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Chapter 3

The associations between personality characteristics and absenteeism: a cross-sectional study in workers with and without depressive and anxiety disorders

This chapter was based on:

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ABSTRACT

Purpose Although numerous studies have identified risk factors for sickness absence, few studies have addressed the role of personality characteristics in absenteeism. The aim of this study was to examine the associations of the Big 5 personality characteristics (neuroticism, extraversion, openness, agreeableness and conscientiousness) and locus of control with absenteeism, taking the presence of depressive and anxiety disorders into account.

Methods Cross-sectional data from the baseline measurement of the Netherlands Study of Depression and Anxiety (NESDA) were examined. NESDA includes persons with current or remitted depressive and anxiety disorders and healthy controls, of which 1883 working participants were selected. Personality characteristics were included as predictor variables, short-term (0-2 weeks) and long-term (>2 weeks) absenteeism as outcome measure. The presence of depressive and anxiety disorders was considered as modifying covariate.

Results High neuroticism, low extraversion, low conscientiousness and external locus of control were significantly associated with long-term absenteeism in both workers with and without depressive and anxiety disorders. Because several personality characteristics interacted with psychopathology in predicting especially short-term absenteeism, stratified analyses were performed. Results indicated that these personality characteristics were more strongly associated with short-term absenteeism in healthy workers.

Conclusions Personality characteristics were significantly associated with work absenteeism in both workers with and without anxiety or depression. Interventions aimed at preventing sickness absence may focus on reducing neuroticism and strengthening extraversion, conscientiousness and locus of control.

INTRODUCTION

Sickness absence from work is an important public health and economic problem [1]. Besides incurring huge financial costs for society, for the Netherlands estimated at almost 20 billion Euros annually, being absent from work has important implications for the individual worker [2]. The ability to work is an important aspect of quality of life by providing meaningful activity, daily structure and social contacts [3, 4]. It is widely recognized that sickness absence is influenced by a wide variety of health-related, personal and job-related factors. Numerous studies have been conducted to identify those factors [5-8]. For example, being unmarried, experiencing psychosomatic complaints, using medication, having a burnout, suffering from psychological problems, having low decision latitude, having low job control, experiencing unfairness at work, work-family role conflict, and a lack of attentive managerial leadership were reported to be significant predictors for sickness absence [6, 9, 10].

In addition to these factors, specific personality characteristics of the worker may be associated with absenteeism. Although these associations have not been addressed in many studies, some personality characteristics have been shown to be predictors for other work outcomes than absenteeism. For example, an internal locus of control, emotional stability and self-efficacy were found to be positively associated with job satisfaction and job performance [11]. In addition, workers with high neuroticism, low self-esteem and an external locus of control, a combination that is often labelled as 'psychological vulnerability,' were found to have a greater risk of impaired functioning at work, regardless of the risk from any mental disorder [12]. Moreover, most of the costs of neuroticism are due to absenteeism, even after adjustment for mental and somatic disorders [13].

Knowledge on the specific associations of personality characteristics with absenteeism is important because it may contribute to the development of interventions aimed at preventing sickness absence. This knowledge will be particularly valuable for employers, occupational physicians (OPs) and other professionals working in occupational healthcare. It may support them in identifying workers at increased risk for (long-term) sickness absence and in determining the focus and intensity of interventions. When studying the associations between personality characteristics and absenteeism, mental disorders need to be taken into account as they are strongly associated with both personality characteristics and absenteeism [1, 14-18]. Of the associations between personality characteristics and mental disorders, particularly high neuroticism, low extraversion, low conscientiousness and low agreeableness have often been linked to mental disorders [17]. Together with openness these factors are referred to as the Big 5 personality domains and are assumed to represent core personality characteristics or 'traits' [17].

In the present study, the associations of the Big 5 personality characteristics and locus of control, another important trait-like personality characteristic, with absenteeism were examined, taking into account the effect of depressive and anxiety disorders. Using data from the Netherlands Study on Depression and Anxiety (NESDA), this study built on previous findings from NESDA, in which current and remitted depressive disorders and current anxiety disorders were associated with absenteeism [18, 19]. Considering earlier findings that high neuroticism and external locus of control were found to be related to

impaired work functioning, it could be expected that these factors would also be associated with absenteeism [12]. Moreover, the associations between personality characteristics and absenteeism could be expected to differ between workers with and without depressive and anxiety disorders. Given the strong associations between depressive and anxiety disorders and absenteeism, the influence of disorder-related factors might predominate in workers with a depressive or anxiety disorder, thereby reducing the influence of personality characteristics in these workers [18]. On the other hand, given the large impact of their disorder, workers with a depressive or anxiety disorders might be more vulnerable to other risk factors for absenteeism as well, thereby increasing the influence of a vulnerable personality. The objective of the present study was to examine the specific cross-sectional associations of personality characteristics with absenteeism in both workers with and without depressive and/or anxiety disorders.

METHODS

Study population

We examined cross-sectional data from the baseline measurement of NESDA. NESDA is a multi-site cohort study among 2981 participants, examining the long-term course and consequences of depressive and anxiety disorders in adults. The NESDA sample consists of persons with a current diagnosis of depressive disorder and/or anxiety disorder, persons with remitted diagnoses, and healthy controls. Participants were recruited in the general population, in general practices, and in mental health organizations [19]. In the present study, 1883 NESDA participants with a paid job for more than 8 hours a week were selected. Seven participants were excluded because of missing data on the outcome measure. Furthermore, 21 participants were excluded because of missing data on all independent variables, resulting in a study population of 1855 participants.

Measures

Outcome measure

The outcome measure absenteeism was defined as the number of work weeks absent in the past 6 months, as measured at baseline by the TiC-P [20]. This variable did not have a normal distribution and was therefore categorised, as done before in NESDA, into 3 categories: no absenteeism, short-term absenteeism (≤ 2 weeks) and long-term absenteeism (> 2 weeks) [18]. By using this categorization, long-term absenteeism (which probably involves more chronic conditions and higher costs) was distinguished from short-term absenteeism (which is probably due to rather common health conditions such as the flu) and from no absenteeism [18, 21].

Predictor variables

Personality characteristics were the predictor variables. They were assessed with the NEO-FFI, measuring 5 domains of personality: neuroticism, extraversion, openness, agreeableness and conscientiousness. This questionnaire contains 60 items, 12 items per domain, measured on a 5-point scale [22]. Locus of control, defined as the extent to which a person perceives himself to be in control of events and ongoing situations, was

assessed with the 5-item version of the Pearlin Mastery Scale, ranging from 5 to 25 [23]. Both the NEO-FFI subscales and the Pearlin Mastery scale had good internal reliability, with Cronbach's alpha varying from .62 to .90, and scores were standardised into z-scores. All these variables are conceptualized as more or less stable and lifelong 'trait' characteristics.

Effect modifiers

The modifying variables were the diagnoses of depressive and anxiety disorders. Depressive and anxiety disorders were established with the CIDI interview (WHO lifetime version 2.1), which were conducted by trained clinical research staff. The CIDI is a reliable, worldwide used instrument which classifies diagnoses according to the DSM-IV criteria [19]. Depressive disorders were classified in the categories current (6-month recency) depressive disorder and remitted depressive disorder, encompassing major depressive disorders as well as dysthymic disorders. Anxiety disorders were classified in current (6-month recency) and remitted anxiety disorders, encompassing panic disorders, generalized anxiety disorders and social phobias.

Covariates

The following potential confounders were taken into account in the analyses: age, gender, education (in years attained), the number of working hours per week, the number of somatic conditions and job characteristics. The number of somatic conditions was assessed with the chronic diseases interview, a 21-item face to face interview instrument that was designed for NESDA. In the chronic diseases interview, the presence of diseases and conditions such as asthma, chronic bronchitis or pulmonary emphysema, heart diseases or infarct, diabetes, stroke or CVA, high blood pressure, allergies, intestinal disorders, and arthritis is assessed. In addition, participants could mention up to 5 additional chronic diseases that were not listed yet [19]. Job characteristics were measured with the Job Content Questionnaire (JCQ), including job demands, decision authority, skill discretion, social support at work and job insecurity [24].

Statistical analyses

Since absenteeism was categorised into 3 categories, multivariate multinomial logistic regression models were used. First, the associations of the Big 5 personality characteristics and locus of control with the presence of short-term and long-term absenteeism were analyzed. Then, it was checked whether depressive and anxiety disorders acted as effect modifiers by entering interaction terms between personality characteristics and depression/anxiety status to the models. In case of significant interaction terms ($p < .10$), subgroup analyses were performed in order to calculate separate odds ratios (OR) for the subgroups. It was checked whether the effects for workers with current psychopathology were similar to those for workers with remitted psychopathology, and in that case, the final subgroup analyses were performed for those without psychopathology (i.e. 'healthy workers') and for those with psychopathology (i.e. current and remitted depressive and/or anxiety disorders). Effect sizes in Cohen's d were calculated, by dividing the differences between two means by the pooled standard

deviation. Effect sizes around .2 indicate a small effect, effect sizes around .5 a moderate effect and effect sizes around .8 a large effect [25].

RESULTS

Characteristics of the study population

Characteristics of the study population are shown in table 1. Of the 1855 participants, 55.1% had a current depressive or anxiety disorder, 21.7% had a remitted depressive or anxiety disorder, and 23.2% had neither a current nor a remitted disorder.

Table 1. Characteristics of the study population.

	No sickness absence (N=833)		0-2 weeks of sickness absence (N=526)		>2 weeks of sickness absence (N=496)		p- value *
<i>Socio-demographics</i>							
Age	42.1	(12.1)	39.1	(11.4)	42.1	(10.6)	<.001
Gender (% male)	40.2		28.9		35.9		<.001
Education in years attained	12.8	(3.2)	12.8	(3.3)	11.9	(3.3)	<.001
<i>Big Five personality characteristics (range 12-60)</i>							
Neuroticism	32.6	(9.4)	36.7	(8.9)	39.1	(8.1)	<.001
Extraversion	39.1	(7.2)	37.3	(7.0)	35.4	(7.0)	<.001
Openness	38.2	(5.7)	38.5	(6.0)	37.8	(6.1)	.138
Agreeableness	44.3	(5.1)	43.3	(5.4)	43.2	(5.3)	<.001
Conscientiousness	43.5	(6.1)	41.7	(6.4)	40.8	(6.7)	<.001
<i>Pearlin Mastery Scale (range 5-25)</i>							
Locus of control	18.8	(4.2)	17.7	(4.2)	15.9	(4.6)	<.001
<i>Psychopathology (%)</i>							
Current depressive or anxiety disorder	39.3		58.6		78.2		<.001
Remitted disorder, and no current disorder	26.1		23.4		12.5		
No current or remitted disorder	34.7		18.1		9.3		
- Current depressive disorder	20.4		35.9		63.9		<.001
- Remitted depressive disorder	30.6		34.0		19.4		<.001
- Current anxiety disorder	30.9		42.4		57.9		<.001
- Remitted anxiety disorder	16.2		18.4		13.1		.066
Co-morbid current depression and anxiety	12.0		19.8		43.5		<.001
<i>Somatic health (range 0-12)</i>							
Number of chronic conditions	.70	(.92)	.71	(.88)	.98	(1.10)	<.001
<i>Job characteristics (range 0-1)</i>							
Job demands	.46	(.33)	.47	(.33)	.54	(.36)	.001
Decision authority	.79	(.28)	.73	(.31)	.69	(.32)	<.001
Skill discretion	.78	(.26)	.72	(.27)	.67	(.27)	<.001
Social support at work	.75	(.28)	.68	(.31)	.60	(.31)	<.001
Job insecurity	.60	(.21)	.59	(.21)	.56	(.27)	.012

The numbers presented are means and standard deviations unless otherwise specified.

** ANOVA for continuous variables, chi-square tests for categorical variables.*

Furthermore, 44.9% of the participants had had no absenteeism in the last 6 months, 28.4% had had 0-2 weeks of absenteeism, and 26.7% had had more than 2 weeks of absenteeism. Significantly higher scores on neuroticism were found in workers with absenteeism, compared with workers without absenteeism, and significantly lower scores on extraversion, agreeableness, conscientiousness and locus of control. In addition, significant differences were found between the groups on psychopathology, socio-demographics, somatic health and job characteristics, with workers with long-term absenteeism scoring least favourably.

The associations of personality characteristics with absenteeism

Table 2 shows the associations of the personality characteristics with absenteeism, adjusted for socio-demographics, number of working hours, number of somatic conditions and job characteristics. High neuroticism, low extraversion, low conscientiousness and external locus of control were significantly associated with absenteeism. We subsequently examined whether the associations with absenteeism differed between workers with and without depressive and anxiety disorders by entering interaction terms (personality characteristic*yes/no depressive or anxiety disorder) into the multivariate analyses. Of the 12 interaction terms tested (6 personality characteristics and 2 yes/no depressive or anxiety disorder), the following interactions with depressive and anxiety disorders were found to be significant in predicting absenteeism: neuroticism ($p=.026$), agreeableness ($p=.008$) and locus of control ($p=.047$) in predicting short-term absenteeism, and openness ($p=.080$) in predicting long-term absenteeism. Given the statistical evidence for effect modification, subgroup analyses were carried out to explore the results in those with and without a depressive or anxiety disorder. Summarizing the results, table 3 contains results only of personality characteristics in which the interaction terms were significant. As an example, the association between neuroticism and short term absenteeism was quite strong and significant among those without a depressive or anxiety disorder (OR=1,75; 95% CI 1,24; 2,48), but smaller and non-significant among those with a depressive or anxiety disorder (OR=1,08; 95% CI 0,90; 1,30). Comparing the effects across those with and without depression or anxiety, the pattern is quite consistent in that personality characteristics were associated with especially short-term absenteeism only in those without a concurrent depressive or anxiety disorder.

DISCUSSION

Main findings

This cross-sectional study showed that specific personality characteristics indicating psychological vulnerability (high neuroticism, external locus of control and low extraversion and conscientiousness) were associated with both short- and long-term work absenteeism. The effect sizes in Cohen's d ranged from 0.15 to 0.73, which can be interpreted as ranging from small to moderately large [25]. In the total study population, the largest effect sizes were found for the associations of neuroticism and locus of control with long-term absenteeism. There were subtle differences in the associations between healthy workers and workers with psychopathology: Significant associations between personality characteristics and long-term absenteeism were found for workers both with

Table 2. Associations of the Big 5 personality characteristics and locus of control with short-term and long-term absenteeism (N=1855).

	0-2 weeks absence				>2 weeks absence			
	OR	(95%CI)	d	p	OR	(95%CI)	d	p
Neuroticism	1.402	(1.220; 1.611)	-.46	<.001	1.921	(1.639; 2.251)	-.73	<.001
Extraversion	.775	(.677; .887)	.25	<.001	.646	(.557; .750)	.52	<.001
Openness	1.073	(.936; 1.231)	-.06	.312	1.037	(.895; 1.200)	.07	.631
Agreeableness	.884	(.770; 1.013)	.19	.077	.960	(.830; 1.112)	.20	.588
Conscientiousness	.801	(.700; .916)	.28	.001	.691	(.597; .799)	.42	<.001
Locus of control	.809	(.701; .934)	.26	.004	.602	(.517; .702)	.67	<.001

Reference category: no absenteeism

Analyses are adjusted for: age, gender, educational level, number of working hours, number of somatic conditions and job characteristics.

Table 3. Adjusted odds ratios for the associations with absenteeism in subgroups with and without psychopathology, for the personality characteristics that interacted with psychopathology.

	Psychopathology (N=1425)										No psychopathology (N=430)						
	0-2 weeks					>2 weeks					0-2 weeks		>2 weeks				
	OR	95% CI	d	p		OR	95% CI	d	p		OR	95% CI	d	p			
Neuroticism	1.081	(.902; 1.296)	-.25	.397						1.751	(1.237; 2.478)	-.46	.002				
Extraversion																	
Openness					1.049	(.891; 1.234)	.08	.568						.593	(.375; .936)	.15	.025
Agreeableness	1.039	(.886; 1.217)	.07	.640						.663	(.480; .915)	.32	.013				
Conscientiousness																	
Locus of control	1.005	(.847; 1.193)	.08	.954						.636	(.437; .926)	.29	.018				

Reference category: no absenteeism

Analyses are adjusted for: age, gender, educational level, number of working hours, number of somatic conditions and job characteristics.

and without psychopathology, but the associations of neuroticism and locus of control with short-term absenteeism were only found in healthy workers. Moreover, low openness and low agreeableness were only associated with absenteeism in healthy workers.

Interpretation of findings

The finding that several personality characteristics were not associated with short-term absenteeism in workers with psychopathology, whereas they were in healthy workers, suggests that in workers with psychopathology disorder-related factors may be more predictive for short-term absenteeism than personality, thereby diminishing the influence of personality characteristics. Most workers with psychopathology had short-term absenteeism and the results showed that in these workers, personality characteristics were particularly associated with long-term absenteeism.

In the present study, the importance of neuroticism in the association with sickness absence was confirmed. Of the associated characteristics, neuroticism showed the strongest association with absenteeism in both workers with and without psychopathology. Moreover, our study demonstrated that the associations of neuroticism and extraversion with long-term absenteeism did not differ in strength between healthy workers and those with psychopathology. Thus, regardless of whether a worker had a current or remitted depressive and/or anxiety disorder, high neuroticism and low extraversion were correlated with long-term absenteeism. Furthermore, the associations that were found in a previous study between high neuroticism, external locus of control and impaired work functioning, were confirmed in the present study for the work outcome absenteeism [12].

The concept of locus of control shows overlap with the concept of perceived behavioral control, which is one of the determinants of behavior according to the theory of planned behavior (TPB) [26]. Since absenteeism is often conceptualized as a complex behaviour, behavioral models such as the TPB, and the derived Attitude-Social influence-self-Efficacy (ASE) model, have been applied in order to better understand absenteeism [27, 28]. While perceived behavioral control refers to the perceived ease or difficulty of performing a specific behavior, locus of control is a more generalized expectancy that remains stable across situations [26]. The association between external locus of control and absenteeism that was found in the present study is in agreement with the importance of perceived behavioral control, and suggests that the more general concept of locus of control is also related to the specific behavior of reporting sick at work.

The relationship between low extraversion and absenteeism might be understood by looking at coping styles. In a previous review, high extraversion was found to be associated with engagement coping, which is dealing with or approaching the stressor or related emotions, and perhaps reporting sick at work can be perceived as a form of avoidance coping [29]. In another study, an avoidant coping style was indeed found to increase sickness absence [30]. The association that was found between low conscientiousness and absenteeism shows that workers with high responsibility, planning and persistence have less absenteeism than workers who score low on these aspects.

Finally, low openness and low agreeableness were only associated with absenteeism in healthy workers. As described by Malouff et al., low openness reflects being conventional, rigid and not open to new experiences, while those low on agreeableness, score low on aspects such as modesty, compliance, co-operation and trust [17]. Persons with high agreeableness and high openness conform more to expectations and rules and are more flexible, and perhaps not reporting sick at work can also be perceived as conforming to expectations and reflecting flexibility. Low agreeableness and low openness in workers might also reflect having an own agenda, perhaps due to conflicts or dissatisfaction at the workplace, which may lead to increased absenteeism. The results of this study suggest that these aspects are associated with absenteeism in healthy workers, and that in workers with psychopathology perhaps other factors, more related to the psychopathology, are of more importance.

Strengths and limitations

In this study, data from a large, naturalistic cohort study were used to examine the associations of the Big 5 personality characteristics and locus of control with absenteeism. The NESDA sample includes persons with current and remitted diagnoses as well as healthy controls, recruited from diverse settings. However, with depressed and anxious participants overrepresented, the study population is not a representative sample of the general working population, which limits the generalizability of the findings. Absenteeism was assessed by self-report, therefore, it is possible that depressed or anxious participants, or those scoring high on neuroticism, overestimated the number of absence weeks. This would result in an overestimation of the associations with absenteeism. Furthermore, we categorized absenteeism in short-term absenteeism (0-2 weeks) and long-term absenteeism (>2 weeks). This operationalization of absenteeism may be somewhat arbitrary. Studies on absenteeism often differ in the operationalizations of absenteeism, which reduces the comparability between studies [6, 31]. Moreover, data was only available on the total number of absence weeks, while data on the number of absence episodes and on the duration of those episodes were lacking. Therefore, absenteeism that was labelled as long-term, might as well have consisted of multiple, shorter episodes of absenteeism. The fact that we were unable to distinguish between long-term and frequent short-term absences, might have biased the results by overestimating the associations of personality with long-term absenteeism. For example, it might be possible that workers with particular personality characteristics might have a lower threshold to report sick than others, leading to frequent, short episodes, while reporting sickness for a long time may be more determined by the presence of a health condition such as a depressive or anxiety disorder. Furthermore, in this study cross-sectional data were used, which limits us to reporting associations between personality and absenteeism instead of causal relationships. Moreover, axis 1 psychopathology and personality characteristics were simultaneously assessed, while the reliability and validity of personality assessment during acute axis 1 psychopathology are topic of widespread debate [32-34]. If personality scores are partly explained by axis 1 psychopathology, then the unique contribution of that personality characteristic would diminish after correcting for axis 1 psychopathology. However, Costa et al. argued that it is not the question whether personality assessments during axis 1 psychopathology are accurate, but when they are accurate. Following that line of reasoning, personality assessment in a patient who suffers a depressive episode provides valuable information on the patient's

personality in the midst of a depression, but will be accurate only as long as the patient is depressed [33]. This suggests a need for separate analyses for those with and without axis 1 psychopathology. In the present study, subgroup analyses are performed when statistical evidence for effect modification was found, and in those analyses indeed, personality did explain less of the variance in absenteeism in workers with a depressive or anxiety disorder.

Practical implications and further research

Absenteeism is a complex, multifactorial phenomenon, that has, particularly in case of long-term absenteeism, negative consequences for the individual worker as well as for society. The findings of the present study suggest that in healthy workers as well as in workers with psychopathology, personality characteristics are associated with absenteeism. These findings may be taken into account in the development of interventions aimed at preventing sickness absence and in the sickness certification of sick-listed workers. Although personality characteristics are assumed to be relatively stable and it should not be expected that current interventions are able to substantially change personality characteristics, Cuijpers et al. commented that we should not be too pessimistic about the possibility to intervene on these characteristics and that further studies need to examine this [13]. Malouff et al. noted as well that researchers might want to explore whether targeting these traits in treatment adds anything to the usual treatment, which often focuses on alleviating neurosis-related problems [17]. Thus, for workers both with and without psychopathology, interventions aimed at preventing sickness absence may focus at reducing neuroticism and strengthening extraversion, conscientiousness and locus of control. A problem solving approach, aimed at strengthening the worker's active problem solving skills and increasing the internal locus of control, may help in the prevention of (long-term) sickness absence [30, 35, 36]. While reporting sick can be perceived as a form of avoidance coping, being absent from work may further reinforce avoidance behaviour and hamper return to work, which underlines the importance of focusing on problem solving skills. In addition, although the subtle cross-sectional differences between healthy workers and workers with psychopathology in the associations between personality and absenteeism may not be a convincing argument for developing separate interventions, for healthy workers focusing on openness and agreeableness might benefit as well. On the other hand, perhaps a substantial change in these personality characteristics does not even need to be the purpose of interventions. To prevent sickness absence, interventions may also be specifically tailored to workers with for instance high neuroticism and an external locus of control. In that case, preventive interventions need to focus on dealing with problems that may often be encountered by workers with high neuroticism or external locus of control due to their vulnerability to stress and perceived lack of control. Furthermore, in order to prevent long-term sickness absence, OPs and employers need to pay extra attention to workers with a vulnerable personality, since these workers will most likely benefit from an early intervention. Employers also need to be alert to workers with low openness and low agreeableness, as they may be at increased risk for absenteeism. Further research may focus on the influence of personality characteristics and depressive and anxiety disorders on return to work. Like absenteeism, return to work after a long-term sickness absence is often conceptualized as a complex behaviour, influenced by multiple factors [7, 37].

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REFERENCES

1. Henderson M, Glozier N, Holland EK. Long term sickness absence. *BMJ*. 2005;330:802-803.
2. CBS. De Nederlandse economie 2009 [In English: The Dutch economy 2009]. Den Haag/Heerlen: Centraal Bureau voor de Statistiek; 2010.
3. Bowling A. What things are important in people's lives? A survey of the public's judgements to inform scales of health related quality of life. *Soc Sci Med*. 1995;41:1447-1462.
4. Bilsker D, Wiseman S, Gilbert M. Managing depression-related occupational disability: a pragmatic approach. *Can J Psychiatry*. 2006;51:76-83.
5. World Health Organization. Towards a common language for functioning, disability and health. ICF. Geneva: 2002.
6. Duijts SF, Kant I, Swaen GM, van den Brandt PA, Zeegers MP. A meta-analysis of observational studies identifies predictors of sickness absence. *J Clin Epidemiol*. 2007;60:1105-1115.
7. Dekkers-Sanchez PM, Hoving JL, Sluiter JK, Frings-Dresen MH. Factors associated with long-term sick leave in sick-listed employees: a systematic review. *Occup Environ Med*. 2008;65:153-157.
8. Vlasveld MC, van der Feltz-Cornelis CM, Bultmann U, Beekman ATF, van Mechelen W, Hoedeman R, Anema JR. Predicting Return to Work in Workers with All-Cause Sickness Absence Greater than 4 Weeks: A Prospective Cohort Study. *J Occup Rehabil*. 2011.
9. Jansen NW, Kant IJ, van Amelsvoort LG, Kristensen TS, Swaen GM, Nijhuis FJ. Work-family conflict as a risk factor for sickness absence. *Occup Environ Med*. 2006;63:488-494.

10. Westerlund H, Nyberg A, Bernin P, Hyde M, Oxenstierna G, Jappinen P, Vaananen A, Theorell T. Managerial leadership is associated with employee stress, health, and sickness absence independently of the demand-control-support model. *Work*. 2010;37:71-79.
11. Judge TA, Bono JE. Relationship of core self-evaluations traits--self-esteem, generalized self-efficacy, locus of control, and emotional stability--with job satisfaction and job performance: a meta-analysis. *J Appl Psychol*. 2001;86:80-92.
12. Michon HW, ten Have M, Kroon H, van Weeghel J., de Graaf R, Schene AH. Mental disorders and personality traits as determinants of impaired work functioning. *Psychol Med*. 2008;38:1627-1637.
13. Cuijpers P, Smit F, Penninx BW, de Graaf R, ten Have M, Beekman AT. Economic costs of neuroticism: a population-based study. *Arch Gen Psychiatry*. 2010;67:1086-1093.
14. Kruijshaar ME, Hoeymans N, Bijl RV, Spijker J, Essink-Bot ML. Levels of disability in major depression: findings from the Netherlands Mental Health Survey and Incidence Study (NEMESIS). *J Affect Disord*. 2003;77:53-64.
15. Ormel J, Oldehinkel AJ, Vollebergh W. Vulnerability before, during, and after a major depressive episode: a 3-wave population-based study. *Arch Gen Psychiatry*. 2004;61:990-996.
16. Kendler KS, Gatz M, Gardner CO, Pedersen NL. Personality and major depression: a Swedish longitudinal, population-based twin study. *Arch Gen Psychiatry*. 2006;63:1113-1120.
17. Malouff JM, Thorsteinsson EB, Schutte NS. The relationship between the five-factor model of personality and symptoms of clinical disorders: a meta-analysis. *Journal of Psychopathology and Behavioral Assessment*. 2005;27:101-114.
18. Plaisier I, Beekman AT, de Graaf R, Smit JH, van Dyck R, Penninx BW. Work functioning in persons with depressive and anxiety disorders: the role of specific psychopathological characteristics. *J Affect Disord*. 2010;125:198-206.
19. Penninx BW, Beekman AT, Smit JH, Zitman FG, Nolen WA, Spinhoven P, Cuijpers P, De Jong PJ, Van Marwijk HW, Assendelft WJ, Van Der Meer K, Verhaak P, Wensing M, De GR, Hoogendijk WJ, Ormel J, Van DR. The Netherlands Study of Depression and Anxiety (NESDA): rationale, objectives and methods. *Int J Methods Psychiatr Res*. 2008;17:121-140.
20. Hakkaart-van Roijen L. *Manual Trimbos/iMTA questionnaire for costs associated with psychiatric illness (in Dutch)*. Rotterdam: Institute for Medical Technology Assessment; 2002.

21. Uegaki K, de Bruijne MC, Anema JR, van der Beek AJ, van Tulder MW, van Mechelen W. Consensus-based findings and recommendations for estimating the costs of health-related productivity loss from a company's perspective. *Scand J Work Environ Health*. 2007;33:122-130.
22. Costa PT, Jr., McCrae RR. Domains and facets: hierarchical personality assessment using the revised NEO personality inventory. *J Pers Assess*. 1995;64:21-50.
23. Pearlin LI, Schooler C. The structure of coping. *Journal of Health and Social Behaviour*. 1978;19:2-21.
24. Karasek R, Brisson C, Kawakami N, Houtman I, Bongers P, Amick B. The Job Content Questionnaire (JCQ): an instrument for internationally comparative assessments of psychosocial job characteristics. *J Occup Health Psychol*. 1998;3:322-355.
25. Cohen J. *Statistical power analysis for the behavioral sciences. Second edition*. Hillsdale, New Jersey: Lawrence Erlbaum Associates, Inc.; 1988.
26. Ajzen I. The theory of planned behavior. *Organizational Behavior and Human Decision Processes*. 1991;50:179-211.
27. Brouwer S, Krol B, Reneman MF, Bultmann U, Franche RL, van der Klink JJ, Groothoff JW. Behavioral determinants as predictors of return to work after long-term sickness absence: an application of the theory of planned behavior. *J Occup Rehabil*. 2009;19:166-174.
28. van Oostrom SH, Anema JR, Terluin B, Venema A, de Vet HC, van Mechelen W. Development of a workplace intervention for sick-listed employees with stress-related mental disorders: Intervention Mapping as a useful tool. *BMC Health Serv Res*. 2007;7:127.
29. Carver CS, Connor-Smith J. Personality and coping. *Annu Rev Psychol*. 2010;61:679-704.
30. van Rhenen W, Schaufeli WB, van Dijk FJ, Blonk RW. Coping and sickness absence. *Int Arch Occup Environ Health*. 2008;81:461-472.
31. Laaksonen M, Pitkaniemi J, Rahkonen O, Lahelma E. Work arrangements, physical working conditions, and psychosocial working conditions as risk factors for sickness absence: Bayesian analysis of prospective data. *Ann Epidemiol*. 2010;20:332-338.
32. Griens AM, Jonker K, Spinhoven P, Blom MB. The influence of depressive state features on trait measurement. *J Affect Disord*. 2002;70:95-99.

33. Costa PT, Jr., Bagby RM, Herbst JH, McCrae RR. Personality self-reports are concurrently reliable and valid during acute depressive episodes. *J Affect Disord.* 2005;89:45-55.
34. Clark LA, Vittengl J, Kraft D, Jarrett RB. Separate personality traits from states to predict depression. *J Pers Disord.* 2003;17:152-172.
35. Nezu AM. Efficacy of a social problem-solving therapy approach for unipolar depression. *J Consult Clin Psychol.* 1986;54:196-202.
36. Oxman TE, Hegel MT, Hull JG, Dietrich AJ. Problem-solving treatment and coping styles in primary care for minor depression. *J Consult Clin Psychol.* 2008;76:933-943.
37. Loisel P, Durand MJ, Berthelette D, Vézina N, Baril R, Gagnon D, Larviere C, Tremblay C. Disability prevention. New paradigm for the management of occupational back pain. *Dis Manage Health Outcomes.* 2001;9:351-360.