Measuring Positive and Negative Occupational States (PNOSI): Structural confirmation of a new Belgian tool.

Running head: VALIDATING THE PNOSI.

M. Barbier (corresponding author)

National Funds for Scientific Research

University of Liège, Boulevard du Rectorat 5 (B32), B-4000 Liège, Belgium.

Tel. : +32 4 366 22 36

Marie.Barbier@ulg.ac.be

S. Peters.

Human Resources Valorisation Unit,

University of Liège, Boulevard du Rectorat 5 (B32), B-4000 Liège, Belgium.

I. Hansez

Human Resources Valorisation Unit

University of Liège, Boulevard du Rectorat 5 (B32), B-4000 Liège, Belgium.

ABSTRACT.

This article reports on the validation of the Positive and Negative Occupational States Inventory (PNOSI), a new tool for measuring positive and negative occupational states. Three goals were defined: testing the structural validity of the PNOSI, testing its stability, and testing its convergent and discriminant validity with engagement, burnout, commitment, and workaholism. Data were collected in seven different companies (more than 16,000 participants). The factorial validity of the PNOSI was demonstrated using covariance structure analyses. A two-factor model with a negative occupational state factor and a positive occupational state factor fitted the data better than an alternative one-factor model. The two corresponding scales demonstrated good internal consistency. The results confirmed that positive and negative occupational states are distinct constructs and should be measured with different items. Convergent and discriminant validity with related constructs, such as engagement, burnout, commitment, and workaholism, were also demonstrated. The conclusion is that the PNOSI has good psychometric properties.

Keywords: wellbeing at work, positive state, negative state, tool validation, structural equation modeling, work psychology, Belgium

Psychology has traditionally focused on human dysfunction, such as anxiety, depression, or ill health. As an illustration, in 2000 Myers found that negative emotions were studied 14 times more in the psychological literature than positive ones. However, a new trend, referred to as "positive psychology" has emerged the last decade, and this emphasizes human strengths and resources rather than failures (Seligman & Csikszentmihalyi, 2000). According to Luthans (2002, p.697):

The aim of positive psychology is to shift the emphasis away from what is wrong with people to what is right with people – to focus on strengths (as opposed to weaknesses), to be interested in resilience (as opposed to vulnerability), and to be concerned with enhancing and developing wellness, prosperity and the good life (as opposed to the remediation of pathology).

Positive psychology studies are thus interested in the existing links between "positive thoughts" (such as optimism, hope or self-esteem) and positive phenomena such as good health (Salovey, Rothman, Detweiler & Steward, 2000; Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000).

The positive psychology perspective has spread to the field of work and organizational psychology. Researchers have been interested not only in negative responses to work demands, but also in positive ones, such as work motivation and engagement. In their so-called "Job Demands-Resources (JD-R) model", Schaufeli and Bakker (2004, see also Bakker & Demerouti, 2007; Demerouti, Bakker, Nachreiner & Schaufeli, 2001) consider both positive and negative well-being at work as different responses developing in different conditions. This model proposes that job characteristics are conceived as either job demands (e.g. high time pressure, workload) or job resources (e.g. participation in decision-making, autonomy). The presence of high job demands would lead to burnout and then to negative

outcomes such as absenteeism or health problems (health-impairment process). The presence of job resources would lead to engagement, and then to positive organizational outcomes, such as a low intent to leave the organization (motivational process).

The theory of affects proposes the existence of two kinds of affect, whereas work psychology proposes the existence of two kinds of individual reactions to the working environment. Even if their topic of interest is different, both ask the same question: What is the relation between the two concepts? While it is widely accepted that two kinds of affect exist (Folkman & Moskowitz, 2000), there is disagreement with respect to the relationship they have with each other. Some authors defend the independence of the two (Warr, Barter & Brownbridge, 1983), whereas others consider them as opposite poles of a bipolar continuum (Russel & Carroll, 1999). As regards well-being at work, the JDR model considers positive and negative well-being at work to be different constructs that should be measured with different tools or items (Schaufeli, Salanova, Gonzalez-Roma & Bakker, 2002).

We concurred with the latter perspective when we developed the Positive and Negative Occupational States Inventory (PNOSI) in 2001. This inventory was designed to measure both positive and negative aspects of well-being at work each with different items. De Keyser and Hansez (1996) and Hansez (2008) define negative occupational state as the response of workers facing demands they feel they have to manage, but for which they doubt they have the necessary resources. In contrast, we define positive occupational state as the response of workers facing demands they feel they have to manage and for which they perceive necessary resources are available.

The PNOSI has been used for diagnostic purposes in French-speaking countries. More than 45,000 participants have been tested with the PNOSI. It has demonstrated good reliability (Cronbach's α higher than .80) in diverse occupational fields such as veterinary practice, farming, informatics, printing, pharmaceutics, and the energy, public and health care sectors (Dardenne, Coibion & Hansez, 2007; Hansez & Bertrand, In press; Hansez, Bracci & Bertrand, 2007; Hansez & Chmiel, 2008; Hansez, Schins & Rollin, 2008). Given its wide use, it is of the utmost importance to establish the structural validity of this instrument. Preliminary factor analyses have confirmed the two-factor structure of the PNOSI (Barbier & Hansez, 2008). Results show that eight items measure positive occupational state, whereas the remaining eleven measure negative occupational state. However, these analyses were exploratory in nature. The first aim of this paper is to test the structural validity of the PNOSI by the means of confirmatory factor analyses.

Our second objective is to test its stability and generalizability across samples of workers active in different areas. We hypothesize that the previously shown two-factor solution would fit the data better than the alternative one-factor solution.

The third aim of this paper is to establish the convergent and discriminant validity of positive and negative states, as measured by the PNOSI, from related constructs such as engagement, commitment, burnout or workaholism. Engagement at work is defined as a persistent, positive, and satisfying state of mind linked to work, not focused on any particular object, event, person or behavior (Schaufeli et al., 2002). Based on this conceptualization of engagement as an "assumption of 'optimal functioning' at work in terms of well-being" (Hallberg & Schaufeli, 2006, p.120), we believe positive occupational state to be an intermediate state occurring prior to engagement. We thus hypothesize that there is a positive correlation between positive occupational state and work engagement scores (*hypothesis 1a*)

and a negative correlation between negative occupational state and engagement at work (*hypothesis 1b*).

Burnout can be defined as a combination of extreme fatigue (which is called exhaustion) and distancing oneself from one's work (Demerouti, Bakker, Vardakou & Kantas, 2003). According to Demerouti, Bakker, Nachreiner, and Ebbinghaus (2002), "whereas short-term effects of strain develop as an immediate reaction to specific work conditions … , burnout will develop only after repeated, prolonged, and unsuccessful confrontation with such conditions" (p.426). They found both exhaustion and disengagement components of burnout to be significantly correlated with short-term strain effects, such as mental fatigue or monotony (here defined as a worker's reaction and not as a characteristic of the task).

According to Hockey's model of compensatory control (1997) and according to Schaufeli and Bakker (2004), workers facing an imbalance between demands and resources at work can react in a strain coping or passive coping way. In the strain coping way, workers put in greater effort so that goals are achieved at the expense of physiological and psychological costs, leading to exhaustion. In the passive coping way, workers make a downwards adjustment so that health is preserved at the expense of performance, leading to disengagement from work. According to Mackay and Cooper's transactional model of stress (1987), perceiving an imbalance in the situation leads to perceived stress and to coping strategies which have implications for mental and physical health. In both the compensatory and transactional model coping is described as an antecedent of burnout. Moreover, in the transactional model the stress reaction is simultaneous to coping strategies. Based on the two models, and on our definition of negative occupational state as a reaction to a demands-resources imbalance at work, we consider negative occupational state to be an intermediate state occurring prior to

burnout. We thus hypothesize burnout to correlate positively with negative occupational state (*hypothesis 2a*) and negatively with positive occupational state (*hypothesis 2b*).

Allen and Meyer (1990) conceptualize commitment as a combination of three components. Affective commitment refers to the extent to which a worker identifies with, gets involved in, and feels affectively attached to his/her organization. Continuance commitment refers to a worker's tendency to stay with his/her organization to avoid disadvantages linked with quitting. Finally, normative commitment refers to a worker feeling of loyalty and duty to his/her organization. Thus, affectively committed workers stay because they want to, continuance committed ones stay because they need to, and normatively committed ones stay because they feel they have to. According to Meyer and Allen (1997), affective commitment would be associated with a motivation or a desire to contribute to the organization, whereas continuance commitment could be associated with frustration and could lead to inappropriate work behavior. Finally, normative commitment, as a feeling of obligation, would be associated with appropriate work behavior, but one can question whether such behavior is performed full heartedly. The authors review studies showing negative correlations between stress and affective commitment, and between stress and normative commitment. Correlations between stress and continuance commitment on the other hand were not significant. In their meta-analysis, Meyer, Stanley, Herscovitch, and Topolnytsky (2002) found desirable work behavior (such as job involvement) to be positively correlated with affective commitment and (even if less strongly) to normative commitment, and not correlated with continuance commitment. We hypothesize positive occupational state to be positively correlated with affective commitment (*hypothesis 3a*) and normative commitment (*hypothesis 3b*), and negatively or not significantly correlated with continuance commitment (*hypothesis 3c*). We also expect negative occupational state to be negatively correlated with affective commitment

(*hypothesis 3d*), and normative commitment (*hypothesis 3e*), but not correlated with continuance commitment (*hypothesis 3f*).

According to Schaufeli, Taris, and Bakker (2006), two types of behavior define workaholism: working excessively and working compulsively (driven by an inner compulsion and not because of external factors). They have found working excessively, but not working compulsively, to correlate with engagement. They conclude that the inner drive differentiates workaholism from engagement. We believe positive occupational state differs from workaholism because it lacks the compulsive component that characterizes workaholic people. A study by Burke (2000) has shown that workaholic people exhibit lower emotional and physical well-being, and more somatic complaints. Finally, Schaufeli, Taris, and van Rhenen (2008) have shown that working excessively is positively correlated with engagement and not correlated with burnout. We hypothesize that positive occupational state correlates positively with working excessively, but does not correlate with working compulsively (*hypotheses 4a and 4b* respectively). On the contrary, we hypothesize that negative occupational state correlates positively with working compulsively, but does not correlate with working excessively (*hypotheses 4c and 4d* respectively).

Method

Samples

Eight different samples were used: a calibration sample, a validation sample, and five replication samples (they are defined in the "Analyses" section). A last sample was used to test PNOSI convergent and discriminant validity. Sample distributions as regards gender, age and organizational tenure are shown in Table 1.

Calibration and validation samples

Data gathered from a large sample of workers employed in a Belgian electricity production and selling company were randomly split into two halves. In the *calibration sample* (referred to as sample 1a, *N* = 2713), 76.89% of the workers are male (*n* = 2086). A large majority are between 25 and 55 years old (*n* = 2202, 81.16%) and have worked in the company for 11 years or more (*n* = 1729, 63.73%). A large majority of *validation sample* workers (referred to as sample 1b, *N* = 2714) are male (*n* = 2098, 77.30%), between 25 and 55 years old (*n* = 2169, 79.92%) and have worked for the company for 11 years or more (*n* = 1830, 67.43%).

Replication samples

Data collected in five French and Belgian companies were used as replication samples (referred to as samples 2-6)[1]. Samples 2 and 4 consist of workers employed in public institutions (*N*=1345 and *N*=1998, respectively). Samples 3 and 5 consist of workers employed in the service sector, specifically a large sale company and an insurance company (*N*=3591 and *N*=5280, respectively). Sample 6 consists of workers employed in a mental and physical health institution (*N*=903).

Validity sample

Data gathered in a Belgian public institution (*N*=955) were used as a validity sample (referred to as sample 7). Men and women were equally represented (*n*=425, 44.50% and *n*=529, 55.39%, respectively) and a majority of workers had worked for this institution for 20 years or more (*n*=420, 43.98%).

[1] One sample corresponds to data collected from one single company

Insert Table 1 around here

Measures

Wellbeing at work

In developing the PNOSI, we first asked university students (N = 150) to list five words describing negative well-being and five others describing positive well-being. Qualitative analyses showed the words represented four dimensions, namely an emotional, a cognitive, a behavioral, and a somatic dimension. We selected the most frequently cited for each dimension. They were included in the first PNOSI version, which counted 34 items. This questionnaire was administered to employees of a Belgian high school (N = 152). Exploratory factor analyses with Varimax rotation were performed. The results revealed a three-factor solution. The first factor was composed of eleven items related to negative experiences, while the second was composed of eight items related to positive experiences. The third factor was composed of two items related to work performance and was not included in the final PNOSI questionnaire.

The final PNOSI version consisted of 19 first singular pronoun formulated items (see Appendix). Eight were formulated to tap positive occupational state (e.g. “I am very active at work”) and the remaining eleven were formulated to tap negative occupational state (e.g. “I feel demoralised by my work”). Workers were asked to indicate how they felt at work during the last seven days. So the PNOSI addressed short term reactions. Answers were given using a Likert scale ranking from 1 (“never or rarely”) to 4 (nearly always or always). No item had to be reversed before scoring.

Engagement

We used the short version of the Utrecht Work Engagement Scale (UWES-9, Schaufeli, Bakker & Salanova, 2006), which operationalizes engagement as a combination of vigor (a high level of energy and concentration while working and the willingness to invest effort in one's work), dedication (a feeling of meaning, enthusiasm, pride, and challenge towards work), and absorption (being completely involved in one's work so that time passes quickly and one has difficulty detaching from it). Answers were made on Likert scales ranging from 0 (never) to 6 (every day).

Burnout

We used the Oldenburg Burnout Inventory (OLBI, Demerouti et al., 2003), which consists of two subscales: exhaustion (8 items, e.g.: "There are days when I feel tired before I arrive at work") and disengagement (8 items, e.g.: "It happens more and more often that I talk about my work in a negative way"). Answers were made on Likert scales ranging from 1 (strongly agree) to 4 (strongly disagree).

Commitment

Affective, normative, and continuance commitment were measured using a French validated version of Allen and Meyer (1990) scales (Stinglhamber, Beintein & Vandenberghe, 2002). We created a short version by selecting the items with the highest loadings. Our final questionnaire consisted of three items measuring affective commitment (e.g.: "I really feel that I belong in this organization"), three items measuring normative commitment (e.g.: "It would not be morally right for me to leave this organization now"), and four items measuring

continuance commitment (e.g.: “I have no choice but to stay with this organization”). Answers were made on Likert scales ranging from 1 (strongly disagree) to 4 (strongly agree).

Workaholism

Schaufeli et al. (2008) insist on the importance of using both behavioral (working excessively) and cognitive (working compulsively) measures of workaholism. The working compulsively component of workaholism was measured using seven items from the Drive scale of Spence and Robbin’s (1992) Workaholism Battery (e.g.: “I feel that there is something inside me that drives me to work hard”). Answers were made on Likert scales ranging from 1 (almost never or never) to 4 (almost always or always). Two open questions measured the working excessively component of workaholism, namely “How many hours per week do you have to work according to your work contract?” and “How many hours per week do you actually work?”. We computed the percentage of overwork using the following formulae: *[(a-c)/c]*100*, with *a* referring to the number of actually worked hours and *c* referring to officially worked hours (Schaufeli et al., 2006b).

Questionnaires were administered in French in samples 2, 5, 6 and 7. They were administered in French and Dutch in samples 1a, 1b, 3 and 4. PNOSI was translated from French to Dutch following a translation back-translation procedure.

Analyses

LISREL 8.80 was used for the confirmatory factor analyses (Jöreskog & Sörbom, 2006). Confirmatory factor analysis compares the covariance matrix obtained from the data with a covariance matrix implied by the theoretical factor model. This model states how latent, unobservable constructs are measured by manifest, observable variables, and how these latent

constructs are linked with each other. Thus, confirmatory factor analysis (also called "structural equation modeling") gives an evaluation of how well the theoretical model fits the original data: the smaller the discrepancy between the two matrices, the better the fit.

We used a cross-validation strategy in four steps, as recommended by Diamantopoulos and Siguaw (2000). We defined the initial model (*Minit*) as a two-factor model, the first factor tapping positive occupational state and the second factor tapping negative occupational state. *Minit* reflected the independence hypothesis of workers' positive and negative reactions to their environment. We defined the alternative model (*Malt*) as a one-factor model, with all items measuring a global well-being concept. This model reflected the continuum hypothesis of workers' positive and negative reactions to their environment. Both models were first tested and improved on the calibration sample in order to select the best "initial "and "alternative" models. Both were retested on the validation sample. Both *Minit* and *Malt* were tested and compared again in replication samples in order to establish their generalizability to other data. The final "best" model was selected based on its fit indices at each comparison step. Our hypothesis was that *Minit* would better fit the data than *Malt*.

Several indices were used to assess the fit. The null hypothesis is that the model fits the data perfectly which is tested by the χ^2 test. . However, given that the value of χ^2 is influenced by sample size, it has to be complemented by other fit indices. The Root Mean Square Error of Approximation (RMSEA) is generally regarded as one of the most informative fit indices. It shows "how well would the model, with unknown but optimally chosen parameters, fit the population covariance matrix if it were available" (Brown & Cudeck, 1993, pp. 137-138). Values less than .08 indicate an acceptable fit. We also used five indices evaluating the discrepancy between the observed and the implied covariance matrices: the Normed Fit Index

(NFI), the Non-Normed Fit Index (NNFI), the Goodness of Fit Index (GFI), the Adjusted Goodness of Fit Index (AGFI) and the Comparative Fit Index (CFI). For NFI, NNFI, GFI and CFI, values higher than .90 are indicative of good fit. For AGFI, values higher than .85 are indicative of good fit. Given that the data were ordinal in nature, polychoric correlation and asymptotic covariance matrices were used, as well as the Weighted Least Squares method of estimation.

The reliabilities of the scales that corresponded with the factors were computed. Ideally, Cronbach's α values should be higher than .80 (Henson, 2001). Mean inter-item correlations should be between .20 and .40 (Briggs & Cheek, 1986). Finally, item-total correlations should be higher than .30 (Kline, 2000).

Finally, Pearson correlation coefficients were computed in order to test convergent and discriminant validity. According to Cohen and Holliday (1982), values above .40 are considered moderate, values between .70 and .89 are considered high, and values superior to .90 are considered as very high correlations.

Results

Structural validity

Means, standard deviations, and correlations for all calibration, validation and replication samples are shown in Table 2. As can be seen, positive occupational state tended to have higher mean values, and was more frequently experienced than negative occupational state. Standard deviations were quite similar in all seven samples (between .53 and .61 for positive occupational state and .48 and .59 for negative occupational state). Apart from Sample 5, the correlation between positive occupational state and negative occupational state scores were

between -.21 and -.32, which reflects quite a low, even though significant, association (all $p < .01$).

Insert Table 2 around here

Model Calibration

Fit indices are shown in Table 3. Both *Minit* and *Malt* had significant chi-square values, χ^2 (151) = 2444.27, $p < .00$, and χ^2 (152) = 3054.54, $p < .00$ respectively. This can be explained by the large sample size. Regarding other fit indices, results were mixed. For *Minit*, all RMSEA, GFI and AGFI values satisfied the recommended thresholds, while NFI, NNFI and CFI failed. For *Malt*, only GFI and AGFI values satisfied the recommended thresholds.

Modification indices for *Minit* suggested adding a path from items 4 ("I feel demoralised by my work") and 5 ("I work in a rush") to positive occupational state. We considered these items to be more related to depression or negative affect (item 4) and to workload (item 5), so we decided to exclude them, and tested the new reduced model (*Mfinal*). All RMSEA, CFI, GFI and AGFI values satisfied the recommended threshold, and were superior to that obtained for *Minit*. Values for NFI and NNFI were near acceptance and were higher than values obtained for *Minit.*

Given that *Mfinal* and *Malt* are not nested models, they had to be compared by the means of the Expected Cross-Validation Index (or ECVI). This index assesses "whether a model is likely to cross-validate across samples of the same size from the same population" (Diamantopoulos & Siguaw, 2000, p. 85). The ECVI is a good indicator of a model's overall

error or fit, and models with smaller ECVI values are to be preferred. As can be seen in Table 3, *Mfinal* showed the smallest ECVI value, and had to be preferred to *Malt*. As can be seen in Table 4, the reliabilities of both positive occupational state and reduced negative occupational state scales all satisfied the recommended criteria.

Model Validation

Both *Mfinal* and *Malt* were tested on the validation sample (see Table 3). Chi-square values were statistically significant, χ^2 (118) = 1196.23, $p < .00$, and χ^2 (152) = 2582.52, $p < .00$, respectively. Again, this can be explained by the large sample size. For *Mfinal*, all fit indices satisfied the recommended thresholds. Modification indices suggested letting error covariance of items 1 ("I am very active at work") and 3 ("Once I am at work, I feel more focused") correlate. However, given that *Minit* already showed an acceptable fit, we did not test this model. According to Diamantopoulos and Siguaw (2000), modifying a model showing acceptable fit would lead to an improved, but unstable model that is hard to generalize to other data. For *Malt*, only GFI and AGFI satisfied the recommended threshold; all other fit indices failed. Finally, ECVI values were smaller for *Mfinal* than for *Malt*. We can thus consider *Mfinal* as the "best" model for these data. The reliabities of POSI and reduced NOSI scales all satisfied the recommended criteria, as can be seen in Table 4.

Model Replication

Both *Mfinal* and *Malt* were tested on all replication samples. Table 3 shows fit indices for both models in all five samples (samples 2-6). Chi-square values were highly significant in all samples, which again can be explained by the large sample sizes. RMSEA values were satisfactory for *Mfinal*, but not for *Malt* (except from samples 3 and 5). NFI, NNFI, and CFI values were satisfactory or near acceptance for *Mfinal*, but not for *Malt*. Finally, GFI and

AGFI values were satisfactory in all samples, and values were higher for *Mfinal* than for *Malt*. Globally speaking, one can say that fit was better for *Mfinal* than for *Malt* in all samples. This is confirmed by ECVI values being smaller for *Mfinal* than for *Malt* in all samples. Reliabilities of positive occupational state and reduced negative occupational state scales are shown in Table 4. They all satisfy the recommended thresholds.

Model calibration, validation and replication show that a two-factor solution is preferable to an alternative one-factor solution to explain the intern structure of the PNOSI. Moreover, the fit is improved when deleting two items linked with depression or workload.

Insert Table 3 around here

Insert Table 4 around here

Convergent and discriminant validity

Means, standard deviations, Cronbach's alpha's and correlations for positive occupational state, negative occupational state, burnout, engagement, commitment and workaholism scales in sample 7 are reported in Table 5. Engagement was positively correlated with positive occupational state, and negatively with negative occupational state, which was in accordance with hypotheses 1a and 1b. However, the correlation with positive occupational state was quite high (r = .78). As regards burnout, both exhaustion and disengagement correlated positively with negative occupational state and negatively with positive occupational state, which confirmed hypotheses 2a and 2b. However, correlation between negative occupational state and exhaustion was quite high (r = .73). As far as commitment was concerned, positive occupational state was positively correlated with affective commitment (r = .54) and normative commitment (r = .39), whereas the correlation with continuance commitment was not significant. This confirmed hypotheses 3a, 3b and 3c. Negative occupational state was

negatively correlated with affective commitment (r = -.27) and normative commitment (r = -.17), which confirmed hypotheses 3d and 3e. However, it is positively correlated with continuance commitment (r = .12), which was contrary to hypothesis 3f. Finally, concerning workaholism, negative occupational state correlated positively with working compulsively (r = .45), but not with working excessively, and positive occupational state was positively correlated with working excessively (r = .20), which confirmed hypothesis 4a, 4c and 4d. Contrary to hypothesis 4b, positive occupational state correlated positively, but slightly with working compulsively (r = .14).

Insert Table 5 around here

Discussion

Structural Validity

Our results show that a two-factor structure with one positive and one negative dimension of well-being at work fits the data better than an alternative one-factor solution. This finding was replicated across six samples, including more than 16,000 participants. The two factor-structure confirms that positive and negative aspects of well-being at work are different constructs, as is hypothesized by the JD-R model and by Schaufeli et al. (2002). However, the correlations between the two factors, although small, are highly statistically significant. This shows that the two constructs are not independent. They are distinct, but related constructs.

Convergent validity

With regard to burnout, negative occupational state is moderately and positively correlated with disengagement, and highly and positively correlated with exhaustion.

According to Cordes and Dougherty (1993), rather than a particular type of stress, burnout can be conceived as an on-going process, with exhaustion occurring first, followed by a distancing from work and, in the longer term, by a feeling of being inefficient at work. Given our results, our measure of negative occupational state seems to be more like exhaustion, which is the first step of the burnout process, than disengagement, a secondary step. This gives support to our conception of negative occupational state being an intermediate state occurring before burnout.

Correlation between positive occupational state and engagement is positive and high, which indicates that the two are very similar constructs. Items from both scales are indeed highly similar. However, both scales were developed independently, and we were unaware of the existence of the UWES when elaborating the PNOSI. If we follow the definition of Schaufeli et al. (2002), which states that engagement is a combination of vigor, dedication, and absorption (as they were defined in the Measure section), we can say that item 1 (“I am very active at work”) relates to vigor, whereas items 7 (“My work allows me to excel myself”) and 9 (“My work gives me great satisfaction”) relate to dedication, and items 3 (“Once I’m at work, I feel more focused”) and 18 (“When I’m working I forget my tiredness”) to absorption. We should thus consider positive occupational state as we define it as an alternative measurement for engagement at work. Thus, if this study tends to confirm the existence of an intermediate state occurring before burnout, the question remains whether such an intermediate state occurs before engagement. If we rely on the JDR model assumptions, this implies that engagement can be replaced by positive occupational state in the motivational process. Additionally, the energetic process can be improved this way: job demands would lead to negative occupational state, which leads to burnout and then health problems.

Discriminant validity

Nearly all hypotheses concerning discriminant validity were confirmed. As expected, positive occupational state is positively related to affective and normative commitment, not related to continuance commitment, and negatively related to burnout. As expected again, negative occupational state is negatively correlated with engagement and affective and normative commitment. However, contrary to our hypothesis, it is positively correlated with continuance commitment. According to Meyer et al. (2002), it could be due to the fact that a feeling of being 'trapped' in one's organization would be stressful for workers.

If correlations between negative occupational state and workaholism go the expected way, results concerning workaholism and positive occupational state are less clear. Positive occupational state is positively related to working excessively, which is in accordance with our hypothesis. However, it is also positively correlated with working compulsively. This is contrary to prior studies which found that positive wellbeing differs from workaholism in that it lacks the compulsive component (Schaufeli et al., 2006b). However, the correlation is very low and its significance may be linked to our large sample size.

Positive and negative occupational states are thus differently related to engagement, burnout and commitment, which strengthens findings that positive and negative occupational states are different constructs. Moreover, correlations between positive occupational state and dimensions of burnout, commitment and workaholism range between -.67 and .40, which is considered as moderate (Cohen & Holliday, 1982). Positive occupational state can thus be considered as distinct from burnout, commitment, and workaholism. Correlations between negative occupational state and dimensions of engagement, commitment, and workaholism

range between -.17 and -.51. That is considered as low to moderate (Cohen & Holliday, 1982). Negative occupational state can thus be considered as distinct from engagement and commitment.

Limits and perspectives

One important shortcoming of this study is that negative occupational state items are all negatively worded, whereas positive occupational well-being items are all positively worded. According to Anastasi (1988), one-side worded scales are not as psychometrically valid as scales that include both positively and negatively worded items. That is because such scales can lead to biased solutions in which positively and negatively worded items are likely to load on separate factors (Doty & Glick, 1998). In consequence, it might be that the two-dimensional structure we obtained is artificial in that it reflects item wording rather than "true" content structure. One important perspective would be to modify wording so that both positive and negative occupational state scales include negative and positive words.

A further point that should be examined is whether all items "behave" the same way with all respondents. For example, if one is interested in negative state at work, it might be that some items are infrequently endorsed by workers (that is, most of them choose the category 'never or rarely') or only by workers who already show a higher level of stress (that is, workers who answer 'nearly always or always' to that item also show higher scores of negative occupational state). Rasch analysis "predicts the probabilities of the responses of a sample of subjects, who vary in the exhibition of a trait, to a test that has items of varying endorsability designed to detect the presence of that trait" (King & Bond, 1996, p. 55). In other words, Rasch analysis indicates how items function according to individual

characteristics. This kind of analysis would bring informative and complementary elements to the validation process of the PNOSI.

One should also check for PNOSI structural invariance across socio-demographic variables such as gender, age, occupation or sector of activity for example. Furthermore, in this study, data collected with French and Dutch versions of PNOSI were mixed in the same sample. In future research, structural analyses should be performed on French and Dutch PNOSI versions separately to address the possible role of language as a confounder. This would also lead to a validation of the Dutch translation of PNOSI.

Finally, further studies should attempt a test of the JDR model using our measures of positive and negative occupational states. More specifically, longitudinal and covariance analyses should test whether positive occupational state can indeed be considered as an alternative measure of engagement in the motivational process. They should also test whether a negative occupational state can be considered as an intermediate state that occurs between job demands and the experience of burnout in the energetic process.

Conclusions

The first aim of our study was to test the intern validity of the PNOSI by the means of confirmatory factor analyses, and to examine the degree to which a two-factor structure should be preferred to alternative solutions. The second aim was to replicate the structure on several samples of workers active in different areas, in order to test its stability and generalizability. The final aim of this paper was to test convergent and discriminant validity with burnout, engagement, commitment and workaholism. Confirmatory factor analyses show

that a two-factor solution has to be preferred to the one-factor solution to explain the structure of the PNOSI. Items relate to two distinct yet related dimensions, one tapping positive occupational state, and the other negative occupational state. Moreover, a reduced model, in which two items relating on other dimensions (namely depression and workload) are deleted, is more acceptable than the originally formulated model. Moreover, the reduced two factor model is stable and generalizable to a wide range of employed samples. Furthermore, a clear pattern of predicted convergent and discriminant relationships emerges that confirms the predicted interpretation of the scales.

We can say that the PNOSI has been shown to be a valid tool for measuring negative and positive occupational states.

Acknowledgments

We wish to thank Fabrice De Zanet, Anne Grisard, Hélène Spitz and Sophie Taeymans for collecting data. Data from samples 2 and 3 were collected thanks to a grant from the Belgian Science Policy.

References

Allen, N.J., & Meyer, J.P. (1990). The measurement and antecedents of affective, continuance and normative commitment to the organization. *Journal of Occupational Psychology, 63*, 1-18.

Anastasi, A. (1988). *Psychological testing* (6th ed). New York: Macmillan.

Bakker, A.B., & Demerouti, E. (2007). The Job Demands-Resources model: State of the art. *Journal of Managerial Psychology, 22*(3), 309-328.

Barbier, M., & Hansez, I. (2008). *Le questionnaire de Stress Professionnel Positif et Négatif : Validation statistique et structurelle.* In Pettersen, N., Boudrias, J.S., & Savoie, A. (Eds.), Entre tradition et innovation, comment transformons-nous l'univers du travail ? Actes du 15ème Congrès de Psychologie du Travail et des Organisations de Langue Française. CD-rom. Québec, Canada : Presses de l'Université de Québec.

Briggs, S., & Cheek, J. (1986). The role of factor analysis in the development and evaluation of personality scales. *Journal of Personality, 54*, 106-148.

Brown, M.W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K.A. Bollen & J.S. Long (Eds), *Testing structural equation models* (pp. 445-455). Newbury Park, CA: Sage.

Burke, R.J. (2000). Workaholism in organizations: Psychological and physical well-being consequences. *Stress Medicine, 16*, 11-16.

Cohen, L., & Holliday, M. (1982). *Statistics for Social Scientists*. London: Harper and Row.

Cordes, C.L., & Dougherty, T.W. (1993). A review and an integration of research on job burnout. *Academy of Management Review, 18*(4), 621-656.

Dardenne, B., Coibion, S., & Hansez, I. (2007). Job engagement and job strain for (Belgian) farmers: Impact of demographic and job characteristics across gender. Manuscript submitted for publication.

Demerouti, E., Bakker, A.B., Nachreiner, F., & Schaufeli, W.B. (2001). The Job Demands-Resources model of burnout. *Journal of Applied Psychology, 86*(3), 499-512.

Demerouti, E., Bakker, A.B., Nachreiner, F., & Ebbinghaus, M. (2002). From mental strain to burnout. *European Journal of Work and Organizational Psychology, 11*(4), 423-441.

Demerouti, E., Bakker, A.B., Vardakou, I., & Kantas, A. (2003). The convergent validity of two burnout instruments: A multitrait-multimethod analysis. *European Journal of Psychological Assessment, 19*(1), 12-23.

De Keyser, V., & Hansez, I. (1996). Vers une perspective transactionnelle du stress au travail: Pistes d'évaluation méthodologique. *Cahiers de Médecine du Travail, 33*(3), 133-144.

Diamantopoulos, A., & Siguaw, J.A. (2000). *Introducing Lisrel: A guide to the uninitiated*. London, Thousand Oaks CA, New Delhi: Sage.

Doty, D.H., & Glick, W.H. (1998). Common methods bias: Does common methods variance really bias results? *Organizational Research Methods, 1*, 374-406.

Folkman, S., & Moskowitz, J.T. (2000). Stress, positive emotion and coping. *Current Directions in Psychological Science, 9*(4), 115-118.

Hallberg, U.E., & Schaufeli, W.B. (2006). "Same same" but different? Can work engagement be discriminated from job involvement and organizational commitment? *European Psychologist, 11*(2), 119-127.

Hansez, I. (2008). The Working Conditions and Control Questionnaire (WOCCQ): Towards a structural model of psychological stress. *European Review of Applied Psychology, 58*, 253-262.

Hansez, I. & Bertrand, F. (In press). Intention de quitter et facteurs de départ potentiels et vécus: Analyse comparative des catégories d'âge. *Le Travail Humain*.

Hansez, I., Bracci, E., & Bertrand, F. (2007). Solutions face au départ précoce des travailleurs : Etude de cas. *Psychologie du Travail et des Organisations, 13(2),* 5-22.

Hansez, I., & Chmiel, N. (2010). The Job Demands-Resources model and management commitment to safety applied to safe behaviour outcomes. Manuscript submitted for publication.

Hansez, I., Schins, F., & Rollin, F. (2008). Occupational stress, work-home interference and burnout among Belgian veterinary practitioners. *Irish Veterinary Journal, 61*(4), 233-241.

Henson, R.K. (2001). Understanding internal consistency reliability estimates: A conceptual primer on coefficient alpha. *Measurement and Evaluation in Counseling and Development, 34*(3), 177-189.

Hockey, G.J. (1997). Compensatory control in the regulation of human performance under stress and high workload: A cognitive-energetical framework. *Biological Psychology, 45*, 73-93.

Jöreskog, K., & Sörbrom, D. (2006). LISREL for Windows [computer software]. Lincolnwood, IL: Scientific Software International, Inc.

King, J., & Bond, T. (1996). A Rasch analysis of a measure of computer anxiety. *Journal of Educational Computer Research, 14*(1), 49-65.

Kline, P. (2000). *The new psychometrics: Science, psychology and measurement*. New York: Routledge.

Luthans, F. (2002). The need for and meaning of positive organizational behavior. *Journal of Occupational Behavior, 23*(6), 695-706.

Mackay, C.J., & Cooper, L. (1987). Occupational stress and health: Some current issues. In Cooper, C.L. & Robertson, I.T. (Eds), International review of industrial and organizational psychology (pp.167-199). Oxford, England: John Wiley and Sons Ltd.

Meyer, J.P., & Allen, N.J. (1997). *Commitment in the workplace: Theory, research, and application.* Thousand Oaks, CA: Sage.

Meyer, J.P., Stanley, D.J., Herscovitch, L., & Topolnytsky, L. (2002). Affective, continuance, and normative commitment to the organization: A meta-analysis of antecedents, correlates, and consequences. *Journal of Vocational Behavior, 61*(1), 20-52.

Myers, D.G. (2000). The funds, friends, and faith of happy people. *American Psychologist, 55*(1), 56-67.

Russell, J.A., & Carroll, J.M. (1999). On the bipolarity of positive and negative affect. *Psychological Bulletin, 125*(1), 3-30.

Salovey, P., Rothman, A., Detweiler, J.B., & Steward, W.T. (2000). Emotional states and physical health. *American Psychologist, 55*(1), 110-121.

Schaufeli, W.B., & Bakker, A.B. (2004). Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study. *Journal of Organizational Behavior, 25*(3), 293-315.

Schaufeli, W.B., Bakker, A.B., & Salanova, M. (2006a). The measurement of work engagement with a short questionnaire: A cross-national study. *Educational & Psychological Measurement, 66(*4), 701-716.

Schaufeli, W.B., Salanova, M., Gonzalez-Roma, V., & Bakker, A.B. (2002). The measurement of engagement and burnout: A two sample confirmatory factor analytic approach. *Journal of Happiness Studies, 3*(1), 71-92.

Schaufeli, W.B., Taris, T.T., & Bakker, A.B. (2006b). Dr Jekyll or Mr Hyde? On the differences between work engagement and workaholism. In R.J. Burke (Ed.), *Research companion to working time and work addiction* (pp.192-227). Cheltenhal, UK, Northampton, MA, USA: Edward Elgar.

Schaufeli, W.B., Taris, T.T., & van Rhenen, W. (2008). Workaholism, burnout, and work engagement: Three of a kind or three different kinds of employee well-being? *Applied Psychology: An International Review, 57*(2), 173-203.

Seligman, M.E.P., & Csikszentmihalyi, M. (2000). Positive psychology. An introduction. *American Psychologist, 55*(1), 5-14.

Spence, J.T., & Robbins, A.S. (1992). Workaholism: Definition, measurement, and preliminary results. *Journal of Personality Assessment, 58*, 160-178.

Stinglhamber, F., Bentein, K., & Vandenberghe, C. (2002). Extension of the three-compoment model of commitment to five foci. Development of measures and substantive test. *European Journal of Psychological Assessment, 18*(2), 123-138.

Taylor, S.E., Kemeny, M.E., Reed, G., Bower, J.E., & Gruenewald, T.L. (2000). Psychological resources, positive illusions, and health. *American Psychologist, 55*(1), 99-109.

Warr, P., Barter, J., & Brownbridge, G. (1983). On the independence of positive and negative affect. *Journal of Personality and Social Psychology, 44*(3), 644-651.

Table 1

Gender, age and, organizational tenure per sample n (%)

	Sample 1a	Sample 1b	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7
Gender								
Male	2086 (76.89)[1]	2098 (77.30)	679 (50.48)	952 (26.51)	956 (47.85)	1977 (37.44)	282 (31.23)	425 (14.50)
Female	623 (22.96)	609 (22.44)	631 (46.91)	2615 (72.82)	1041 (52.10)	3300 (62.50)	621 (68.77)	529 (55.39)
Missing	4 (.15)	7 (.26)	35 (2.60)	24 (.67)	1 (.05)	3 (.06)	0	1 (0.10)
Total	2713 (100)	2714 (100)	1345 (100)	3591 (100)	1998 (100)	5280 (100)	903 (100)	955 (100)
Age								
Less than 25	265 (9.77)	261 (9.62)	19 (1.41)	372 (10.36)	28 (1.40)	n.a.[2]	13 (1.44)	27 (2.83)
25 – 35	647 (23.85)	569 (20.97)	432 (32.12)	570 (15.87)	293 (14.66)	n.a.	165 (18.27)	173 (18.12)
36 – 45	779 (28.71)	796 (29.33)	436 (32.42)	1346 (37.48)	531 (26.58)	n.a.	260 (28.79)	173 (18.12)
46 – 55	776 (28.60)	804 (29.62)	333 (24.76)	1071 (29.82)	803 (40.19)	n.a.	302 (33.44)	372 (38.95)
More than 55	243 (8.96)	274 (10.10)	120 (8.92)	213 (5.93)	342 (17.12)	n.a.	163 (18.05)	204 (21.36)
Missing	3 (.11)	10 (.37)	5 (.37)	19 (.53)	1 (.05)	n.a.	0	6 (0.63)
Total	2713 (100)	2714 (100)	1345 (100)	3591 (100)	1998 (100)	n.a.	903 (100)	955 (100)
Tenure								
Less than 1 year	n.a.	215 (7.92)	45 (3.35)	216 (6.02)	24 (1.20)	n.a.	68 (7.53)	35 (3.66)
1 – 5	n.a.	465 (17.13)	346 (25.72)	710 (19.77)	202 (10.11)	n.a.	215 (23.81)	204 (21.36)
6 – 10	n.a.	186 (6.85)	355 (26.39)	255 (7.10)	216 (10.81)	n.a.	174 (19.27)	125 (13.09)
11 – 20	n.a.	719 (26.49)	350 (26.02)	871 (24.26)	405 (20.27)	n.a.	221 (24.47)	126 (13.19)
More than 20	n.a.	1111 (40.94)	243 (18.07)	1454 (40.49)	1145 (57.30)	n.a.	225 (24.91)	420 (43.98)
Missing	n.a.	18 (.66)	6 (.45)	85 (2.37)	6 (.30)	n.a.	0	45 (4.71)
Total	n.a.	2714 (100)	1345 (100)	3591 (100)	1998 (100)	n.a.	903 (100)	955 (100)

Notes. [1] *n (%),* [2] n.a.: data are not available.

Table 2

Means, standard deviations, and intercorrelations of POSI and NOSI score

		Mean	SD	r
Sample 1a	POSI	2.82	.53	-.22 **
	NOSI	1.72	.48	
Sample 1b	POSI	2.82	.53	-.24 **
	NOSI_reduced	1.68	.50	
Sample 2	POSI	2.62	.61	-.21 **
	NOSI_reduced	1.79	.59	
Sample 3	POSI	2.96	.58	-.32 **
	NOSI_reduced	1.73	.56	
Sample 4	POSI	2.67	.57	-.24 **
	NOSI_reduced	1.79	.57	
Sample 5	POSI	2.63	.57	-.41 **
	NOSI_reduced	1.77	.55	
Sample 6	POSI	2.85	.53	-.27 **
	NOSI_reduced	1.83	.53	

Note. NOSI_reduced refers to NOSI scale from which items 4 and 5 have been removed.

* p<.05. ** p<.01.

Table 3

Fit indices for calibration and validation models

Samples	Models	χ^2	df	RMSEA	NFI	NNFI	GFI	AGFI	CFI	ECVI
Sample 1a (N=2713)	Minit.	2444.27**	151	.07	.85	.84	.96	.96	.86	.93
	Mfinal	1521.34**	118	.07	.89	.88	.98	.97	.90	.59
	Malt	3054.54**	152	.08	.81	.80	.96	.94	.82	1.15
Sample 1b (N=2714)	Mfinal	1196.23**	118	.06	.90	.90	.98	.97	.91	.47
	Malt	2582.52**	152	.08	.82	.80	.96	.95	.82	.98
Sample 2 (N=1345)	Mfinal	999.43**	118	.07	.89	.89	.97	.96	.91	.80
	Malt	3302.84**	152	.12	.71	.69	.91	.89	.72	2.51
Sample 3 (N=3591)	Mfinal	1592.29**	118	.06	.89	.89	.98	.97	.90	.46
	Malt	2705.56**	152	.07	.84	.82	.97	.96	.84	.78
Sample 4 (N=1998)	Mfinal	1326.37**	118	.07	.88	.87	.97	.96	.89	.70
	Malt	3886.40**	152	.11	.68	.65	.92	.90	.69	1.98
Sample 5 (N=5280)	Mfinal	2620.87**	118	.06	.93	.92	.98	.97	.93	.51
	Malt	4280.69**	152	.07	.89	.89	.97	.96	.90	.83
Sample 6 (N=903)	Mfinal	776.97**	118	.08	.88	.88	.96	.95	.90	.94
	Malt	2530.28**	152	.13	.68	.66	.90	.87	.70	2.89

Note. ** $p < .01$.

Table 4

Psychometric properties of POSI and NOSI scales

		α	Mean inter-items correlations	Item-total correlations (from-to)
Sample 1a	POSI	.84	.39	.45 - .72
	NOSI_reduced	.86	.40	.48 - .70
Sample 1b	POSI	.84	.40	.44 - .74
	NOSI_reduced	.86	.40	.48 - .70
Sample 2	POSI	.83	.38	.40 - .72
	NOSI_reduced	.87	.42	.43 - .73
Sample 3	POSI	.81	.36	.40 - .72
	NOSI_reduced	.85	.39	.48 - .67
Sample 4	POSI	.83	.38	.40 - .71
	NOSI_reduced	.88	.44	.46 - .69
Sample 5	POSI	.85	.41	.36 - .76
	NOSI_reduced	.88	.45	.42 - .77
Sample 6	POSI	.81	.35	.36 - .68
	NOSI_reduced	.87	.41	.40 - .75

Table 5

Means, standard deviations, Cronbach's α's (on diagonal,) and correlations for POSI, NOSI, burnout, engagement, commitment and workaholism scales (sample 7)

	Mean	SD	1	2	3	4	5	6	7	8	9	10
1. Working compulsively	2.04	.66	.84	.13**	.13**	.32**	.05	.45**	.14**	.05	.12**	.10**
2. Working excessively	1.05	11.46		/	-.17**	.02	.18**	.06	.20**	.12**	.11**	-.05
3. Disengagement	2.41	.54			.79	.57**	-.70**	.50**	-.67**	-.56**	-.37**	.01
4. Exhaustion	2.39	.52				.82	-.49**	.73**	-.47**	-.32**	-.19**	.15**
5. Engagement	4.18	1.22					.92	-.42**	.78**	.58**	.40**	-.02
6. NOSI	1.70	.59						.89	-.34**	-.27**	-.17**	.12**
7. POSI	2.63	1.14							.88	.54**	.39**	-.02
8. AC	3.25	1.23								.86	.57**	.17**
9. NC	2.81	.94									.88	.32**
10. CC	3.00											.64

Note. ** p < .01. AC=affective commitment; NC=normative commitment; CC=continuance commitment

Appendix: The Positive and Negative Occupational States Inventory (PNOSI)

1. I’m very active at work (positive occupational state)

2. I feel I can’t cope with everything I have to do at work (negative occupational state).

3. Once I’m at work, I feel more focused (positive occupational state)

4. I feel demoralized by my work (negative occupational state)*.

5. I work in a rush (negative occupational state)*.

6. I have insomnia because of my working life (negative occupational state).

7. My work allows me to excel myself (positive occupational state).

8. My work stresses me (negative occupational state).

9. Work gives me great satisfaction (positive occupational state).

10. I find my work mentally exhausting (negative occupational state).

11. I’m full of energy at work (positive occupational state).

12. I suffer from nausea when I’m at work (negative occupational state).

13. I feel stimulated by my work (positive occupational state).

14. I’m tired at work (negative occupational state).

15. My work is fascinating (positive occupational state).

16. I’m nervous at work (negative occupational state).

17. I get easily irritated at work (negative occupational state).

18. When I’m working I forget my tiredness (positive occupational state).

19. I’m worried by my working life (negative occupational state).

* These items were deleted from the initial scale.