Open access • Journal Article • DOI:10.1007/S10926-012-9410-0

Prognostic Factors for Successful Work Functioning in the General Working Population — Source link

Femke I. Abma, Benjamin C. Amick, Jac J. L. van der Klink, Ute Bültmann

Institutions: University of Groningen, University of Texas at Austin

Published on: 01 Jun 2013 - Journal of Occupational Rehabilitation (Springer US)

Topics: Ordinal regression

Prognostic Factors for Successful Work Functioning in the General Working Population

Abma, Femke I.; Amick, Benjamin C.; van der Klink, Jac J. L.; Bultmann, Ute

Published in:
Journal of Occupational Rehabilitation

DOI:
10.1007/s10926-012-9410-0

Publication date:
2013

J Occup Rehabil (2013) 23:162–169
DOI 10.1007/s10926-012-9410-0

Prognostic Factors for Successful Work Functioning in the General Working Population

Femke I. Abma · Benjamin C. Amick III · Jac J. L. van der Klink · Ute Bültmann

Published online: 18 December 2012

Abstract *Purpose* To help workers to stay at work in a healthy productive and sustainable way and for the development of interventions to improve work functioning, it is important to have insight in prognostic factors for successful work functioning. The aim of this study is to identify prognostic factors for successful work functioning in a general working population. *Methods* A longitudinal study (3 months follow-up) was conducted among the working population (N = 98). Work functioning was assessed with the Work Role Functioning Questionnaire 2.0 (WRFQ). The total score was categorized as follows: 0–90; >90 ≤95; and >95–100 (defined as 'successful work functioning'). Ordinal logistic regression analyses were performed to examine bivariate relationships between potential prognostic factors and the dependent variable (successful work functioning) to identify potential prognostic factors for the multivariate models ($p < 0.10$). A stepwise approach was used to introduce the variables in the multiple ordinal regression analyses. *Results* Baseline work functioning and work ability were significant prognostic factors for successful work functioning at 3 months follow-up. No prospective associations were identified for psychological job demands and supervisor social support with successful work functioning. *Conclusion* To our knowledge this is the first longitudinal study to identify prognostic factors for successful work functioning in the general working population. High work ability is predictive for future successful work functioning, independent of baseline work functioning.

Keywords Work Role Functioning Questionnaire · Occupational epidemiology · Working population · Job content · Longitudinal study

Introduction

Due to demographic, political and social changes in Western European countries (i.e., the ageing workforce, a shift from a work compensation model to a work participation model, the increase of retirement age and advances in medical treatment) more workers with a health problem that may interfere with their ability to accomplish their work will likely participate in the labour force [1]. Given the expected labour force shortages, the challenge is to help workers to stay at work in a healthy, productive and sustainable way.

Research has shown that health conditions can impact functioning at work in several ways. For example, depressed workers reported greater experienced difficulties in time management, mental, interpersonal and output job demands [2, 3]. Other research showed that poor health and multiple health problems were associated with low work performance [4].

Health-related work functioning (hereafter referred to as work functioning) is a construct developed to assess how

F. I. Abma · J. J. L. van der Klink · U. Bültmann
University Medical Center Groningen, University of Groningen, Groningen, The Netherlands

F. I. Abma (✉)
Department of Health Sciences, Community and Occupational Medicine, University Medical Center Groningen, University of Groningen, Antonius Deusinglaan 1, FA10, Room 610, 9713 AV Groningen, The Netherlands
e-mail: f.i.abma@umcg.nl

B. C. Amick III
Institute for Work and Health, Toronto, ON, Canada

B. C. Amick III
Health Science Center at Houston, University of Texas School of Public Health, Houston, TX, USA

workers with health problems are accomplishing their work. Work functioning is determined by the joint influence of work and health and is viewed as a continuum that varies from working successfully (i.e., the ability to meet all work demands for a given state of health) to work absence (i.e., the inability to meet all work demands given a state of health) [5, 6]. Work functioning, therefore, goes beyond the dichotomy of being at work versus being absent from work and provides information about a workers' actual functioning when present at work.

To date, longitudinal studies identifying prognostic factors for successful work functioning in the general working population are lacking. Limited evidence is available from studies investigating other constructs or other populations. Wynne-Jones et al. [7] found that individuals with increased psychological distress and poor perceived workplace management reported reduced performance. The authors did not find any significant associations between objective workplace characteristics and performance. Another study examined successful return to work in a population recovering from carpal tunnel surgery. The authors identified predictors for successful work functioning after return to work [8] and found baseline work functioning (before surgery), self-efficacy and a supportive organization to be predictive for successful work functioning at 6 months and 12 months after return to work. Lerner et al. [9] studied the impact of work stressors on work performance measured with the work limitations questionnaire (WLQ) in a population with depression. They found that decreased depression symptom severity and a change in general physical health were predictive for an improvement in work limitations in one or more of the WLQ scales.

To help workers to stay at work in a healthy, productive and sustainable way and for the development of interventions to improve work functioning, it is important to have insight in prognostic factors for successful work functioning. Therefore, the study aims to identify prognostic factors, measured at baseline, for successful work functioning at follow-up in a general working population.

Methods

A longitudinal study was conducted among the working population. Participants were recruited via several companies and organizations in various work settings in the Netherlands, via advertisements in a regional newspaper and online. The study consisted of a baseline measurement and a 3-month follow-up measurement. The inclusion criteria were: aged between 18 and 64 years and working at least 12 h per week (in the past 4 weeks). Exclusion criteria were: (1) not able to read and understand Dutch (the language of the questionnaire), (2) being pregnant, or (3) having plans to stop working within 6 months (for example due to retirement). All participants with a WRFQ 2.0 total score at follow-up were included in the analyses (N = 98). As for ethical standards, in this study we adhered to the declaration of Helsinki and the guidelines of the association of universities in the Netherlands [10]. According to the medical ethics committee of the University Medical Center Groningen no ethical approval was necessary. Participation in the study was voluntary, all participants provided informed consent, and answers were processed anonymously.

Dependent Variable

Work Functioning

Work functioning was assessed with the Work Role Functioning Questionnaire (WRFQ) 2.0 [6, 11]. The WRFQ 2.0 measures the perceived difficulties in meeting work demands among workers given their physical health or emotional problems. It consists of 27 items, divided into four subscales: work scheduling & output demands, physical demands, mental & social demands, and flexibility demands. In addition, a total score can be calculated. All items have to be answered on a five-point scale from 0 = difficult all the time (100 %), 1 = difficult most of the time, 2 = difficult half of the time (50 %), 3 = difficult some of the time, 4 = difficult none of the time (0 %). There is a response option 'Does not apply to my job'. The total score is calculated by adding all answers, dividing by the number of items not missing and then multiplied with 25 to obtain percentages between 0 and 100, with higher scores indicating better work functioning. The scores on 'Does not apply to my job' were transformed to missing values. If 20 % or more items were missing, the scale score was set to missing. The WRFQ 2.0 scores are positively skewed to the right, both at baseline and 3 month follow-up: baseline mean 86.2, SD 12.2, range 37.5–100; 3 month follow-up: mean 87.0, SD 11.1, range 37.5–100. The total score was categorized as follows: 0–90 'working, but only able to meet the demands of the job less than 90 % of the time' (N = 53); >90 ≤95 'good work functioning' (N = 18); and >95–100 'successful work functioning' (N = 27). In an earlier study, the cut-off value of 90 was used for successful work functioning [8], however, this was employed in a return to work population after carpal tunnel release surgery. To be able to distinguish between good work functioning and successful work functioning the cut-off value was set at >95 for this study.

Independent Variables

In the conceptual model described by Amick and Gimeno [5], work functioning reflects the interplay between work

demands and health. Independent variables were chosen from these two domains.

Health Status

The physical component score (PCS-12) and the mental component score (MCS-12) of the Short Form-12 (SF-12) were measured at baseline [12, 13]. The 12 items were scored and transformed to a mean of 50 and a standard deviation of 10, with higher scores reflecting better health (range 0–100). Scores were then dichotomized at the population mean of 50. Fatigue was assessed with the 'subjective experience of fatigue' subscale of the Checklist Individual Strength (CIS) [14, 15]. This 8-item subscale was designed to measure 'severity of fatigue'. The items are scored on a seven-point Likert scale (1 = yes, that is true to 7 = no, that is not true), with low scores indicating low fatigue (range 7–56). This scale was dichotomized at 35, a cut-off value for severe fatigue [14, 16, 17].

Work

Job content was measured with four subscales of the Job Content Questionnaire (JCQ) [18–20], psychological job demands (PsD) (range 12–48), decision latitude (DL) (range 24–96), supervisor social support (SS) (range 0–16) and co-worker social support (CS) (range 0–16). The four scales were dichotomized at the median (DL = 76; SS = 12; CS = 12 and PJD = 32). The 9-item version of the Utrecht Work Engagement Scale (UWES) was included to assess work engagement [21]. Work engagement is described as a positive, fulfilling work-related (persistent) state of mind that is characterized by vigour, dedication and absorption [21]. The items are rated on a seven-point Likert scale from 0 = never to 6 = always, a total score was calculated by taking the mean of all items [22] (range 0–6) and was dichotomized at 4.66 to differentiate between low-moderate and high-very high [22].

Work Ability

The single item "current work ability compared with the lifetime best"—with a possible score of 0 = completely unable to work to 10 = work ability at its best—of the Work Ability Index (WAI) was included as a self-assessed measure of ability to work [23, 24]. A correlation of 0.49 was calculated between this item and work functioning in this sample, indicating that although both measures are related they are not measuring the same construct. The score was dichotomized at a WAI score of 8 [24].

Covariates

Age and education level were measured. Education was categorized as high (higher vocational and university), medium (high school and intermediate vocational) and low (lower vocational, elementary school and no finished education).

Statistical Analyses

A non-response analysis was performed to identify significant differences in respondents versus non-respondents scores (*t* tests). Ordinal logistic regression analyses were performed to examine the bivariate relationships between potential prognostic factors (both continuous and dichotomized) and the dependent variable (successful work functioning) to identify potential prognostic factors for the multivariate models ($p < 0.10$). Both continuous and dichotomized variables were used to explore differences between the two models. By dichotomizing variables important information might be lost. However, using dichotomized scores often provides results that are easier to interpret in (clinical) decision making. A stepwise introduction of the variables was used in the multiple ordinal regression analyses. Baseline work functioning (continuous variable) was included in all steps and models. First the continuous variables were included in the analyses. The first step included the significant health status variables (mental/physical health and fatigue; model 1). In the second step, the significant work variables were added (work engagement, job content; model 2), and in the third step, work ability was added (model 3). Odds ratios and 95 % confidence intervals were calculated. Additional analyses were conducted by including all potential prognostic factors as dichotomous variables (with the exception of baseline work functioning and age which were used as continuous variables), to simplify interpretation. All analyses were performed using SPSS 18 (SPSS, Inc., Chicago, IL).

Results

Sample

Of the 275 baseline participants, N = 185 (67 %) participants provided their (e-mail) address for the follow-up questionnaire. Of those, N = 98 participants completed the questionnaire (response rate of 53 %) and a WRFQ total score was calculated. As Table 1 shows, no significant differences were found between respondents and non-respondents for age, WRFQ total score, health status, fatigue, work ability and work engagement at baseline. For level of education and gender, significant differences were found ($p < 0.001$), with respondents being higher educated and

more likely to be female. Compared to the general working population in the Netherlands, this sample shows a very good representation of the gender distribution [25]. The distribution of education is skewed in comparison to the Dutch working population as the current sample comprises more higher educated workers (the general Dutch population comprises 22.6 % low; 42.3 % moderate and 34.1 % high educated workers). At baseline 26.8 % of the participants had a WRFQ total score >95, 21.6 % scored between 90 and 95 and 51.5 % scored <90. At follow up 27.6 % had a WRFQ total score >95, 218.4 % scored between 90 and 95 and 54.1 % scored <90.

Bivariate Analyses

Mental health, fatigue, decision latitude, work engagement, work ability and work functioning at baseline were prospectively associated with successful work functioning at 3 months follow-up ($p < 0.10$, Table 2). Physical health, and job characteristics (except decision latitude), education and age were not prospectively associated with future successful work functioning.

When variables were treated as dichotomous variables, mental and physical health, fatigue, work ability, work engagement and co-worker social support at baseline were all prospectively associated with successful work functioning at 3 months follow-up ($p < 0.10$, Table 2). Job characteristics (except co-worker social support), education and age were not prospectively associated with future successful work functioning.

Successful Work Functioning

Table 3 shows the results for the continuous prognostic variables. When mental health and fatigue were introduced in model 1, only baseline work functioning was prospectively associated with successful work functioning (Odds Ratio (OR) = 1.16, 95 % confidence interval (95 % CI) 1.07–1.24). When work engagement and decision latitude were added (model 2), only baseline work functioning remains significantly associated with successful work functioning [baseline work functioning OR = 1.16 (1.08–1.25)]. With the introduction of work ability in the final step (model 3), baseline work functioning (OR = 1.16 (1.07–1.25)), and work ability (OR = 2.07 (1.22–3.49)) were prospectively associated with future successful work functioning.

Table 4 shows the results for the dichotomized prognostic factors. Only baseline work functioning is associated with successful work functioning in model 1 and 2 (model 1 OR = 1.19 (1.10–1.28); model 2 OR = 1.21 (1.11–1.31)). With the introduction of work ability in the final step (model 3), baseline work functioning (OR = 1.20 (1.10–1.31)) and work ability (OR = 3.22 (1.10–9.36)) were predictive for future successful work functioning.

Running both analyses with continuous and dichotomized variables with only the significant variables (baseline

Table 1 Sample description

	Respondents/participants (N = 98)	Non-respondents (N = 87)
Age in years, mean (SD)	44.6 (10.9)	42.1 (11.3)
Gender*		
Male, N (%)	54 (55.1)	78 (89.7)
Female, N (%)	44 (44.9)	9 (10.3)
Education*		
Low, N (%)	6 (6.1)	10 (11.5)
Middle, N (%)	18 (18.4)	47 (54.0)
High, N (%)	73 (74.5)	30 (34.5)
WRFQ 2.0 total score (baseline), mean (SD)	86.2 (12.2)	87.0 (14.3)
Mental health, mean (SD)	50.7 (8.4)	52.1 (7.6)
Physical health, mean (SD)	51.7 (6.6)	52.1 (6.3)
Fatigue, mean (SD)	21.2 (10.2)	20.6 (11.4)
Psychological job demands, mean (SD)	32.1 (5.2)	29.9 (5.3)
Decision latitude, mean (SD)	75.4 (9.5)	72.1 (9.9)
Supervisor social support, mean (SD)	11.5 (2.2)	10.7 (2.3)
Coworker social support, mean (SD)	12.4 (1.6)	11.8 (1.7)
Work engagement, mean (SD)	4.2 (1.1)	4.3 (1.1)
Work ability, mean (SD)	7.9 (1.5)	8.0 (1.5)

* Means differ significant in *t* test ($p < 0.05$)

Table 2 Baseline predictors for work functioning at 3 months

	Continuous variables			Dichotomous variables		
	Estimate (Beta)	SE	*p* value	Estimate (Beta)	SE	*p* value
Mental health	**0.120**	**0.034**	**0.000**	**1.338**	**0.464**	**0.004**
Physical health	0.041	0.031	0.191	**0.885**	**0.464**	**0.056**
Fatigue	**−0.096**	**0.024**	**0.000**	**1.121**	**0.677**	**0.098**
Psychological job demands	0.028	0.038	0.461	−0.075	0.396	0.850
Decision latitude	**0.048**	**0.022**	**0.029**	0.510	0.392	0.193
Supervisor social support	0.125	0.091	0.168	0.486	0.398	0.222
Coworker social support	0.186	0.124	0.133	**0.798**	**0.409**	**0.051**
Work engagement	**0.673**	**0.210**	**0.001**	**1.102**	**0.410**	**0.007**
Work ability	**1.060**	**0.229**	**0.000**	**1.774**	**0.429**	**0.000**
WRFQ baseline	**0.175**	**0.036**	**0.000**			
Age	0.003	0.018	0.870			
Education (low)				0.306	0.802	0.703
Education (middle)				0.457	0.496	0.358

Bold = significant at $p < 0.10$

Table 3 Multiple ordinal logistic analyses—baseline predictors (continuous) for successful work functioning at 3 months

	Model 1		Model 2		Model 3	
	OR	95 % CI	OR	95 % CI	OR	95 % CI
WRFQ baseline	**1.16**	**(1.07–1.24)**	**1.16**	**(1.08–1.25)**	**1.16**	**(1.07–1.25)**
Mental health	1.06	(0.98–1.15)	1.04	(0.96–1.13)	1.02	(0.93–1.11)
Fatigue	0.95	(0.90–1.00)	0.96	(0.91–1.01)	0.99	(0.94–1.05)
Decision latitude			1.02	(0.96–1.07)	1.00	(0.94–1.06)
Work engagement			1.41	(0.84–2.37)	1.29	(0.76–2.20)
Work ability					**2.07**	**(1.22–3.49)**

Bold = significant at $p < 0.05$

Table 4 Multiple ordinal logistic analyses—baseline predictors (dichotomous) for successful work functioning at 3 months

	Model 1		Model 2		Model 3	
	OR	95 % CI	OR	95 % CI	OR	95 % CI
WRFQ baseline	**1.19**	**(1.10–1.28)**	**1.21**	**(1.11–1.31)**	**1.20**	**(1.10–1.31)**
Mental health						
High (good)	2.08	(0.72–6.02)	1.43	(0.47–4.37)	1.24	(0.39–3.95)
Low (poor)	1.00	Reference				
Physical health						
High (good)	1.12	(0.40–3.66)	0.92	(0.27–3.12)	0.77	(0.21–2.73)
Low (poor)	1.00	Reference				
Fatigue						
Low	0.61	(0.12–3.21)	0.79	(0.14–4.46)	0.56	(0.10–3.08)
High	1.00	Reference				
Co-worker support						
High			2.53	(0.94–6.85)	1.96	(0.72–5.33)
Low			1.00	Reference		
Work engagement						
High			2.60	(0.99–6.83)	1.65	(0.59–4.59)
Low			1.00	Reference		
Work ability						
High					**3.22**	**(1.10–9.36)**
Low					1.00	Reference

Bold = significant at $p < 0.05$

work functioning and work ability) revealed very similar results (data not shown).

Discussion

This prospective, longitudinal study showed that baseline health-related work functioning and work ability were significant prognostic factors for successful health-related work functioning at 3 months follow-up (work ability both as continuous variable and dichotomized at 8). If a worker assessed his or her ability to perform work as high (high work ability) or was able to meet the demands of his or her job given their health (high work functioning) then at 3 months after baseline he or she was sustaining a high level health-related work functioning. No prospective associations with successful work functioning were identified for psychological job demands, supervisor social support, education or age.

Work ability (measured with the overall single item) was found to be predictive for future successful work functioning. The work ability item asks for the workers indication of his/her general ability to work compared to lifetime best, while work functioning (measured with the WRFQ) is a detailed indication of a persons experienced difficulties in performing specific work demands in the past 4 weeks. Probably, good work ability is a prerequisite for

good work functioning. A previous study has shown that it is difficult to detect changes in the pattern of work ability [24]. Designing interventions to support successful health-related work functioning should therefore focus on other, underlying concepts. Patterns of variation in health-related work functioning might provide more in-depth information for the design of interventions.

To our knowledge this is the first longitudinal study to identify prognostic factors for successful work functioning in a general working population. To some extent the findings are in line with previous prognostic research in other populations. A longitudinal study found a prognostic effect for psychological distress and perceptions of work for self-rated work performance [7]. The authors did not find an effect for the mental/physical component scores (SF12), health status measured with the EQ5D, or objective work measures such as contract type, flexible working arrangements or physical job characteristics in a multivariate analysis. A study identifying predictors for successful work functioning after carpal tunnel release surgery [8] also found baseline work functioning (before surgery) to be predictive for successful work functioning at 6 months after return to work. However, they also identified physical health, self-efficacy and organizational support to be predictive for successful work functioning in their population, which was not predictive in the multivariate analyses in this study with a general working population.

In cross sectional research, associations were found between 'low performance at work' and age and poor general health [4]. Associations between several work-related factors (among others job content) and 'low performance at work' in both bivariate and multivariate analyses were also observed. In the current study, no job content variable was prospectively associated with successful work functioning in the multivariate models. This might suggest that job content influences a workers' functioning at work, but that this effect attenuates over time. This lack of an association could also be a result of the inclusion of baseline work functioning in the analyses. Amick et al. [8] note that the attenuation of the effect of job content might be due to organizational support. More longitudinal studies with repeated measurements are needed to further study these associations.

In the bivariate analyses, fatigue was prospectively associated with successful work functioning (both continuous and dichotomized). Earlier research has shown the influence of fatigue on work limitations. For example, Hansen et al. [26] studied work limitations in a breast cancer survivor population. They found more work limitations in the breast cancer survivors in comparison to the non-cancer group and fatigue was related to work limitations to a greater degree than in the non-cancer group. Munir et al. [27] studied the effect of a variety of chronic conditions on work limitations and work adjustments and found that for many health conditions it were generic symptoms like fatigue that resulted in work limitations [27].

With respect to the current study, several strengths and limitations have to be addressed. Although a response rate of 53 % at follow-up was reasonable for a survey in the working population, the number of participants in the analyses (N = 98) was rather low. A non-response analysis showed that there was no difference between the respondents and non-respondents for baseline work functioning. However, differences were found for education and gender. Although no information is available about the influence of education on work functioning scores, a relatively high educated population may have led to a bias in work functioning scores at follow-up. The over representation of higher educated participants might have also led to a lack of variance in other variables such as physical health, fatigue, decision latitude or work engagement. The proportional odds assumption was tested for each model [28]. All tests showed that the assumption was met, though due to small sample sizes the reliability of the test might be questioned. Although the initial aim was to include 100 participants in each change group (with change defined as either improved or deteriorated work functioning), difficulties in recruitment and design changes resulted in lower numbers. Due to the limited number of participants with a follow-up score on work functioning, the number of variables in the models was restricted. The rule of thumb to have at least 10 participants per variable was used and variables were chosen based on the conceptual model of work functioning. In addition, the follow-up period of 3 months might have been too short to find a change in work functioning in the general working population. Amick et al. found an increase in work functioning 2 and 6 months after carpal tunnel syndrome release surgery. Unfortunately, in the current study it was not possible to conduct an intervention to improve work functioning in the general working population, nor was it practically possible to have a longer follow-up period. This might have also contributed to the limited number of participants that showed change in work functioning and the large influence of baseline work functioning scores. Future research should therefore take a longer follow-up time into account and should look at the effect of interventions on changes in work functioning.

A point of interest is the assessment of the independent and dependent variables. Both were measured with self-report measures, which might have resulted in an overestimation of the associations due to shared method variance or shared response biases [29]. In addition, the used cut-off value for successful work functioning needs to be addressed as to date there is no evidence based cut-off value for

successful work functioning available. Other studies have used and proposed various values. Amick et al. [8] used the value of >90 for successful work functioning in a population of workers who returned to work after carpal tunnel surgery. Lerner et al. [30] proposed a value of 100 to be a 'healthy' norm (WLQ). The use of a cut-off value is always arbitrary and contains judgment [31]. In this study the WRFQ 2.0 scores were positively skewed to the right, both at baseline and 3 month follow-up. To be able to distinguish between good work functioning and successful work functioning for this study the cut-off value was set at >95, including the top 25 percent. Following this issue, various cut-off values were used to dichotomize the independent variables, including median split. Possible consequences of using dichotomized independent variables are loss of information, loss of power and spurious statistical significance [32]. By showing the results from both continuous and dichotomized variables it is possible to compare the findings. The bivariate analyses showed differences in variables significantly related with work functioning. Although the multiple ordinal regression analyses for the continuous and dichotomized variables differed in terms of included independent variables, both analyses showed that work ability and baseline work functioning were predictive of successful work functioning.

To our knowledge this is the first longitudinal study to identify prognostic factors for successful work functioning in the general working population. Further research, in larger populations and with repeated measurements, is needed to identify more prognostic factors for successful work functioning and to explore if there are different prognostic factors for various levels of baseline work functioning. With the expected shortages in the labour force and the increase of participation of workers with a health problem, (preventive) interventions are needed to help workers to stay at work in a healthy, productive and sustainable way. Identifying prognostic factors for successful work functioning might help in the development of interventions to improve future work functioning.

Acknowledgments This study was financially supported by Stichting Instituut Gak, the Netherlands. The funder had no role in study design, data collection and analysis, or preparation of the manuscript.

Conflict of interest The authors report no declaration of interest.

References

1. Jagger C, Gillies C, Moscone F, Cambois E, Van OH, Nusselder W, et al. Inequalities in healthy life years in the 25 countries of the European Union in 2005: a cross-national meta-regression analysis. Lancet. 2008;372:2124–31.
2. Lerner D, Henke RM. What does research tell us about depression, job performance, and work productivity? J Occup Environ Med. 2008;50:401–10.
3. Erickson SR, Guthrie S, Vanetten-Lee M, Himle J, Hoffman J, Santos SF, et al. Severity of anxiety and work-related outcomes of patients with anxiety disorders. Depress Anxiety. 2009;26:1165–71.
4. van den Heuvel SG, Geuskens GA, Hooftman WE, Koppes LL, van den Bossche SN. Productivity loss at work; health-related and work-related factors. J Occup Rehabil. 2010;20:331–9.
5. Amick BC, III, Gimeno D. Measuring work outcomes with a focus on health-related work productivity loss. In: Wittink H, Carr D, editors. Pain management: evidence, outcomes, and quality of life: a sourcebook. Amsterdam: Elsevier; 2008. p. 329–43.
6. Abma FI, van der Klink JJ, Bultmann U. The Work Role Functioning Questionnaire 2.0 (Dutch Version): examination of its reliability, validity and responsiveness in the general working population. J Occup Rehabil. 2012.
7. Wynne-Jones G, Buck R, Varnava A, Phillips CJ, Main CJ. Impacts on work performance; what matters 6 months on?. Occup Med (Lond) 2011; 61:205–8.
8. Amick BC III, Habeck RV, Ossmann J, Fossel AH, Keller R, Katz JN. Predictors of successful work role functioning after carpal tunnel release surgery. J Occup Environ Med. 2004;46:490–500.
9. Lerner D, Adler DA, Rogers WH, Chang H, Lapitsky L, McLaughlin T, et al. Work performance of employees with depression: the impact of work stressors. Am J Health Promot. 2010;24:205–13.
10. VSNU. Gedragscode voor gebruik van persoonsgegevens in wetenschappelijk onderzoek (Code of Behavior for using Personal Data in Scientific Research). Available at the website of the Association of Universities in the Netherlands: www.vsnu.nl, 2005.
11. Abma FI, Amick BC, 3rd, Brouwer S, van der Klink JJL, Bültmann U. The cross-cultural adaptation of the Work Role Functioning Questionnaire to Dutch. Work J Prev Assess Rehabil 2012; 43:203–10.
12. Ware J Jr, Kosinski M, Keller SD. A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. Med Care. 1996;34:220–33.
13. Ware JE, Kosinski M, Turner-Bowker DM, Gandek B. How to score version 2 of the SF-12 Health Survey. Lincoln: QualityMetric Incorporated; 2002.
14. Vercoulen JH, Swanink CM, Fennis JF, Galama JM, van der Meer JW, Bleijenberg G. Dimensional assessment of chronic fatigue syndrome. J Psychosom Res. 1994;38:383–92.
15. Beurskens AJ, Bultmann U, Kant I, Vercoulen JH, Bleijenberg G, Swaen GM. Fatigue among working people: validity of a questionnaire measure. Occup Environ Med. 2000;57:353–7.
16. Vercoulen JH, Alberts M, Blijenberg G. De Checklist Individual Strength (CIS). Gedragstherapie. 1999;32:131–6.
17. Huibers MJ, Kant IJ, Knottnerus JA, Bleijenberg G, Swaen GM, Kasl SV. Development of the chronic fatigue syndrome in severely fatigued employees: predictors of outcome in the Maastricht cohort study. J Epidemiol Community Health. 2004;58:877–82.
18. Karasek RA. Job Content Questionnaire and Users's Guide. Los Angeles: University of Southern California, Department of Industrial and Systems Engineering, 1985.
19. Karasek RA. Job demands, job decision latitude, and mental strain: implications for job redesign. Adm Sci Q. 1979;24:285–309.
20. Reliability and validity of the Dutch version of the Karasek Job Content Questionnaire. Washington, DC: APA/NIOSH Conference on Work, Stress and Health; 1995.
21. Schaufeli WB, Bakker AB, Salanova M. The measurement of work engagement with a short questionnaire: a cross-national study. Educ Psychol Meas. 2006;66:701–16.
22. Schaufeli WB, Bakker AB. Test manual for the Utrecht work engagement scale. 2003. (Available at http://www.schaufeli.com).
23. Tuomi K, Ilmarinen J, Jahkola A, Katajarinne L, Tulkki A. Work ability index. In: Rautoja S, Pietiläinen R, editors. Finland:

K-Print Oy Vantaa, Finnish Institue of Occupational Health; 1998.
24. Ahlstrom L, Grimby-Ekman A, Hagberg M, Dellve L. The work ability index and single-item question: associations with sick leave, symptoms, and health—a prospective study of women on long-term sick leave. Scand J Work Environ Health. 2010;36: 404–12.
25. Statistics Netherlands. StatLine database. Available at: http://statline.cbs.nl/StatWeb. [Accessed June 2012].
26. Hansen JA, Feuerstein M, Calvio LC, Olsen CH. Breast cancer survivors at work. J Occup Environ Med. 2008;50:777–84.
27. Munir F, Jones D, Leka S, Griffiths A. Work limitations and employer adjustments for employees with chronic illness. Int J Rehabil Res. 2005;28:111–7.
28. Lammers J. Categorische data analyse met SPSS: inleiding in loglineaire analysetechnieken. Assen: Koninklijke Van Gorcum; 2007.
29. Amick B, Kasl S. Work stress. In: McDonald C, editor. Epidemiology of work related diseases. London: BMJ Publishing Group; 2000. p. 283–308.
30. Lerner D, Reed JI, Massarotti E, Wester LM, Burke TA. The Work Limitations Questionnaire's validity and reliability among patients with osteoarthritis. J Clin Epidemiol. 2002;55:197–208.
31. Dwyer CA. Cut scores and testing: statistics, judgment, truth, and error. Psychol Assess. 1996;8:360–2.
32. MacCallum RC, Zhang S, Preacher KJ, Rucker DD. On the practice of dichotomization of quantitative variables. Psychol Methods. 2002;7:19–40.