

The Short Inventory on Stress and Well-Being: A psychometric evaluation of the Well-Being Indicators

Tinne Vander Elst
K.U. Leuven, Belgium

Audray Eartmans and Sofie Taeymans
ISW Limits (Innovating Support @ Work), Leuven, Belgium

Hans De Witte
K.U. Leuven, Belgium and North-West University, Vanderbijlpark Campus, South-Africa

Nele De Cuyper
K.U. Leuven, Belgium

The aim of the current study was to evaluate the psychometric characteristics (i.e., the validity and the reliability) of the Short Inventory on Stress and Well-being (S-ISW), in particular the part of the S-ISW that measures well-being. The S-ISW is developed by ISW Limits in both Dutch and French and measures the following well-being indicators: strain, motivation and negative acts at work, which can be considered as possible outcome variables or employees' reactions to the perceived work situation. Four samples ($N_1 = 17,781$; $N_2 = 462$; $N_3 = 264$; $N_4 = 3596$) were used to perform analyses, with longitudinal data available for Sample 2 and 3. The results supported the three-factor structure of the S-ISW (factor validity) and the invariance of this factor structure between the Dutch and the French S-ISW. Furthermore, we established the content similarity of strain and motivation with negative stress and positive stress, respectively, supporting the construct validity of the S-ISW. The predictive validity of the well-being indicators was established using measures of absenteeism and doctor consultations. Finally, the S-ISW was reliable, as the indicators of well-being showed high test-retest reliability and adequate internal consistency. The part of the S-ISW that measures well-being is thus both valid and reliable, and may be a helpful instrument in conducting research to aid organizations in the development of their well-being policy.

Keywords: validity, reliability, well-being, strain, motivation, negative acts at work

Address of correspondence: Tinne Vander Elst, Research Group on Work, Organizational and Personnel Psychology, K.U.Leuven, Tiensestraat 102, BOX 3725, 3000 Leuven, Belgium; tel. +32 16 32 59 55; email: Tinne.VanderElst@psy.kuleuven.be

Introduction

Work has increasingly become mentally and emotionally demanding due to important developments in work life (Schabracq, Winnubst, & Cooper, 2003; Schaufeli, Bakker, & de Jonge, 2003). Examples are the multiple reorganizations in companies, the call for more flexibility, efficiency and innovation, the rise of the service sector and the shift from physical to mental work. Not surprisingly, research has increasingly given attention to these mental and emotional work demands, more specifically to their influence on employees' psychosocial functioning and (mental and physical) health. This has traditionally been the topic of occupational health psychology research (Schabracq, Cooper, Travers, & van Maanen, 2001; Schabracq et al., 2003; Schaufeli et al., 2003; Tetrick & Quick, 2003)

The potential detrimental effects of work on employees' well-being and health have also been recognized by legislation. As an example from Belgium, which forms the context of this study, the Law of August 4th 1996 on employees' well-being at work and the Belgian Royal Decree of May 17th 2007 on the prevention of psychosocial pressure at work, including violence, mobbing and undesirable sexual behaviour at work, compel employers to pursue a preventive policy and to promote employees' well-being. The basic components of such a preventive policy against stress at work are outlined in the collective agreement number 72 of March 30th 1999 on the policy to prevent stress at work in the private sector: The employer is obliged to investigate, evaluate and prevent the potential risk factors of stress. However, this legislation does not specify the way in which psychosocial risk analyses of the work situation should be organized.

For instance, the employer may choose between a qualitative and a quantitative research approach and decide

The Short Inventory on Stress and Well-being (S-ISW) was developed by ISW Limits¹ to assist employers to achieve this goal. The S-ISW taps various aspects associated with stress at work, including strain, motivation and negative acts at work; thus, tapping the whole spectrum from ill-health and poor well-being to optimal health and well-being. Unlike most other instruments that are used in occupational health psychology, it is designed with a view of organizational diagnosis and possibilities for intervention. Key criteria in the development process were efficiency, also in the form of minimal time investment on the part of organization and their employees, and low threshold for participation. While definitively valuable to organizational practice, the validity and the reliability of the S-ISW has yet to be demonstrated; an issue that will be addressed in the current study.

The S-ISW

The S-ISW is developed in Dutch and French; the Belgian most frequently spoken official languages. The translation of the original Dutch questionnaire into French was performed by several bilingual experts in work and health psychology. Back translation was used as a means of quality control. The S-ISW follows the traditional model that stressors and resources influence strain and motivation, which subsequently influence behaviour, as outlined in the Job-Demands Resources Model, for example (Bakker, Demerouti, de Boer, & Schaufeli, 2003; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). The focus in this paper will be on indicators of strain and motivation, and on subsequent behaviours, as outlined below.

The first group, strain, comes in different flavours; namely, cognitive, emotional and physical reactions to the demanding work situation (Le Blanc, de Jonge, & Schaufeli, 2000). Cognitive strain includes feelings of insufficiency (i.e., feelings of not being able to manage the job) as well as forgetfulness and concentration problems. Emotional strain concerns bad moods (i.e., unhappy or depressed mood; see e.g., Karasek, 1979; Warr, 1987, 1994), tension (i.e., nervousness, anxiety or tension; see e.g., Karasek, 1979; Warr, 1987, 1994), irritation (i.e., angry feelings or irritation) and exhaustion (i.e., the experience of being overextended and depleted of one's resources; Maslach, Schaufeli, & Leiter, 2001). Physical strain concerns sleeping problems, fatigue, neck or back aches and headaches, and persistent strain (i.e., the difficulty to relax after work).

The second group concerns issues related to motivation, much in line with the upcoming positive psychology movement (e.g., Maslach et al., 2001; Schaufeli & Bakker, 2001; Seligman & Csikszentmihalyi, 2000). This group covers positive consequences of work, including the worker's experiences of personal accomplishment (see Maslach et al., 2001), and associated feelings of pride in one's job or organization, and lack of

whether or not to involve external partners.

turnover intentions. It may also concern feelings of joy, such as enthusiasm (versus 'distance' as defined by Maslach et al., 2001) and job satisfaction (i.e., being satisfied with one's job; see e.g., Hackman & Oldham, 1975; Karasek, 1979; Warr, 1987, 1994) and job centrality (i.e., internal work motivation; see e.g., Hackman & Oldham, 1975).

The third group concerns negative acts in the form of observing or being a victim of harassment or mobbing, and related behaviour at work that have been defined as undesirable in Belgian law (e.g., sexual harassment and violence). Mobbing occupies a fairly central position in the S-ISW owing to its critical role in the Belgian legislation regarding well-being at work. More specifically, the Royal Decree of May 17th 2007 prescribes employers to take preventive actions against mobbing and regulates the procedures that have to be followed in cases of mobbing.

Validity and reliability of the S-ISW

The main purpose of the present study is to evaluate the psychometric quality (i.e., the validity and reliability) of the three groups of outcomes (i.e., strain, motivation and negative acts at work) included in the S-ISW, and both among Dutch-speaking and French-speaking respondents. To that aim, we did the following.

We checked the validity in four steps. First, we checked the factor structure underlying strain, motivation and negative acts at work. In particular, we investigated whether the model with the three factors fitted the data better than alternative models. Second, we checked the cross-cultural measurement invariance of the three-factor structure across groups of Dutch-speaking and French-speaking respondents. Third, the convergent validity of the S-ISW was checked. More specifically, we inspected whether our measures of strain and motivation were related with the scales positive and negative stress (i.e., eustress and distress, respectively) from the questionnaire SPPN (Stress Professionnel Positif et Négatif; De Keyser, 2001). We argue that strain is positively related to negative stress, and that motivation is positively related to positive stress. Fourth, we checked the predictive validity by relating the three groups of outcomes from the S-ISW to three behavioural, long-term outcomes; namely employees' absence frequency, absence duration and the number of doctor consultations, all measured one year later. While absence frequency is "an indicator of 'voluntary absenteeism' and a function of employees' motivation" (Bakker et al., 2003, p. 342), absence duration and the number of doctor's consultations can be considered as health-related outcomes that are less influenced by employees' motivation at work. Hence, motivation is hypothesized to be negatively associated with absence frequency one year later. Conversely, strain is hypothesized to associate positively with absence duration and the number of doctor consultations one year later. Additionally, we may also make predictions about the long-term consequences of negative acts at work. Mobbing has important consequences, such as absenteeism and being hospitalised (see e.g., Einarsen & Mikkelsen, 2003; Kivimäki, Elovainio, & Vahtera, 2000; Romanov, Appelberg, Honkasalo, & Koskenvuo, 1996). Therefore, we hypothesize that negative acts at work relate positively to employees' absence frequency, absence duration and the number of doctor consultations in the last year. We may

¹ ISW Limits is a spin-off company of the Katholieke Universiteit Leuven (K.U.Leuven) and is specialised in the optimisation of human relations in organizations. On the one hand, ISW Limits identifies the characteristics of the work situation and their impact on employees' well-being, on the other hand it focuses on optimizing well-being in practice through policy supporting interventions.

conclude for predictive validity when the three well-being indicators of the S-ISW explain absenteeism and doctor consultations one year later.

Table 1. *Composition of the samples 1, 2, 3 and 4 according to Socio-Demographic Characteristics*

Socio-demographic characteristics	Sample 1		Sample 2		Sample 3		Sample 4	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Total	17781	100	462	100	264	100	3596	100
Language								
Dutch	12362	70	330	71	180	68	2418	67
French	5419	30	132	29	84	32	1178	33
Gender								
Male	9184	52	200	43	125	47	2839	79
Female	8597	48	262	57	139	53	757	21
Age								
Younger than 25 years old	2180	12	48	10	12	4	318	9
25-34 years old	6659	37	210	46	113	43	832	23
35-44 years old	4553	26	107	23	70	27	1088	30
45-54 years old	3568	20	80	17	54	20	1028	29
Older than 55 years old	821	5	17	4	15	6	330	9
Full-time versus part-time employment								
Full-time	15227	86	407	88	236	89	3370	94
Part-time	2554	14	55	12	28	11	226	6
Contract								
Permanent	14169	80	364	79	217	82	3261	91
Temporary	3612	20	98	21	47	18	335	9
Occupational status								
Blue-collar worker	3521	20	13	3	9	3	}2821	}78
White-collar worker	10030	56	321	69	190	72		
Manager	3774	2	115	25	54	21	775	22
Self-employed worker	456	3	13	3	11	4	0	0

To evaluate the reliability of the S-ISW, we calculated the test-retest reliability. In this respect, we investigated whether the scores on the scales strain, motivation and negative acts at work are stable over a period of time. Second, we examined the internal consistency of the scales for strain, motivation and negative acts at work.

Method

Data collection and respondents

The current study is based on data of four samples. The first sample consisted of 8,263 employees from 11 organizations (46%) and 9,518 readers of the magazine *Vacature*² (54%), totalling 17,781 respondents. The employees of the organizations completed the S-ISW in a study on stress and well-being ordered by their employer. They filled out the questionnaire online or on paper, on a voluntary basis. The readers of *Vacature* took part in a large study about stress and rumination of the Belgian population that was organized by ISW Limits, K.U.Leuven, Université Catholique de Louvain (U.C.Louvain) and *Vacature*. They gained access to the online questionnaire (including the S-ISW) by clicking on a link posted on the website of *Vacature*.

The respondents of the stress and rumination questionnaire from Sample 1 who expressed their interest in the study results ($N = 7,380$) were invited to participate a follow-up study one year later. Eight hundred sixty-nine

employees responded positively, which yielded a response rate of 12%. After eliminating the respondents with missing data and employees who changed jobs in the past year, longitudinal data of 462 employees were available. We refer to this sample as Sample 2.

The respondents of Sample 2 who gave their explicit permission to invite them to another repeated measurement ($N = 609$) received the S-ISW a third time at least 10 days after the previous measurement. Three hundred thirty-two persons filled out the questionnaire (response rate of 55%) and, at the end, 264 respondents completed all critical questions for the current study at time 2 and time 3. We refer to this sample as Sample 3 (with longitudinal data for time 2 and time 3).

The fourth sample, unlike the other, was not part of a longitudinal design. It included 3,596 employees from a production company, who participated in a screening project on stress and well-being in their organization. The questionnaire used in this project included both the S-ISW and the SPPN (Stress Professionnel Positif et Négatif; De Keyser, 2001) and was filled out online or on paper.

Only the subjects without missing values on the crucial measures in the current study were selected for analyses. Table 1 shows the socio-demographic characteristics of the four samples.

Measures

In the current study, we validated the measures for strain, motivation and negative acts at work included in the S-ISW. This validation concerned both the Dutch and the French versions.

Strain was measured with eight items. These referred to cognitive strain (e.g., "I am distracted or find it hard to

² The magazine *Vacature* is a weekly published HR magazine that offers career information and vacancies to readers and internet users, mainly highly educated workers.

concentrate on my work”, “I feel I can no longer cope with my job”), emotional strain (e.g. “I generally feel depressed or unhappy”, “I am nervous, afraid or tense because of my work”, “I feel angry or irritated because of my work”, “I feel burnt out because of my job”), and physical strain (e.g., “I have physical complaints (sleeping problems, fatigue, neck or back pain, headache)”, “I find it hard to relax immediately after work”). Respondents were asked to rate these items on a five-point Likert-type scale, ranging from 1 (*never*) to 5 (*always*).

Motivation was measured with seven items. Topics covered were experiences of personal accomplishment and performance (e.g., “At work, I make a positive contribution to the functioning of the organization”), feelings of pride in one’s job (e.g., “I am proud of my job”) and in one’s organization (e.g., “I am proud of the organization which I work for”), lack of turnover intentions (e.g., “I am thinking about changing jobs in the near future” – reverse coded), and feelings of joy (e.g., enthusiasm: “I work less enthusiastically than in the past”; job satisfaction: “I am generally satisfied with my job”; job centrality: “Even if I were extremely wealthy, I would still do this job”). Items were scored on a seven-point scale (1 = *strongly disagree*; 7 = *strongly agree*).

Negative acts were measured with a set of four items. The items referred to experiences of mobbing in general (“In the office people do harass each other at times (more than innocent teasing)”) and as a victim (“I am harassed during work time occasionally (more than innocent teasing)”). It furthermore included an item about other negative acts (“Sometimes I am a victim of other undesirable behaviour (discrimination, violence and aggression, sexual harassment, insults, etc.)”). Finally, an item about general mutual respect was added (“In my company, people treat each other with respect” – reverse coded). The items were rated on a 5-point scale, ranging from 1 (*never*) to 5 (*always*).

In addition, the respondents of the second sample filled out three questions about absence frequency (“How many times have you been absent due to sickness in the last 12 months?”), absence duration (“How many working days have you been absent due to sickness in the last 12 months?”) and number of doctor consultations (“How many times did you visit a doctor due to sickness in the last 12 months?”). As the responses to these questions were not normally distributed, they were dichotomised (absence frequency: 0 = maximum one time, 1 = more than one time; absence duration: 0 = no longer than two working days, 1 = longer than two working days; doctor consultation frequency: 0 = maximum one time, 1 = more than one time).

The respondents of the fourth sample also filled out the *questionnaire Stress Professionnel Positif et Négatif* (questionnaire SPPN; De Keyser, 2001), which is part of the Working Conditions and Control Questionnaire Package (WOCCQ Package; Hansez, 2001). The questionnaire SPPN tapped two constructs, namely negative stress and positive stress. Negative stress is interpreted as “a worker’s response to the demands of a job for which he/she feels he/she may not have the necessary resources, and which he/she considers he/she has to cope with” (De Keyser & Hansez, 1996, p. 133). The positive component of stress (eustress) is healthy stress and works stimulating, while negative stress (distress) is unhealthy and exhausting.

Negative stress was measured with 11 items (Cronbach’s alpha coefficient = .87). Examples of items

were “I feel I cannot cope with everything I have to do at work” and “My work stresses me”. Positive stress was measured with eight items (De Keyser, 2001; e.g., “I’m very active at work” and “My work is fascinating”; Cronbach’s alpha coefficient = .84). Participants were asked to rate these items on a 4-point Likert-type scale (1 = *Never or rarely*; 4 = *Always or almost always*). A higher score reflected more negative respectively positive stress in the job.

In calculating the predictive validity (Sample 2), several demographic and work related variables were controlled for, namely gender (0 = female; 1 = male), age (1 = younger than 25 years old; 2 = 25-34 years old; 3 = 35-44 years old; 4 = 45-54 years old; 5 = 55 years or older), full-time versus part-time employment (0 = part-time; 1 = full-time) and contract type (0 = temporary; 1 = permanent). Occupational status was recoded into three dummy variables with white-collar workers as the reference group, namely blue-collar worker (0 = white-collar worker, manager, and self-employed worker; 1 = blue-collar worker), manager (0 = blue-collar worker, white-collar worker and self-employed worker; 1 = manager) and self-employed worker (0 = blue-collar worker, white-collar worker and manager; 1 = self-employed worker).

Analyses

To investigate whether the proposed model of the well-being indicators fitted the data well, we performed confirmatory factor-analysis (CFA; maximum likelihood estimation) using AMOS 17.0 (Arbuckle, 2005). Three models were tested and compared: the proposed model with strain, motivation and negative acts at work as the three dimensions, a wording model in which all positively phrased items loaded on one factor and all negatively phrased items on the other factor, and a one-factor model in which all indicators loaded on the same factor. The dimensions strain, motivation and negative acts at work in the three-factor model (i.e., strain, motivation and negative acts at work) were allowed to correlate.

The measurement invariance of the proposed factor structure across the Dutch and the French speaking groups was investigated using multiple group CFA. In particular, we tested whether the factor loadings, the factor variances and the error variances were equivalent across the two groups by testing increasingly restrained models (Steenkamp & Baumgartner, 1998); namely a model with equal factor loadings, a model with equal factor loadings and equal factor variances, and a model in which also the error variances were constrained to be invariant across the Dutch and the French speaking groups. If these models would fit the data equally well as the model with the free parameters, support would be found for more stringent forms of measurement invariance across the Dutch and the French speaking groups (i.e., metric invariance, factor variance invariance and error variance invariance, respectively; Steenkamp & Baumgartner, 1998).

Both the CFA and the multiple group CFA were performed using the maximum-likelihood method. Following the recommendations by Bollen and Long (1993) and Byrne (2001), the fit of the models was evaluated using five indices that were interpreted relative to each other: (1) the chi-square statistic (χ^2), (2) the Comparative Fit Index (*CFI*), (3) the Non-Normed Fit Index (*NNFI*), (4) the Root Mean Square Error of Approximation (*RMSEA*) and (5) the Standardized Root Mean Square Residuals (*SRMR*). *CFI* and *NNFI* values

indicate a good fit when they are larger than or equal to .90 (Bentler, 1990; Hoyle, 1995). Values on the *RMSEA* and the *SRMR* indicate a good fit when they are smaller than or equal to .08 and .10, respectively (Browne & Cudeck, 1993; Byrne, 2001; Hu & Bentler, 1999). As the chi-square statistic is sensitive to sample size, it should not be used as a direct indication for the goodness-of-fit of a model (Kline, 1998; Weston & Gore, 2006). Competing models were compared based on the chi-square-difference test and the fit indices (Steenkamp & Baumgartner, 1998).

The analyses for testing the factor structure and the cross-cultural invariance were repeated for two independent subsamples. These subsamples were randomly drawn from Sample 1 and included 1000 respondents. We selected these subsamples for two reasons. First, we wished to exclude the possibility that the test results would be the outcome of the specific composition of our sample. Second, we wanted to prevent the values of the fit indices to be distorted by the sample size using smaller samples: As fit indices are dependent on the sample size, using a reference group of 17,781 observations would inflate the fit. In addition, CFA was not only repeated for the two subsamples of Sample 1, but also for the Dutch and the French speaking groups within those subsamples.

Furthermore, we tested the convergent validity of the strain and motivation scales using Sample 4. In particular, we calculated the Pearson's correlation coefficients between strain and motivation on the one hand and positive and negative stress (from the SPPN) on the other hand (thus, in a 2*2 correlation matrix). Correlations beneath .30 were considered low, correlations between .30 and .50 were moderate and correlations above .50 indicated high convergent validity (Field, 2005). These calculations were made for total Sample 4 and separately for the Dutch and the French speaking group of Sample 4.

Logistic regression analyses were performed on the dichotomized long-term outcome variables (i.e., absence frequency, absence duration and doctor consultation frequency) to investigate whether the well-being indicators at time 1 were associated with these outcomes at time 2 (using SPSS 15.0; Field, 2005). We adjusted for gender, age, full-time versus part-time employment, permanent versus temporary contract, blue-collar worker, manager and self-employed worker (versus white-collar worker) by including them in the first step of the analysis. In the second step, strain, motivation and negative acts at work were entered. Results are presented in terms of odds ratios and 95% confidence intervals. The analyses were only performed for the total Sample 2, as the size of the Dutch and the French speaking subgroups was too small.

Finally, we evaluated the reliability of the scales strain, motivation and negative acts at work by calculating the Cronbach's alpha coefficients and the test-retest correlations (over a period of at least 10 days). Test-retest correlations were calculated based on Sample 3 and the Dutch and French speaking subgroups. Values above .65 indicated a good stability of the measurements over time (Eggen & Sanders, 1993). We selected an inter-measurement period of at least 10 days, as this was long enough to measure test-retest reliability and short enough to exclude changes in employers' well-being experience. Cronbach's alpha coefficients on the other hand were calculated for Sample 1, the two randomly drawn subsamples of Sample 1 (see above) and the Dutch and French speaking subgroups. Values of .70 for existing scales demonstrated the measurement's reliability (Nunnally & Bernstein, 1994).

A summary of the aims, the tests performed and the samples used in the current study is displayed in Table 2.

Table 2. Summary of the Aims, Tests and Samples

Aim	Test	Sample
Validity		
1. Test underlying factor structure	Confirmatory factor analysis	1, two independent subsamples
2. Test measurement invariance	Multiple group confirmatory factor analysis	1, two independent subsamples
3. Test congruent validity	Pearson's correlation coefficients	4
4. Test predictive validity	Logistic regression analysis	2
Reliability		
5. Test test-retest reliability	Pearson's correlation coefficients	3
6. Test internal consistency	Cronbach's alpha coefficients	1, two independent subsamples

Table 3. Results of the CFA for the Two Randomly Drawn Subsamples of Sample 1: Fit-Indices for Alternative Factor Structure Models of the Well-Being Indicators of the S-ISW

Model	χ^2	<i>df</i>	<i>P</i>	<i>CFI</i>	<i>NNFI</i>	<i>RMSEA</i>	<i>SRMR</i>	Model comparison	ΔX^2
Total subsample 1 (<i>N</i> = 1000)									
1. Three-factor model	894.33	149	<.001	.92	.90	.07	.06	-	-
2. Wording model	2353.61	151	<.001	.75	.72	.12	.10	1 versus 2	1459.28
3. One-factor model	3023.67	152	<.001	.68	.64	.14	.10	1 versus 3	2129.34
Total subsample 2 (<i>N</i> = 1000)									
1. Three-factor model	921.72	149	<.001	.91	.90	.07	.06	-	-
2. Wording model	2413.99	151	<.001	.75	.71	.12	.10	1 versus 2	1492.27
3. One-factor model	3180.57	152	<.001	.66	.62	.14	.10	1 versus 3	2258.85

Note. *S-ISW* = Short Inventory on Stress and Well-being; *CFA* = confirmatory factor analysis; *CFI* = Comparative Fit Index; *NNFI* = Non-Normed Fit Index; *RMSEA* = Root Mean Square Error of Approximation; *SRMR* = Standardized Root Mean Square Residuals.

Results

Factor validity

Table 3 displays the results of the CFA for the two randomly drawn subsamples of Sample 1. The three-factor model yielded a satisfactory fit: The *CFI* and *NNFI* values

were larger or equal to .90 and the *RMSEA* and the *SRMR* values did not exceed the critical values of .08 and .10, respectively. Furthermore, this model fitted the data significantly better than the wording model and the one-factor model, again for all subsamples concerned. This was demonstrated by the values of fit indices and the chi-square

difference test, in which the three-factor model was compared with the wording model and the one-factor model, $\Delta\chi^2(2) = 1459.28, p < .001$ and $\Delta\chi^2(3) = 2129.34, p < .001$, respectively, for subsample 1, and $\Delta\chi^2(2) = 1492.27, p < .001$ and $\Delta\chi^2(3) = 2258.85, p < .001$, respectively, for subsample 2. Similar results were found for both the Dutch and the French speaking groups in the

two randomly drawn subsamples (see Table 4): The values of the *CFI*, the *RMSEA* and the *SRMR* satisfied the criteria, although the *NNFI* values were slightly below of .90. In addition, here too, the three-factor model fitted the data better than any other model. Therefore, a general conclusion is that the three-factor model presented a reasonable fit.

Table 4. Results of the CFA for the Dutch and the French Speaking Groups of the Two Randomly Drawn Subsamples of Sample 1: Fit-Indices for Alternative Factor Structure Models of the Well-Being Indicators of the S-ISW

Model	χ^2	df	P	CFI	NNFI	RMSEA	SRMR	Model comparison	ΔX^2
Dutch speaking group of subsample 1 (N = 698)									
1. Three-factor model	734.43	149	<.001	.91	.89	.08	.07	-	734.43
2. Wording model	1663.98	151	<.001	.76	.73	.12	.10	1 versus 2	1663.98
3. One-factor model	2202.49	152	<.001	.68	.64	.14	.11	1 versus 3	2202.49
Dutch speaking group of subsample 2 (N = 723)									
1. Three-factor model	786.80	149	<.001	.90	.88	.08	.07	-	-
2. Wording model	1745.56	151	<.001	.75	.71	.12	.10	1 versus 2	958.76
3. One-factor model	2310.65	152	<.001	.66	.61	.14	.11	1 versus 3	1523.85
French speaking group of subsample 1 (N = 302)									
1. Three-factor model	413.69	149	<.001	.90	.89	.08	.07	-	-
2. Wording model	926.08	151	<.001	.71	.67	.13	.10	1 versus 2	512.39
3. One-factor model	1037.91	152	<.001	.67	.62	.14	.10	1 versus 3	624.22
French speaking group of subsample 2 (N = 277)									
1. Three-factor model	392.34	149	<.001	.91	.89	.08	.07	-	-
2. Wording model	951.29	151	<.001	.70	.66	.14	.11	1 versus 2	558.95
3. One-factor model	1139.14	152	<.001	.63	.58	.15	.11	1 versus 3	746.80

Note. S-ISW = Short Inventory on Stress and Well-being; CFA = confirmatory factor analysis; CFI = Comparative Fit Index; NNFI = Non-Normed Fit Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residuals.

Table 5. Results of the Multiple Group CFA for the Two Randomly Drawn Subsamples of Sample 1: Test of the Equality of an Increasingly Restrained Model across the Dutch and the French Speaking Groups

Model	χ^2	df	P	CFI	NNFI	RMSEA	SRMR	Model comparison	ΔX^2
Total subsample 1 (N = 1000)									
1. Free parameters	1148.25	298	<.001	.91	.89	.05	.07	-	-
2. Equal factor loadings	1193.05	314	<.001	.90	.89	.05	.07	1 versus 2	44.80
3. Equal factor variances	1270.36	320	<.001	.90	.89	.06	.07	1 versus 3	122.11
4. Equal error variances	1389.26	339	<.001	.88	.88	.06	.07	1 versus 4	241.02
Total subsample 2 (N = 1000)									
1. Free parameters	1179.28	298	<.001	.90	.89	.05	.07	-	-
2. Equal factor loadings	1259.94	314	<.001	.89	.88	.06	.07	1 versus 2	80.66
3. Equal factor variances	1346.89	320	<.001	.88	.88	.06	.07	1 versus 3	167.61
4. Equal error variances	1503.04	339	<.001	.87	.87	.06	.07	1 versus 4	323.76

The standardized solutions of the CFA for the two randomly drawn subsamples showed that all observed variables loaded significantly ($p < .001$) and in the expected direction on their intended latent factor (loadings ranging from .46 to .89 for subsample 1 and from .51 to .90 for subsample 2). Additionally, as expected, motivation was negatively related to strain ($r = -.67, p < .001$ and $r = -.63, p < .001$ for subsample 1 and 2, respectively) and negative acts at work ($r = -.36, p < .001$ and $r = -.42, p < .001$ for subsample 1 and 2, respectively). Strain and negative acts at work were positively associated ($r = .46, p < .001$ and $r = .44, p < .001$ for subsample 1 and 2, respectively).

Cross-cultural invariance

Multiple group CFA, using the two randomly drawn subsamples of Sample 1, were conducted in order to test for the level of measurement invariance across the Dutch and the French speaking groups (i.e., scalar invariance, factor variance invariance or error variance invariance; Steenkamp & Baumgartner, 1998) (see Table 5). The chi-square-difference test indicated that the model with the free parameters fitted the data significantly better than the

model with equivalent factor loadings, the model with equivalent factor variances and the model with equivalent error variances, $\Delta\chi^2(16) = 44.80, p < .001$; $\Delta\chi^2(22) = 122.11, p < .001$ and $\Delta\chi^2(41) = 241.02, p < .001$ for subsample 1; $\Delta\chi^2(16) = 80.66, p < .001$; $\Delta\chi^2(22) = 167.61, p < .001$ and $\Delta\chi^2(41) = 323.76, p < .001$ for subsample 2, respectively. This suggests that the factor loadings, the factor variances and the error variances were not equivalent across the Dutch and the French speaking groups of the subsamples. However, constraining the factor loadings to be invariant across the Dutch and the French speaking groups (equal factor loadings) did not substantially decrease the fit in terms of the fit indices (change between the model with free parameters and the model with equal factor loadings was -.003 and -.007 in the CFI value, +.003 and -.002 in the NNFI value, 0 and -.001 in the RMSEA value, and -.002 and -.004 in the SRMR value for subsamples 1 and 2, respectively). Following the recommendation by Steenkamp and Baumgartner (1998) to not exclusively rely on the chi-square-difference test, we may carefully conclude for metric invariance of the S-ISW across the Dutch and the French speaking groups.

Convergent validity

The fourth sample (i.e., the employees from the production company; $N = 3596$) was used to inspect the convergent validity of the dimensions strain and motivation, by assessing their relationship with the dimensions positive and negative stress from the questionnaire SPPN (in a 2*2 correlation matrix). As expected, high correlations (> 0.50 ; Field, 2005) were found between strain and negative stress ($r = .81, p < .001$), and between motivation and positive stress ($r = .68, p < .001$) (see Table 6). Additionally, the correlations between strain and positive stress and between motivation and negative stress were moderately negative (between 0.30 and 0.50; Field, 2005), -0.37 and -0.46 , respectively. Similar values were found for the Dutch and the French speaking groups (see Table 7).

Table 6. Intercorrelations for Sample 4 between Strain and Motivation (S-ISW) on one hand and Positive Stress and Negative Stress (SPPN) on the other hand ($N = 3596$)

Scale	1	2	3	4
1. Strain	-	-0.56	0.81	-0.37
2. Motivation		-	-0.46	0.68
3. Negative stress			-	-0.23
4. Positive stress				-

Note. All correlations were significant at $p < 0.001$, two-tailed.

Table 7. Intercorrelations for the Dutch ($n = 2418$) and the French Speaking Group ($n = 1178$) of Sample 4 between Strain and Motivation (S-ISW) on one hand and Positive Stress and Negative Stress (SPPN) on the other hand

Scale	1	2	3	4
1. Strain	-	-0.57	0.79	-0.40
2. Motivation	-0.52	-	-0.44	0.66
3. Negative stress	0.86	-0.50	-	-0.21
4. Positive stress	-0.30	0.72	-0.25	-

Note. The results for the Dutch speaking group are presented above the diagonal. The results for the French speaking group

Table 8. Strain, Motivation, Negative Acts at Work, Absence Frequency, Absence Duration and Doctor Consultation Frequency: Descriptive Statistics and Correlations for Sample 2 ($N = 462$)

Scale	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. Strain ^a	3.31	1.05	-					
2. Motivation ^b	4.65	1.23	-.47	-				
3. Negative acts at work ^a	1.55	0.68	.43	-.43	-			
4. Absence frequency ^c	na	na	.17	-.20	.07	-		
5. Absence duration ^c	na	na	.15	-.16	.17	.60	-	
6. Doctor consultation frequency ^c	na	na	.25	-.16	.18	.43	.44	-

Note. na = not applicable. ^aScale from 1 to 5. ^bScale from 1 to 7. ^cScale from 0 to 1.

All correlations were significant at $p < 0.01$, two-tailed, except for the correlation between negative acts at work and absence frequency.

Table 9. Summary of Hierarchical Logistic Regression Analyses for Sample 2 with Strain, Motivation and Negative Acts at Work at Time 1 Predicting Absence Frequency, Absence Duration and Doctor Consultation Frequency at Time 2 ($N = 462$)

	Absence frequency		Absence duration		Doctor consultation frequency	
	OR (95% CI)	<i>p</i>	OR (95% CI)	<i>p</i>	OR (95% CI)	<i>p</i>
Strain	1.21 (0.96-1.52)	.11	1.07 (0.86-1.33)	.54	1.42 (1.13-1.76)	<.01
Motivation	0.74 (0.61-0.90)	<.01	0.88 (0.73-1.05)	.16	0.92 (0.76-1.11)	.37
Negative acts at work	0.93 (0.66-1.32)	.70	1.54 (1.09-2.18)	.02	1.32 (0.92-1.90)	.26

Note. All effects are adjusted for gender, age, full-time versus part-time employment, temporary versus permanent contract, blue-collar versus white-collar worker, manager versus white-collar worker and self-employed versus white-collar worker. OR = odds ratio; CI = confidence interval.

Test-retest reliability

By means of the longitudinal data of the third sample (i.e., the respondents of the study on stress and rumination who participated in the second and the third survey; $N = 264$), we examined the extent to which the measures of strain, motivation and negative acts at work were stable over time or, stated differently, could be repeated. The

are presented beneath the diagonal. All correlations were significant at $p < 0.001$, two-tailed.

Predictive validity

The predictive validity of the well-being indicators was examined using the longitudinal data of the second sample (i.e., the respondents of the study on stress and rumination who participated the first and the second survey; $N = 462$). We tested whether strain, motivation and negative acts at work at time 1 predicted absence frequency, absence duration and doctor consultation frequency at time 2, after controlling for several important background variables. Table 8 displays the means, the standard deviations and the intercorrelations for all scales that were used in examining the predictive validity. In line with our expectations, the results of the logistic regression analyses showed that employees' motivation at time 1 was negatively associated with absence frequency at time 2 ($p = .002$) (Table 9). More motivated workers were less likely to stay at home because of illness than less motivated workers. Strain and negative acts at work were not significantly related to absence frequency. Additionally, negative acts at work at time 1 were positively associated with absence duration at time 2 ($p = .015$). Workers who experienced more negative acts at work were more likely to stay longer at home due to illness than workers who experienced fewer negative acts. Strain and motivation were not significantly related to absence duration, which was inconsistent with our hypotheses. Finally, strain at time 1 was positively associated with doctor consultation frequency at time 2 ($p = .002$). Workers who experienced more strain were more likely to visit their doctor than workers who expressed less strain. The well-being indicators are thus associated with long-term outcome variables following a specific pattern, underlying the predictive validity of the S-ISW.

respectively) and the French speaking group ($r = .89, p < .001$; $r = .86, p < .001$; and $r = .88, p < .001$ for strain, motivation and negative acts at work, respectively). Both the Dutch and the French measurements can therefore be considered as stable over time, suggesting a good test-retest reliability of the three well-being indicators.

Internal consistency

Using the data of Sample 1 ($N = 17781$), the internal consistency of the three scales of the indicators of well-being was examined by calculating Cronbach's alpha coefficients for the whole sample, the two randomly drawn subsamples, and the Dutch and the French speaking

groups. The Cronbach's alpha coefficients were satisfactory (see Table 10): They were clearly higher than .70, which is traditionally considered a good cut-off value for existing scales (Nunnally & Bernstein, 1994). Considering the whole sample, Cronbach's alpha coefficient was .87 for strain, .85 for motivation, and .81 for negative acts at work. Besides, similar Cronbach's alpha coefficients were found for the two randomly drawn subsamples, as well as for the Dutch and the French speaking groups. As the Cronbach's alpha coefficients offer an indication of the lower bound of reliability (Maris, 2003), the results suggest that the scales of the S-ISW were internally consistent.

Table 10. *Strain, Motivation and Negative Acts at Work: Cronbach's Alpha Coefficients for Sample 1, its Two Randomly Drawn Subsamples and the Dutch and French Speaking Groups*

Scales	Total sample ($N = 17781$)	Dutch speaking group ($n = 12310$)	French speaking group ($n = 5423$)
Strain	0.87	0.87	0.88
Motivation	0.85	0.86	0.82
Negative acts at work	0.81	0.79	0.84
	Total subsample 1 ($N = 1000$)	Dutch speaking group of subsample 1 ($n = 698$)	French speaking group of subsample 1 ($n = 302$)
Strain	.88	.88	.87
Motivation	.85	.86	.81
Negative acts at work	.82	.78	.86
	Total subsample 2 ($N = 1000$)	Dutch speaking group of subsample 2 ($n = 723$)	French speaking group of subsample 2 ($n = 277$)
Strain	.88	.87	.88
Motivation	.85	.85	.85
Negative acts at work	.83	.81	.86

Discussion

The main goal of the current study was to validate the measures strain, motivation and negative acts at work of the S-ISW. Analyses were conducted for both the Dutch and the French version of the S-ISW.

In order to evaluate the validity of the S-ISW, we first examined the factor structure using CFA, in which three models were tested and compared (i.e., the three-factor model, the wording model and the one-factor model). The results showed that the three-factor model, with strain, motivation and negative acts at work as the dimensions, fitted the data in a satisfactory manner and better than the other models for the two randomly drawn subsamples, the Dutch and the French speaking groups. Hence, these results led us to conclude that the three-factor structure fitted the data best. Note also that the results were no artefact of the item formulation (i.e., negatively versus positively phrased items), as the wording model was clearly inferior to the hypothesized three-factor model.

Second, the validity of the S-ISW was also examined by testing the measurement invariance of the three-factor structure model across two groups, namely the Dutch speaking and the French speaking respondents, using multiple group CFA. The results demonstrated the consistency of the factor structure of the S-ISW across the Dutch and the French speaking groups, as the model with the free parameters provided a good fit to the data. No evidence was found for the two most restrained forms of measurement invariance, that is factor variance invariance and error variance invariance (Steenkamp & Baumgartner, 1998). However, we did find some evidence supporting the metric invariance of the S-ISW across the Dutch and the French speaking groups. This implies that differences

across the Dutch and the French speaking groups on the observed items are indicative of similar differences in the underlying constructs (Steenkamp & Baumgartner, 1998). Hence, meaningful comparisons of the item scores across Dutch and French speaking groups can be made.

Third, the validity of the S-ISW was further tested by investigating the convergent validity of the dimensions strain and motivation. In particular, we calculated the correlation coefficients between strain and motivation on the one hand and two constructs of the SPPN, namely negative and positive stress (De Keyser & Hansez, 1996), on the other hand. Similar results were found for total Sample 4, as well as for the Dutch and the French speaking group separately: Strain and negative stress showed a high degree of content similarity, as did motivation and positive stress. Additionally, strain was negatively related to positive stress, while motivation was negatively related to negative stress. These results allowed us to conclude for the convergent validity of the dimensions strain and motivation.

Fourth, the predictive validity of the S-ISW was investigated by looking at the associations between strain, motivation and negative acts at work, and absence frequency, absence duration and number of doctor consultations one year later, using logistic regression analyses. The results were clear-cut: Strain was positively associated with the number of doctor consultations. Motivation was negatively related to absence frequency due to illness and negative acts at work were positively associated with absence duration. These results align with the literature on stress and mobbing. Based on the JD-R model (Demerouti et al., 2001), long-term consequences of strain and motivation may be expected. While strain is expected to be related to health-related outcomes, such as

the number of doctor consultations, motivation is predicted to be associated with rather voluntary behavioural outcomes, such as absence frequency (see Bakker et al., 2003). Furthermore, the literature on negative acts at work describes consequences for both workers' health and motivation related variables (see e.g., Einarsen & Mikkelsen, 2003; Kivimäki et al., 2000; Romanov et al., 1996). However, contrary to our expectations, we found no significant relationships between strain and absence duration and between negative acts at work on the one hand and absence frequency and doctor visitation frequency on the other hand.

Besides the validity of the S-ISW, we also aimed at testing its reliability. Therefore, we first investigated the test-retest reliability of the S-ISW. The results showed that the scores on strain, motivation and negative acts at work were very stable over a period of at least 10 days. Measurements with the S-ISW can thus be repeated over a relatively short period of time. Second, we examined the internal consistency of the S-ISW scales, calculating Cronbach's alpha coefficients. The coefficients for strain, motivation and negative acts at work indicated adequate reliability.

In summary, our findings supported both the validity and the reliability of the S-ISW: (1) the three-factor model, with the dimensions strain, motivation and negative acts at work, was supported by our data, (2) the factor structure and the factor loadings were invariant across the Dutch and the French speaking groups, (3) strain and negative stress, as well as motivation and positive stress showed a high degree of content similarity (congruent validity), (4) strain, motivation and negative acts at work explained variance in absence frequency, absence duration and number of doctor consultations one year later (predictive validity), (5) strain, motivation and negative acts at work were stable in time (test-retest reliability) and, (6) the three dimensions of the well-being indicators showed adequate internal consistency.

Limitations of the study

Possible limitations of the current study should be mentioned. A first limitation of the current study is the absence of randomly drawn samples. The organizations in our study and the respondents of the stress and rumination survey were not randomly selected. Consequently, the

generalizability of the results could be questioned. However, our samples were fairly heterogeneous, including a wide range of organizations and sectors.

Second, all measurements were based on self-reports, which opens the possibility that common method bias may have influenced the results (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). For example, the relationships between the measurements may be inflated. However, we tested a one-factor model using CFA to address this issue, which could not account for the variance in the data.

A third limitation concerns the research design that was used to investigate the predictive validity of the S-ISW. We investigated whether our measures predicted behavioural outcomes one year later, but we did not control for the baseline values of these outcomes. Nevertheless, this type of research design offers a more conservative test than a cross-sectional design.

A fourth limitation concerns the period between the two measurements, which were used to investigate the test-retest reliability. This period was at least 10 days, but was not the same for all respondents. The maximum possible time period between the two measurements was 45 days. While a fixed period could offer a stronger test for test-retest reliability, this would require great effort to accomplish in practice (e.g., participants still have a time frame in which they can choose a moment to participate). Nevertheless, good support was found for the test-retest reliability.

Finally, we did not investigate the divergent validity of our measures for strain, motivation and negative acts at work. The reason is that we did not measure variables that are predicted to be unrelated to the research variables.

Practical implications

Based on the current study, we may conclude that the S-ISW, and more specifically the part that measures strain, motivation and negative acts at work, is a valid and reliable instrument. Additionally, this questionnaire contains only 19 items to measure occupational well-being and is therefore a short and practical instrument. The S-ISW can therefore be considered as a solid tool for conducting research to aid organizations in the development of a well-being policy or prevention plan, in order to meet statutory regulations.

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