. Sum scores were calculated for work engagement and the three dimensions separately. The lowest quartile was defined as a low work engagement, low vigor, low absorption, and low dedication.

Psychosocial work-related characteristics

Using an abbreviated version of a validated Dutch questionnaire about psychosocial job demands and job stress based on the Job-Demand-Control model of Karasek three psychosocial work-related characteristics were measured: decision authority (5 items, Cronbach's $\alpha = 0.83$), skill discretion (3 items, Cronbach's $\alpha = 0.75$), and work demands (5 items, Cronbach's $\alpha = 0.83$).^{25, 26} Questions on decision authority were related to influence on planning of tasks and work pace. Skill discretion related to creativity, varied work, and required skills and abilities. Work demands related to excessive work and insufficient time to complete the work. All questions were answered on a four-point scale ('never', 'sometimes', 'often', and 'always'). A standardized sum score was calculated for each characteristic separately and the adverse quartile was defined as an unfavorable work-related characteristic.

Physical work-related characteristics

Physical work-related characteristics concerned the regular presence of working in awkward postures and lifting heavy loads (> 25 kg). The four answer possibilities were dichotomized into 'seldom or never, now and then' and 'quite a lot, a lot' with the latter classified as high exposure.²⁷

Health behaviors

Body Mass Index (BMI: $\text{weight}/\text{length}^2$) was calculated based on self-reported height in meters and weight in kilograms and categorized into normal weight (BMI < 25 kg/m²), overweight (25 ≤ BMI < 30 kg/m²), and obesity (BMI ≥ 30 kg/m²).

Fruit and vegetable intake was measured using a slightly adapted version of the Dutch Food Frequency Questionnaire.²⁸ The six-item questionnaire asked about the monthly intake of different fruits (four items; tangerines, citrus fruits, other fruit, fruit juice) and vegetables (two items: raw and cooked vegetables). Dichotomization was based on the Dutch guidelines for healthy nutrition, which states that one needs to consume 200 grams of fruit and 200 grams vegetables daily. Employees who ate at least 400 grams of fruit and vegetables per day were considered those meeting the guidelines.

Physical activity was measured by first asking employees about the number of days a week they participated in sports and secondly, how many minutes on average were spent on sports per occasion. Someone participated sufficiently in sports when he/she participated in sports for at least 20 minutes on at least three occasions per week.

Smoking was assessed using a single-item question: "Do you smoke?". Answer possibilities were: 'yes', 'now and then', and 'no'. Employees answering the question with 'yes' or 'now and then' were defined as being a 'current smoker'.

Individual characteristics

The following individual characteristics were assessed: age, gender, and educational level. Age was categorized into three age groups: 18-39, 40-49, and 50-65. Educational level was determined by asking the employees about their highest level of education, which was then categorized into three categories: low (primary school, lower and intermediate secondary schooling, or lower vocational training), intermediate (higher secondary schooling or intermediate vocational schooling), and high (higher vocational training or university).

Data analysis

Descriptive statistics were used to report on the characteristics of the study population. The Spearman rank coefficient was used for studying the correlations between the measured variables. Factors associated with loss to follow-up were studied using logistic regression analysis.

Logistic regression analyses, adjusted for age, gender, educational level, and organization, were used to study associations between the independent variables health behavior, work-related characteristics, and work engagement and self-perceived health and work ability. Multinomial logistic regression analyses, adjusted for age, gender, educational level, and organization, were used to examine the associations between the independent variables and short and long-term sickness absence. Thereafter, all health behaviors and work-related characteristics associated with the outcome measure at $p < 0.20$ were entered into one model simultaneously (i.e. enter method) while also controlling for potential confounders (i.e. age, gender, educational level, organization). Additionally, the latter analysis was repeated, now also work engagement was included as an

independent variable. The change in Nagelkerke R^2 was calculated to assess the contribution of work engagement besides health behaviors and work-related characteristics to the explained variance in outcome measures. Chi-square tests on the goodness-of-fit were performed to examine whether the contribution of work engagement statistically significantly improved the models.

The OR was estimated as measure of association with a corresponding 95% confidence interval (95% CI). All analyses were carried out using the IBM SPSS Statistics version 20 for Windows (SPSS Inc, Chicago, IL, USA).

RESULTS

Description of the study population

The study population consisted of 733 employees with a mean age of 45.0 years (SD: 9.2) and a mean work ability of 42.2 (SD: 4.2). Further details are presented in Table 1.

The psychosocial work-related characteristics 'decision authority' and 'skill discretion' were moderately correlated (Spearman's rho: 0.34) and both also moderately correlated with work engagement (Spearman's rho: 0.31 and 0.45, respectively). Furthermore, there was a moderate correlation between work ability and self-perceived health (Spearman's rho: 0.46) (Appendix 1).

The percentage of employees aged 50 years or older was higher in the group who completed both questionnaires than in the group who only completed the baseline questionnaire (34% versus 26%), but gender and educational level distribution were similar. Employees lost to follow-up did not differ from those completing both questionnaires with regard to their work engagement, health behaviors, and psychosocial work-related characteristics at baseline. However, the percentage of employees reporting unfavorable physical work-related characteristics was higher among the employees lost to follow-up (lifting heavy loads: 6% vs 3%; awkward postures: 9% vs 5%) (data not shown).

Insert Table 1

Health behaviors and work-related characteristics

Insufficient sports participation was statistically significantly related with a less than good self-perceived health (OR: 4.30, 95% CI: 1.31-14.14), a less than good work ability (OR: 2.50, 95% CI: 1.15-5.44), and long-term sickness absence (OR: 2.59, 95% CI: 1.13-5.93) at six-month follow-up. Obesity was statistically significantly related with long-term sickness absence (OR: 2.44, 95% CI: 1.12-5.35) at six-month follow-up. All other health behaviors showed no relations with the outcome measures. Work-related characteristics were only related with work ability. High work demands (OR: 2.23,

95%CI: 1.24-3.99) and low skill discretion (OR: 2.19, 95%CI: 1.23-3.90) statistically significantly predicted a less than good work ability at six-month follow-up (Table 2).

Work engagement

A low level of work engagement statistically significantly predicted a less than good work ability (OR: 3.68, 95%CI: 2.15-6.30) and long-term sickness absence (OR: 1.84, 95%CI: 1.04-3.27) at six-month follow-up (Table 2). Concerning the three dimensions of work engagement, only low vigor was statistically significantly related with all three outcome measures; less than good self-perceived health (OR: 2.66, 95% CI: 1.40-5.05), less than good work ability (OR: 4.84, 95% CI: 2.78-8.43), and short-term sickness absence (OR: 1.58, 95% CI: 1.12-2.25). Scoring unfavorably on absorption (OR: 2.33, 95%CI: 1.37-3.97) or dedication (OR: 3.05, 95%CI: 1.79-5.21) was only statistically significantly related with a less than good work ability at six-month follow-up (Appendix 2).

When employees' health behavior and work-related characteristics were taken into account, work engagement was still statistically significantly related with work ability (OR: 3.51, 95% CI: 1.85-6.68), but not with self-perceived health (OR: 1.70, 95% CI: 0.87-3.31) and sickness absence (short OR: 1.26, 95% CI: 0.83-1.91; long OR: 1.76, 95% CI: 0.89-3.46) at six-month follow-up. The explained variance after including also work engagement increased by 0.8% (7.0 to 7.8%) for self-perceived health, 4.1% (16.5% to 20.6%) for work ability, and 0.5% (10.2% to 10.7%) for sickness absence. The relative improvement of the models was 11% for self-perceived health, 25% for work ability, and 5% for sickness absence. Adding work engagement into the models improved the overall goodness-of-fit statistically significant of the models for work ability ($p < 0.001$) and sickness absence ($p < 0.001$) but not for self-perceived health ($p = 0.13$).

Insert Table 2

DISCUSSION

Self-perceived health and sickness absence were most strongly predicted by health behaviors while work ability was mostly predicted by work-related characteristics. Work engagement was related to work ability and long-term sickness absence. Taking into account employees' work engagement besides health behaviors and work-related characteristics improved the explained variance in work ability at six-month follow-up.

Influence of health behaviors and work-related characteristics

Employees insufficiently engaging in sports were over four times more likely to report a poor to moderate health status at six-month follow-up. Previous cross-sectional studies also reported the

importance of this health behavior for maintaining a good health status.^{4, 11, 29} In our study, none of the work-related characteristics influenced employees' perception of their health status. In contrast to previous studies that found associations between high job demands and low job control and ill health.^{11, 29, 30} However, when a distinction was made between mental and physical health status, unfavorable work-related characteristics were only associated with employees' mental health status.⁴ In this study only a limited number of employees (n=42) reported a less than good self-perceived health which might have led to finding non-significant associations.

As self-perceived health, reporting long-term sickness absence was also predicted by unhealthy behavior and not by any work-related characteristic. Obese employees and those not engaging sufficiently in sports were more likely to report long-term sickness absence, which was also concluded by previous studies.^{2, 3, 7, 31} Regarding work-related characteristics, previous studies have identified unfavorable psychosocial work-related characteristics and physically strenuous working conditions as risk factors for sickness absence.^{6, 13, 32} Although not statistically significant, the effect estimates of awkward postures and lifting heavy loads point into the same direction with ORs above two.

Unfavorable work-related characteristics did predict a moderate to poor work ability. In line with the results of a systematic review, high work demands and low skill discretion were associated with a less than good work ability.⁵ A lack of sports participation was also related to less than good work ability, showing the multifactorial character of work ability.

Work engagement

In contrast to previous research, our study showed no significant association between a low work engagement and ill health.³³ However, employees reporting low on the vigor dimension of work engagement were more likely to have a poor to moderate health status. The finding might be explained by the similarity between how the vigor component of work engagement and self-perceived health are defined. However, we found a low correlation between vigor and self-perceived health (Spearman's rho: 0.13). Thus, the vigor component partly predicts employees' health status.

Our finding that employees with a low work engagement were more likely to report long-term sickness absence (i.e. 10 or more days) is in line with previous research.²¹ In our study, information on cumulative sickness absence days was collected. Long-term sickness absence could be driven by either the frequency or duration of sickness absence. Previous studies have shown that work engagement more strongly predicted the frequency of sickness absence than the duration.²¹ It is hypothesized that being absent from work due to illness for a longer period is often involuntary and caused by serious illness and not by unfavorable work-related characteristics. Reporting sick from work frequently is assumed to be "voluntary absence" and the result of a lack of motivation.²¹

Of the dimensions of work engagement, a low vigor was most strongly related to sickness absence. Previous studies found that the exhaustion dimension of burnout – which could be considered as the opposite of the vigor dimension of work engagement – significantly predicted sickness absence.^{31, 34}

Employees with a low work engagement were more likely to have a less than good work ability. This finding confirms previous studies.^{14, 35} Of the three dimensions of work engagement, the vigor dimension had the strongest association with work ability. Employees who felt vigorous at work had a five times higher likelihood of reporting a good work ability. It could be argued that the concepts of work engagement and work ability are closely related. However, the correlation between both was low (Spearman's rho: 0.22).

The contribution of work engagement

Reason for conducting this study was to investigate whether work engagement improved the explained variance in self-perceived health, work ability, and sickness absence beyond known health behaviors and work-related characteristics. Our findings showed that work engagement improved the explained variance in work ability and sickness absence. Known health behaviors and work-related characteristics explained only 10% of the variance of sickness absence among the employees. Including work engagement into the models led to a relatively 5% increase in the total explained variance. Possibly including other factors such as having health problems or factors related to the organization might improve the explained variance in sickness absence.^{32, 36} In contrast, adding work engagement improved the explained variance in work ability by 4%, a relative improvement of 25% in the total explained variance. The 4% added explained variance is greater than the 1% Airila and colleagues (2012) found.¹⁴ This difference might be due to that they included work ability at baseline in the model which answers the question whether a change in work ability is predicted by work engagement.

Our aim was to investigate whether work engagement is a determinant of self-perceived health, work ability, and sickness absence. As said above, an alternative - and different - question is whether a *change* in these outcomes is predicted by work engagement. In our study, self-perceived health, work ability, and sickness absence were also measured at baseline. To investigate how the results might differ, we performed additional analyses in which we also adjusted for the baseline value of the outcome measure besides demographics, health behaviors, and work-related characteristics. Work engagement in these analyses statistically significantly predicted a *change* in work ability (OR: 2.75, 95%CI: 1.28-5.91). Association between work engagement and changes in self-perceived health (OR: 1.01, 95%CI: 0.46-2.24) and sickness absence (short-term: OR: 1.09, 95%CI: 0.69-1.71; long-term: OR: 1.51, 95%CI: 0.71-3.14) were not statistically significant.

Intervention implications

A recent meta-analysis concluded that workplace health promotion programs aiming to increase health, work ability, or sickness absence by improving health behavior have modest effects.³⁷ Based on our study, health promotion programs at the workplace may potentially have more impact by also promoting work engagement.³⁸ Recently, two randomized controlled trials have been conducted aiming to increase i.a. work engagement as a measure of sustainable employability. Oude Hengel et al. (2012) implemented an intervention involving reducing physical load, increase awareness of the importance of taking breaks, and increasing empowerment. Strijk et al. (2013) tried to improve work engagement by improving physical activity and fruit intake.^{39,40} However, both intervention-studies found non-significant effects on work engagement demonstrating that more research is needed to investigate what positively changes employees' work engagement and how this can be targeted by interventions. Perhaps work engagement can better be addressed by improving psychosocial work-related characteristics.³⁸

Limitations

The strength of this study is the longitudinal design. However, the relative short follow-up period might be a limitation. Sickness absence was measured over the past year whereas the follow-up period was a half-year therefore, it might be that sickness absence days were taken before the baseline measurement. Furthermore, sickness absence was operationalized by one of the dimensions of the WAI, therefore the results for work ability and sickness absence are not completely independent although the correlation was low (Spearman's rho: 0.26). The study population was rather healthy with only few employees doing physically demanding work as compared to previous studies.^{11,41} Therefore, we need to be cautious to generalize our results to other populations. The relative small sample size limited the statistical power and made it impossible to stratify the analysis by e.g. organization or gender. Since it was an online survey, employees with limited internet access might not have participated and selective participation based on health might have occurred. However, concerning loss to follow-up, there were no difference between the respondents and those lost to follow-up with regard to demographics, health behaviors, psychosocial work-related characteristics, self-perceived health, and internet access at home or work. Furthermore, a review on workplace health promotion program participation concluded that there is no evidence that healthier employees are more likely to participate.⁴²

CONCLUSION

Employees with a low work engagement were more likely to report a low work ability and long-term sickness absence. Ill health and long-term sickness absence among employees was most strongly

predicted by poor health behaviors, while a low work ability among employees was mostly determined by experiencing unfavorable work-related characteristics. Work engagement contributes to work ability beyond health behaviors and work-related characteristics among employees at follow-up. These findings give direction for future policy or interventions of companies aiming to promote sustainable employability.

List of Supplemental Digital Content

1. Supplement digital content 1.doc

→ Spearman correlations between all study variables (n=733)

2. Supplement digital content 2.doc

→ Adjusted associations between the three dimensions of work engagement (i.e. vigor, absorption, and dedication) and self-perceived health, work ability, and sickness absence at six-month follow-up among employees (n=733).

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Table 1: The characteristics of the study population (n=733).

	n = 733	%
<i>Baseline</i>		
Individual characteristics		
Age		
18-39	209	28.5
40-49	269	36.7
50-65	255	34.8
Male	542	73.9
Educational level		
Low	145	19.8
Intermediate	201	27.4
High	387	52.8
Health behaviors		
Body Mass Index		
Normal weight (BMI < 25 kg/m ²)	350	47.7
Overweight (BMI 25-30 kg/m ²)	298	40.7
Obese (BMI 30kg/m ² and higher)	85	11.6
Insufficient sports participation (less than 3 days a week 20 min)	563	76.8
Insufficient fruit and vegetable intake (less than 400 grams a day)	485	66.2
Current smoker	138	18.8
Work-related characteristics		
High work demands	189	25.8
Low decision authority	210	28.6
Low skill discretion	159	21.7
Awkward postures	39	5.3
Lifting heavy loads (≥25kg)	26	3.5
Work engagement		
Low work engagement	186	25.4
<i>Six-month follow-up</i>		
Health		
Less than good self-perceived health	42	5.7
Work ability		
Less than good work ability	65	8.9
Sickness absence		
1-9 days	320	43.7
10 or more days	67	9.1

Table 2: Adjusted association between health behaviors, work-related characteristics, and work engagement and self-perceived health, work ability, and sickness absence at six-month follow-up among employees (n=733).

	Less than good self-perceived health (n=42)	Less than good work ability (n=65)	1-9 sickness absence days (n=320)	10 or more sickness absence days (n=67)
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Health behaviors				
Body Mass Index				
Normal weight	1.00	1.00	1.00	1.00
Overweight	1.25 (0.59-2.63)	0.93 (0.51-1.70)	0.96 (0.68-1.35)	1.83 (0.97-3.45)†
Obese	2.41 (0.99-5.84)†	1.12 (0.51-2.46)	0.60 (0.34-1.04)†	2.44 (1.12-5.35)*
Insufficient sports participation	4.30 (1.31-14.14)*	2.50 (1.15-5.44)*	0.83 (0.58-1.19)	2.59 (1.13-5.93)*
Insufficient fruit and vegetable intake	0.90 (0.46-1.73)	0.95 (0.54-1.65)	0.73 (0.52-1.01)†	0.79 (0.45-1.39)
Current smoker	1.29 (0.62-2.71)	0.89 (0.47-1.70)	1.17 (0.78-1.76)	0.92 (0.46-1.85)
Work-related characteristics				
High work demands	1.44 (0.71-2.95)	2.23 (1.24-3.99)*	1.00 (0.70-1.44)	1.14 (0.62-2.13)
Low decision authority	0.79 (0.38-1.61)	1.60 (0.93-2.76)†	1.38 (0.97-1.96)†	0.94 (0.51-1.73)
Low skill discretion	0.96 (0.45-2.06)	2.19 (1.23-3.90)*	1.35 (0.92-1.99)†	1.53 (0.81-2.88)†
Awkward postures	1.31 (0.42-4.07)	2.07 (0.91-4.75)†	0.70 (0.33-1.51)	2.18 (0.87-5.46)†
Lifting heavy loads	1.49 (0.41-5.45)	2.00 (0.76-5.25)†	0.96 (0.38-2.40)	2.34 (0.77-7.17)†
Work engagement				
Low work engagement	1.66 (0.86-3.21)†	3.68 (2.15-6.30)*	1.36 (0.95-1.95)†	1.84 (1.04-3.27)*

* statistically significant at p<0.05, † statistically significant at p < 0.20 and included in fully adjusted models.

All analyses are adjusted for age, gender, educational level, and organization