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ORIGINAL ARTICLE

# Can the Maslach Burnout Inventory and Utrecht Work Engagement Scale be used to screen for risk of long-term sickness absence?

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**Abstract**
*Objectives* To investigate the Maslach Burnout Inventory—General Survey (MBI—GS) and the Utrecht Work Engagement Scale (UWES) for their ability to identify non-sicklisted employees at increased risk of long-term sickness absence (LTSA).
*Methods* One-year prospective cohort study including 4,921 employees participating in occupational health surveys in the period 2008–2010. The MBI—GS and UWES were part of the health survey questionnaire and LTSA in the year following the health survey was retrieved from an occupational health register. Associations of baseline MBI—GS and UWES scores with LTSA during 1-year follow-up were stratified by the cause (mental, musculoskeletal, and other somatic illness) of LTSA. Discrimination was assessed by the area (AUC) under the receiver operating characteristic curve and considered practically useful for AUC $\geq$0.75.
*Results* During 1-year follow-up, 103 employees (2 %) had LTSA due to mental ($N = 43$), musculoskeletal ($N = 31$), or other somatic ($N = 29$) illness. MBI—GS scores were positively and UWES scores negatively associated with mental LTSA, but not musculoskeletal or other somatic LTSA. Discrimination between employees at high and low risk of mental LTSA was moderate: AUC = 0.68 for the MBI—GS and AUC = 0.70 for the UWES. Discrimination did not improve when the MBI—GS and UWES were used simultaneously.
*Conclusion* The MBI—GS and UWES predicted future mental LTSA in non-sicklisted employees, but discrimination was not practically useful for identifying employees at high risk of LTSA. However, both instruments could be used to select employees for further assessment of mental LTSA risk.

**Keywords** Absenteeism · Mental health · Prognostic research · Risk factor screening · ROC analysis · Sick leave

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## Introduction

Chronic strain without physical and mental recovery drains an individual's energy and may eventually lead to burnout, a state characterized by exhaustion, cynicism, and lack of professional efficacy (Maslach et al. 2001). Originally described as a psychological condition occurring among employees working in human service jobs (e.g., healthcare and education), burnout has now been expanded to all professions and even to persons outside the labor market (Kompier 2006). Still, most burnout studies are based on specific occupational groups, particularly in the healthcare sector where the prevalence of burnout is high (Mateen and

Dorji 2009). It is difficult to compare burnout prevalences across occupations or countries because of differences in definition and measurement. The European Commission (2006) surveyed mental health states in EU countries with the Eurobarometer, revealing that 55 % of respondents had lots of energy most of the time, 27 % sometimes and 18 % rarely or never. Thus, a substantial number of EU employees experience reduced energy levels, although this may not necessarily imply having burnout. The estimated prevalence of burnout in the Netherlands has increased from 11 % in 2007 to 13 % in 2013 (Statistics Netherlands 2014).

Some employees with burnout report sick, while others stay at work. On the one hand, sickness absence may be a last resort to recover from work overload, thus preventing further energy depletion. On the other hand, it may be more and more difficult for employees with burnout to achieve work goals, which could aggravate feelings of inefficacy and ultimately lead to sickness absence (Bakker et al. 2003; Schaufeli et al. 2009). In a cross-sectional population-based study, sickness absence was more prevalent in Finnish employees with burnout than in those without burnout (Ahola et al. 2008). Several prospective studies have reported relations between burnout and sickness absence. Baseline burnout levels were found to increase the number of sickness absence spells in Finnish industrial workers (ToppinenTanner et al. 2005) and Danish human service workers (Borritz et al. 2006). In Sweden, burnout was found to be prospectively associated with long-term sickness absence in healthcare (Peterson et al. 2011) and public service (Hallsten et al. 2011).

As mental disorders are negatively valued and stigmatized (Gaebel et al. 2006; Baumann 2007; Metha et al. 2009), burnout may be underreported. Probably, underreporting is less of a problem for positive psychological states emerging from the theory of positive psychology (Gillham and Seligman 1999; Seligman and Csikszentmihalyi 2000). Work engagement is an example of such a positive work-related psychological state, characterized by high energy levels and dedication to work (Schaufeli et al. 2002). Originally, burnout and work engagement were considered counterparts (González-Romá et al. 2006). While cynicism and dedication are each other's opposites, exhaustion and vigor are not (Demerouti et al. 2010; Mäkikangas et al. 2012). Hence, burnout and work engagement are now regarded as distinct, yet closely related concepts. If higher burnout levels are related to an increased risk of sickness absence, then higher levels of work engagement could be associated with a reduced risk of future sickness absence.

In the Netherlands, the annual costs of sickness absence amount to €7.2 billion of which €2.7 billion is related to mental illness (De Graaf et al. 2011). Taimela et al. (2008) and Kant et al. (2008) found that preventive consultations reduced the number of sickness absence days. Such consultations might also reduce or prevent long-term sickness absence (LTSA) episodes, but then we have to know which employees are at risk of LTSA. As burnout is an increasing cause of LTSA, the objective of the present study was to assess the case-finding ability (i.e., the ability to identify non-sick-listed employees at risk of future LTSA) of the instrument used for measuring burnout in occupational healthcare. To bypass potential underreporting of burnout, we also investigated the instrument to measure work engagement for its LTSA case-finding ability.

## Methods

### Study setting and design

ArboNed is a Dutch national occupational health service (OHS) that provides occupational health care to 1.1 million employees of more than 70,000 contracted companies (75 % small businesses and 25 % (multi)national corporations) in the agricultural (7 %), industrial (23 %), private (40 %), and public (30 %) sectors. Besides the registration of sickness absence and guidance of sick-listed employees back to work, the surveillance of work and health is an important OHS task in the Netherlands. According to Dutch law, employers are obliged to offer a health survey to their personnel every 4 years, although participation in health surveys if not compulsory for employees. ArboNed provides different types of health surveys ranging from brief checkups to extended health checks with physical examinations and blood tests. Employers decide on the type of health survey in dialog with the works council or employee representatives.

In the period 2008–2010, ArboNed invited a total of 7,480 employees by order of 58 contracted companies for a 'vitality check.' This type of health survey consists of an extended questionnaire about physical and mental health, lifestyle, coping behaviors, well-being, personality and resources (self-efficacy, resilience, hope, and optimism), work ability, job demands, job resources (e.g., autonomy, support, feedback), job satisfaction and motivation, leadership, and work–home interference. A total of 4,921 (66 %) employees completed the vitality check questionnaire online and received a personal report and advice based on the questionnaire results.

The vitality check questionnaire contains instruments to measure burnout and work engagement. The scores on these instruments were associated with LTSA retrieved from the OHS register in the year following the vitality check. Ethical clearance for this prospective cohort study was granted by the Medical Ethics Committee of

the University Medical Center Groningen (reference M12.116654).

### Maslach Burnout Inventory—General Survey (MBI—GS)

The Dutch version of the MBI—GS contains 15 items measuring exhaustion, cynicism, and personal efficacy with good psychometric properties (Bakker et al. 2002). The exhaustion scale consists of five items (Cronbach's $\alpha = 0.86$) about feeling emotionally overextended and exhausted by work. The cynicism scale contains four items ($\alpha = 0.76$) about disengagement from work and lack of enthusiasm. All items were scored on a frequency scale, ranging from 0 'never' to 6 'always.' Item scores were summed to scale scores 0–30 and 0–24, with higher scores representing more exhaustion and cynicism, respectively. There is cumulating evidence that lack of professional efficacy plays a divergent role as compared to exhaustion and cynicism (Schaufeli and Salanova 2007). Hence, we decided to exclude the six-item ($\alpha = 0.76$) professional efficacy scale from our analyses. Consequently, a total MBI—GS score was calculated by summing the scores on exhaustion and cynicism. The total MBI—GS score was standardized as percentage of the maximum score, and higher standardized scores (range 0–100) represent higher levels of burnout.

### Utrecht Work Engagement Scale (UWES)

The UWES consists of 17-items measuring three aspects of work engagement: vigor (six items; $\alpha = 0.88$), dedication to work (five items; $\alpha = 0.92$), and absorption in work (six items; $\alpha = 0.77$). The UWES has been psychometrically validated for use in organizational settings (Schaufeli and Bakker 2004a). UWES items were scored on a frequency scale, ranging from 0 'never' to 6 'always,' and summed to scale scores 0–36, 0–30, and 0–36 with higher scores reflecting more vigor, dedication, and absorption, respectively. A total UWES score was calculated by summing all scores (Schaufeli et al. 2006) and standardized as percentage of the maximum score. Higher standardized UWES scores (range 0–100) represent higher levels of work engagement.

### Sickness absence

There is no international consensus on how to define LTSA. Sickness absence in the Netherlands is employer-compensated if it is medically certified by an occupational physician (OP) within 42 days of reporting sick (OECD 2007). Therefore, we defined LTSA as sickness absence episodes lasting ≥42 consecutive days. LTSA was medically certified with a diagnostic code of the 10th version of the International Classification of Diseases (ICD-10), which was recorded in the OHS register. At 1-year follow-up, LTSA was retrieved at the individual level from the register; if an employee had more than one LTSA episode during follow-up, then the first LTSA episode was used for analysis. Based on the OP-diagnosis, LTSA was stratified into mental (ICD-10 chapter F: Mental and Behavioral Disorders), musculoskeletal (ICD-10 chapter M: Musculoskeletal Disorders), and other somatic LTSA (remaining ICD-10 chapters).

### Confounder analysis

Previously, Borritz et al. (2006) analyzed the association between burnout and sickness absence controlling for a variety of sociodemographic, work-related, and health-related variables. Unfortunately, the authors did not investigate which variables acted as confounders. Furthermore, we know little about factors that might confound the association between UWES scores and LTSA. Therefore, we analyzed the confounding effect of sociodemographic and lifestyle variables obtained from the vitality check questionnaire. Job demands and job resources were not assessed as potential confounders as these variables play a role in the causal pathways to burnout and work engagement (Bakker et al. 2003; Schaufeli and Bakker 2004b; Schaufeli et al. 2009). Work-related conflicts were also not assessed because we could not rule out the possibility that conflicts play a role in the pathway between burnout and sickness absence. After all, cynicism and lack of professional efficacy might provoke irritations and disturb relations at the workplace, ultimately leading to sickness absence.

Sociodemographic variables included age, gender (men, women), marital status (living with parents, alone, cohabiting, other), children at home (no, yes), employment (permanent, temporary), work hours/week, tenure in work and in the present job as well as gross monthly income (<€2,000, €2,000–2,999, €3,000–3,999, €4,000–4,999, ≥€5,000). Lifestyle variables included body mass index (BMI), physical activity, smoking habits, alcohol consumption, and the use of drugs and sedatives. BMI was calculated from employee-reported body length and weight. Leisure-time physical activity was assessed by two items about performing moderately straining daily activities (e.g., walking stairs, vacuum cleaning) for at least 30 consecutive minutes and practising sports for at least 20 consecutive minutes. Both items were rated on a frequency scale 'never,' '1×/week,' '3×/week,' '5×/week,' and 'daily.' Smoking and drinking alcohol were rated on frequency scales 'never,' '1×/week,' '3×/week,' and 'daily.' The use of drugs was assessed by items on soft drugs (e.g., cannabis), hard drugs (e.g., heroin,

**Table 1** Confounder analysis

| | Maslach Burnout Inventory | | Utrecht Work Engagement Scale | | |
|---|---|---|---|---|---|
| | Exhaustion | Cynicism | Vigor | Dedication | Absorption |
| Crude | 0.171 | 0.214 | −0.076 | −0.129 | −0.108 |
| *Adjusted for* | | | | | |
| Age | 0.174 | 0.210 | −0.082 | −0.129 | −0.106 |
| Gender | 0.174 | 0.219 | −0.077 | −0.134 | −0.109 |
| Education | 0.171 | 0.214 | −0.074 | −0.129 | −0.107 |
| Marital status | 0.174 | 0.214 | −0.078 | −0.129 | −0.108 |
| Children at home | 0.170 | 0.213 | −0.074 | −0.128 | −0.107 |
| Income | 0.167 | 0.211 | −0.081 | −0.130 | −0.104 |
| Employment | 0.171 | 0.220 | −0.102‡ | −0.151‡ | −0.114 |
| Work hours | 0.171 | 0.211 | −0.072 | −0.128 | −0.105 |
| Tenure in work | 0.175 | 0.207 | −0.085‡ | −0.128 | −0.106 |
| Tenure in present job | 0.169 | 0.215 | −0.086‡ | −0.133 | −0.110 |
| Body mass index | 0.176 | 0.218 | −0.076 | −0.134 | −0.108 |
| Physical activity | 0.179 | 0.204 | −0.071 | −0.119 | −0.102 |
| Practising sports | 0.177 | 0.214 | −0.079 | −0.121 | −0.104 |
| Smoking | 0.132‡ | 0.199‡ | −0.055‡ | −0.116‡ | –0.114 |
| Drinking alcohol | 0.171 | 0.214 | −0.077 | −0.132 | –0.108 |
| Using soft drugs | 0.171 | 0.223 | −0.076 | −0.129 | −0.110 |
| Using hard drugs | 0.171 | 0.214 | −0.076 | −0.129 | −0.108 |
| Using sedatives | 0.176 | 0.232 | −0.071 | −0.123 | −0.105 |
| Prior LTSA | 0.107‡ | 0.159‡ | −0.043‡ | −0.099‡ | −0.062‡ |

The table shows logistic regression coefficients of crude and adjusted associations with long-term (≥42 days) sickness absence (LTSA). If the regression coefficient changed ≥10 %, the added variable was regarded as confounder (Twisk 2006)

‡ Indicates confounding

cocaine) and sedatives, rated on frequency scales 'never,' '1×/week,' '3×/week,' and 'daily.' Finally, LTSA (no/yes) recorded in the OHS register in the year prior to the vitality check was tested as a potential confounder. A total of 93 employees (2 %) were shown to have had LTSA in the year prior to the vitality check: 35 (38 %) due to mental, 28 (30 %) musculoskeletal, and 30 (32 %) other somatic illness.

In confounder analysis, we considered variables as confounders if the regression coefficients of MBI—GS and UWES scales changed ≥10 % after adding the variable to regression analysis (Twisk 2006). Table 1 shows that smoking habits and LTSA in the year prior to the health check potentially confounded the associations of MBI—GS and UWES scales with LTSA. Adding prior LTSA caused the greatest change in regression coefficients and was therefore the strongest confounder. When prior LTSA was included as covariate in regression analysis, smoking habits did not additionally affect the regression coefficients [data not shown], indicating that it sufficed to include prior LTSA as confounder in the analyses (Twisk 2006).

The type of employment (permanent vs. temporary) and tenure in both work and present job confounded the relationship between UWES scales and LTSA (Table 1). Adding the type of employment to regression models including UWES scales and prior LTSA, increased the regression coefficients of vigor and dedication by more than 10 %. Neither tenure in work nor tenure in the present job additionally affected regression coefficients of these UWES scales [data not shown]. Hence, the analyses of associations between UWES and LTSA were controlled for prior LTSA and type of employment.

## Statistical analysis

Statistical analyses were performed in IBM SPSS Statistics for Windows (version 20.0). The associations of MBI—GS scale scores and the total MBI—GS score with LTSA (no = 0, yes = 1) were investigated by logistic regression analyses, controlling for prior LTSA. Likewise, we investigated associations of UWES scale scores and the total UWES score with LTSA, controlling for prior LTSA and type of employment. Throughout the paper, we present adjusted odds ratios (OR) and related 95 % confidence intervals (CI).

The ability of MBI—GS and UWES to discriminate between employees at high and low risk of LTSA was assessed by receiver operating characteristic (ROC) analysis. If we regard employees with LTSA as 'cases' and those without LTSA as 'non-cases,' then we can calculate the sensitivity and specificity for each score of the MBI—GS or UWES. The ROC curve plots sensitivity

(i.e., true positive rate) against 1—specificity (i.e., false positive rate) for each possible MBI—GS or UWES score. The area under the ROC curve (AUC) reflects the degree of discrimination, that is, the ability of MBI—GS or UWES to correctly classify employees as 'cases' or 'non-cases.' If we were to rely on pure chance, the ROC curve would be a diagonal line and AUC = 0.50. Generally, AUC ≥ 0.75 is considered to reflect practically useful discrimination (Fad et al. 2006). AUC ≥ 0.75 indicates that for each pair of employees, the one at highest risk of LTSA will be correctly identified in 75 % or more of the cases.

## Results

Of the 4,921 employees who completed the vitality check questionnaire, 27 (5 ‰) had missing data on the MBI—GS, while there were no missing data on the UWES. A total of 4,894 employees had complete data records for analysis; their characteristics are presented in Table 2. They had a mean standardized MBI—GS score of 19.4 [standard deviation (SD) = 12.8] and a mean standardized UWES score of 63.0 (SD = 16.3).

During 1-year follow-up, 103 employees (2 %) had at least one LTSA episode: 43 (42 %) employees had mental LTSA, 31 (30 %) musculoskeletal LTSA, and 29 (28 %) other somatic LTSA due to respiratory ($N = 9$), neurologic ($N = 6$), gastrointestinal ($N = 4$), urogenital ($N = 4$), cardiovascular ($N = 1$), metabolic ($N = 1$), and non-specified ($N = 4$) disorders.

### MBI—GS and LTSA

The total MBI—GS ($P = 0.004$) and cynicism scale ($P = 0.005$) score were positively associated with LTSA during 1-year follow-up, whereas exhaustion was not ($P = 0.059$). Although prospectively associated with LTSA, the total MBI—GS showed poor discrimination with AUC = 0.60 (95 % CI 0.54–0.66). This means that for each pair of employees, MBI—GS will correctly identify the one at highest risk of LTSA in 60 % of the cases. It should be reminded that the probability of correctly allotting the highest risk by chance is 50 %.

When stratifying by ICD-10 diagnosis, exhaustion ($P = 0.022$), cynicism ($P = 0.024$), and total MBI—GS ($P = 0.021$) scores were positively associated with mental LTSA (Table 3). Discrimination between employees at high and low risk of mental LTSA was not practically useful with AUC = 0.68 (95 % CI 0.58–0.78) as is shown in Fig. 1. MBI—GS scales and total MBI—GS score were not significantly associated with musculoskeletal and other somatic LTSA during follow-up.

**Table 2** Baseline study population characteristics ($N = 4,894$)

| | Mean (SD) | *N* (%) |
|---|---|---|
| Age (years) | 37.0 (10.6) | |
| *Gender* | | |
| Men | | 2,545 (52) |
| Women | | 2,349 (48) |
| *Marital status* | | |
| Single | | 1,272 (26) |
| Cohabiting | | 3,377 (69) |
| Living with parents | | 196 (4) |
| Other | | 49 (1) |
| *Children at home* | | |
| No | | 2,692 (55) |
| Yes | | 2,202 (45) |
| *Employment* | | |
| Permanent | | 4,502 (92) |
| Temporary | | 392 (8) |
| Work hours per week | 39.5 (9.2) | |
| Work tenure (years) | 13.9 (10.1) | |
| Job tenure (years) | 4.8 (5.9) | |
| *Monthly income* (€) | | |
| <2,000 | | 527 (14) |
| 2,000–2,999 | | 1,420 (37) |
| 3,000–3,999 | | 897 (24) |
| 4,000–4,999 | | 481 (13) |
| ≥5,000 | | 492 (13) |
| Missing | | 1,077 |
| Body mass index | 24.4 (3.6) | |
| *Physical activity* | | |
| Never | | 147 (3) |
| 1× per week | | 587 (12) |
| 3× per week | | 1,321 (27) |
| 5× per week | | 930 (19) |
| Daily | | 1,909 (39) |
| *Practising sports* | | |
| Never | | 979 (20) |
| 1× per week | | 1,615 (33) |
| 3× per week | | 1,762 (36) |
| 5× per week | | 294 (6) |
| Daily | | 244 (5) |
| *Smoking* | | |
| Never | | 3,817 (78) |
| 1× per week | | 245 (5) |
| 3× per week | | 147 (3) |
| Daily | | 685 (14) |
| *Drinking alcohol* | | |
| Never | | 416 (10) |
| 1× per week | | 1,083 (26) |
| 3× per week | | 1,585 (37) |
| Daily | | 1,164 (27) |
| Missing | | 646 |

**Table 2** continued

| | Mean (SD) | *N* (%) |
|---|---|---|
| *Using soft drugs* | | |
| Never | | 2,594 (98 %) |
| 1× per week | | 53 (2 %) |
| Missing | | 2,247 |
| *Using hard drugs* | | |
| Never | | 3,274 (100 %) |
| Missing | | 1,620 |
| *Using sedatives* | | |
| Never | | 4,577 (96 %) |
| 1× per week | | 95 (2 %) |
| 3× per week | | 67 (1 %) |
| Daily | | 29 (1 %) |
| Missing | | 126 |

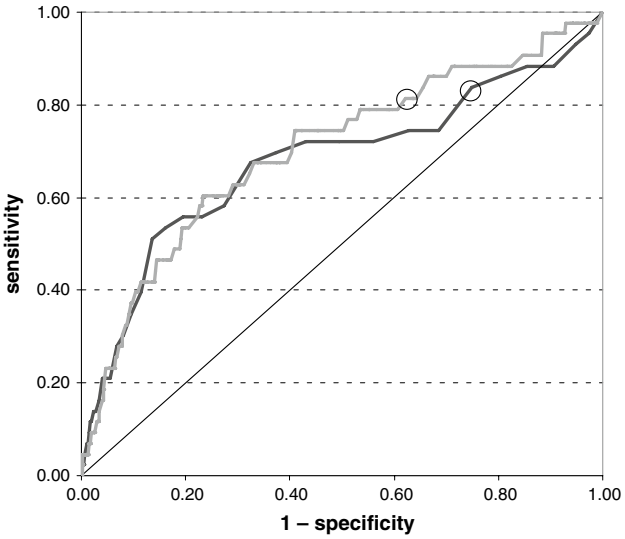


**Fig. 1** Discrimination graph for mental sickness absence. The figure shows the receiver operating characteristic (ROC) curve. The area under the ROC curve reflects discrimination between employees at high and low risk of mental absence by the Maslach Burnout Inventory—General Survey (MBI—GS, *black line*) and Utrecht Work Engagement Scale (UWES, *gray line*); the diagonal reflects no discrimination above chance and the circles indicate cutoffs at MBI—GS >10 and UWES <70 scores

### UWES and LTSA

Dedication was negatively associated ($P = 0.026$) with the risk of LTSA, but the total UWES score was not associated ($P = 0.087$) with all-cause LTSA during 1-year follow-up. Hence, it was not useful to investigate the ability of the UWES to discriminate employees at high risk of LTSA from those at low risk.

After stratifying LTSA by ICD-10 diagnosis, dedication ($P = 0.045$), absorption ($P = 0.029$), and total UWES ($P = 0.049$) scores were associated with mental LTSA during follow-up (Table 4). The UWES moderately discriminated between employees with and without risk of mental LTSA (AUC = 0.70; 95 % CI 0.62–0.79). Discrimination between employees at high and low risk of mental LTSA did not improve when the UWES was used in combination with the MBI—GS: AUC = 0.70 (95 % CI 0.61–0.80).

## Discussion

Total MBI—GS scores, but not UWES scores were prospectively associated with long-term (≥42 days) sickness absence (LTSA) irrespective of cause. After stratifying by LTSA cause, the MBI—GS was positively and the UWES negatively related to the risk of mental LTSA. Discrimination between employees at high and low risk of mental LTSA was not practically useful and did not improve when both instruments were used simultaneously. Our main impression

**Table 3** Burnout and long-term sickness absence (LTSA)

| MBI—GS | Score | | Sickness absence medically certified as | | | All medically certified |
|---|---|---|---|---|---|---|
| Scale | Range | Mean (SD) | Mental ($N = 43$) | Musculoskeletal ($N = 31$) | Other somatic ($N = 29$) | Sickness absences ($N = 103$) |
| Exhaustion | 0–30 | 6.3 (4.3) | 1.12 (1.02–1.22)* | 1.08 (0.89–1.32) | 1.02 (0.94–1.10) | 1.11 (1.00–1.25) |
| Cynicism | 0–24 | 4.2 (3.5) | 1.17 (1.02–1.34)* | 1.12 (0.89–1.41) | 1.08 (0.81–1.44) | 1.17 (1.05–1.30)** |
| Total (standardized) | 0–100 | 19.4 (12.8) | 1.55 (1.07–2.25)†* | 1.38 (0.74–2.58)† | 1.13 (0.48–2.67)† | 1.54 (1.14–2.06)†** |

The table shows odds ratios (OR) with related 95 % confidence intervals (CI) of logistic regression analysis of associations between baseline Maslach Burnout Inventory—General Survey (MBI—GS) scores and medically certified LTSA during 1-year follow-up, adjusted for LTSA in the year prior to baseline

*SD* standard deviation

* $P < 0.05$

** $P < 0.01$

† Per 10-point increase in standardized MBI—GS score

**Table 4** Work engagement and long-term sickness absence (LTSA)

| UWES | Score | | Sickness absence medically certified as | | | All medically certified |
|---|---|---|---|---|---|---|
| Scale | Range | Mean (SD) | Mental ($N = 43$) | Musculoskeletal ($N = 31$) | Other somatic ($N = 29$) | Sickness absences ($N = 103$) |
| Vigor | 0–36 | 22.7 (6.2) | 0.94 (0.85–1.05) | 1.01 (0.85–1.19) | 0.94 (0.78–1.14) | 0.96 (0.88–1.04) |
| Dedication | 0–30 | 20.2 (5.6) | 0.89 (0.80–1.00)* | 0.96 (0.80–1.15) | 0.90 (0.75–1.10) | 0.91 (0.83–0.99)* |
| Absorption | 0–36 | 21.4 (6.5) | 0.89 (0.80–0.99)* | 1.00 (0.85–1.17) | 0.96 (0.80–1.15) | 0.94 (0.87–1.02) |
| Total (standardized) | 0–100 | 63.0 (16.3) | 0.67 (0.45–0.99)*† | 0.96 (0.51–1.80)† | 0.76 (0.38–1.55)† | 0.76 (0.55–1.03)† |

The table shows odds ratios (OR) with related 95 % confidence intervals (CI) of logistic regression analysis of associations between baseline Utrecht Work Engagement Scale (UWES) and medically certified LTSA during 1-year follow-up, adjusted for LTSA in the year before baseline and the type of employment (permanent vs. temporary)

*SD* standard deviation

* $P < 0.05$

† Per 10-point increase in standardized UWES score

from these results is that the MBI—GS and UWES fail to discriminate between employees at high and low risk of all-cause LTSA, but moderately discriminate between employees at high and low risk of mental LTSA. The MBI—GS and UWES might be used as tools to select employees for further assessment of their risk of mental LTSA.

### Prospective associations of MBI—GS and UWES with LTSA

Our finding that MBI—GS was associated with higher odds of LTSA is in line with the results of previous studies (Bakker et al. 2003; ToppinenTanner et al. 2005; Borritz et al. 2006; Schaufeli et al. 2009; Peterson et al. 2011; Hallsten et al. 2011). We found that exhaustion was not significantly related to future LTSA, although the association was on the verge of significance. In this regard, it is interesting to note that Saastamoinen et al. (2013) found no significant associations between exhaustion and sickness absence among Finnish employees in Helsinki, whereas Peterson et al. (2011) did find significant associations in Swedish female health professionals. In contrast to Peterson et al. (2011), our results showed a significant association between cynicism and LTSA. A relationship between cynicism and LTSA is plausible as higher cynicism levels represent more distance to work and may entail feelings of insufficiency, incapacity, and self-doubt. Cynical employees may ask themselves whether or not they will be able to return to work, and therefore, it may also take them longer to resume work.

The present study is the first to describe prospective relations between burnout and LTSA stratified by diagnosis. Burnout as measured with the MBI—GS was associated with mental LTSA, but not with musculoskeletal or other somatic LTSA. This makes sense because burnout is primarily a psychological condition, although hypofunction of the hypothalamic-hypophysial-adrenocortical axis has been described in burnout patients (Verhaege et al. 2012; Kakiashvili et al. 2013). Cortisol levels 30 min upon awakening are low in burnout patients, particularly those reporting emotional exhaustion (Marchand et al. 2014).

This is also the first study that investigates the relationship between work engagement and LTSA in a heterogeneous sample of employees working in different economic sectors. Previously, work engagement was found to be associated with the frequency, but not duration of sickness absence in 201 managers and executives of a Dutch telecom company (Schaufeli et al. 2009). The present study confirmed that work engagement as measured with the UWES was not related to long duration sickness absence. However, UWES scores were negatively associated with the risk of future mental LTSA. This finding is in line with recent results of Leijten et al. (2014) who reported that higher work engagement at baseline was related to better mental health during 1-year follow-up of 8,837 Dutch workers aged 45–64 years.

### Discriminative ability and practical implications

Peterson et al. (2011) concluded that burnout measures might be useful to identify employees at risk of LTSA. The authors reported significant associations between exhaustion and LTSA, but significant associations are not sufficient to recommend using an instrument as tool to identify high-risk employees.

Although discrimination was not practically useful according to the guidelines of Fad et al. (2006), our study showed that MBI—GS and UWES discriminated to some extent between employees at high and low risk of mental LTSA. The MBI—GS or UWES could be used as a

primary screening tool, but there is no advantage in using both instruments simultaneously. To screen for risk of mental LTSA, we recommend cut-off scores MBI—GS >10 or UWES <70. However, ROC analysis shows that false positive rates at these cut-off points are high (75 and 62 %, respectively). Previously, Kleijweg et al. (2013) showed that the MBI—GS did not discriminate patients with burnout from those without burnout. The authors concluded that the MBI—GS should not be used by itself as a diagnostic tool, because of a high probability of overdiagnosing burnout. In line with these findings, we conclude that neither MBI—GS nor UWES should be used by itself as prognostic tool for mental LTSA because of a high probability of false positive findings (i.e., 'overprognosing' mental LTSA). Further examination of the psychological state of employees selected with MBI—GS or UWES is required to restrict unnecessary referral to interventions aimed at preventing mental LTSA.

### Strengths and weaknesses of the study

The prospective design of the study and the use of different data sources (health check questionnaires and OHS register) are assets of the current study. The heterogeneous sample of employees working in different economic sectors is a further strength of the study, although the study population was not representative of the Dutch workforce, because employees in the public sector were predominantly working in healthcare and employees in the private sector in finance.

The use of OP-certified sickness absences is better than relying on employee-rated causes for sickness absence. Previously, O'Niell et al. (2008) reported a good agreement between OPs and psychiatrists for the diagnosis 'mental illness.' An important weakness of the study, however, is that OPs could only certify LTSA with one ICD-10 diagnosis. Comorbidities could not be recorded in the OHS register. Physical illness has been reported to be more common in employees with burnout than in those without burnout (Honkonen et al. 2006; Peterson et al. 2008), and many studies have demonstrated comorbidity between musculoskeletal disorders and mental health. Joint associations of emotional exhaustion and pain with sickness absence were found to be stronger than separate associations (Saastamoinen et al. 2013). Thus, comorbid burnout and pain might be more predictive of LTSA than burnout alone.

Furthermore, the incidence of LTSA was low. Mental LTSA, for example, occurred in only 43 of 4,894 (i.e., 8.8 per 1,000) employees, which is half of the incidence previously reported for the Dutch workforce (Roelen et al. 2012). The low incidence may be due to the definition of LTSA as ≥42 consecutive days. Although shorter than in previous burnout studies (Borritz et al. 2006; Hallsten et al. 2011; Peterson et al. 2011), such long absence duration could have been too strict a criterion and may consequently have underestimated the prospective associations of MBI—GS and UWES with LTSA. However, when shorter absences would be defined as LTSA, we ran the risk that not all LTSA cases were medically certified. In that case, we would not have been able to stratify the analysis by LTSA cause.

An alternative explanation for the low LTSA incidence could be that healthy employees were over-represented among health check participants. The mean score for exhaustion was 6.3 (5 items) and for cynicism 4.2 (4 items); when divided by the number of items in each scale, mean scores were 1.3 and 1.1 respectively. In comparison, Leone et al. (2007) found scores of 1.4 for exhaustion and 1.2 for cynicism in 8,338 workers representative of the Dutch workforce. Thus, we concluded that 'healthy volunteer' bias was not likely in the present study population. Although there were few mental, musculoskeletal, and other somatic LTSA events, the number of events per variable was sufficient for stable predictions (Vittinghoff and McCulloch 2007), because confounder analysis restricted the number of independent variables in the logistic regression models.

## Conclusion

We conclude that baseline MBI—GS and UWES scores were prospectively associated with mental, but not musculoskeletal or other somatic LTSA during 1-year follow-up of Dutch employees working in different economic sectors. The ability of the MBI—GS and UWES to discriminate between employees at high and low risk of mental LTSA was moderate, but instruments could be used as primary screening tool to select employees for further assessment of mental LTSA risk.

**Conflict of interest** The authors declare that they have no conflict of interest.

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