

Does an entrepreneur run the risk of developing stress due to unsuitability as an entrepreneur? Validation of an entrepreneurship scale

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Abstract.

BACKGROUND: Self-employed workers have largely been missing from research in work and occupational health. There are hardly any questionnaires that measure the specific problems and stressors of the self-employed. Recently the Work and Well-Being Inventory (WBI) (in Dutch: VAR-2) was normal and validated for the self-employed. However, a scale that measures the suitability as an entrepreneur was still lacking.

OBJECTIVE: This study aimed to assess the psychometric properties of a new developed WBI-scale for self-employed workers (entrepreneurs) to assess the suitability as an entrepreneur.

METHODS: The new developed entrepreneurship scale consisted of 15 items divided among 4 subscales: entrepreneurial attitude (4 items), management skills (3 items), entrepreneurial resilience (5 items), and financial health (3 items). We conducted a cross-sectional study, including 676 self-employed workers (business owners, liberal professions, and medical practitioners). Data was used to calculate the test-retest reliability, construct validity, concurrent validity, and incremental validity. Concurrent validity was calculated against external measures of stress and job demands.

RESULTS: Business owners obtained the highest mean score on the entrepreneurship scale, followed by liberal professions and medical practitioners. Cronbach's alpha was good for the full scale and sufficient for two subscales. Confirmatory factor analyses showed an excellent fit of the bi-factor model. We found a negative correlation between the entrepreneurship scale and the external measures of stress and job demands.

CONCLUSIONS: The new developed entrepreneurship scale provides a good reliable and valid instrument to assess psychosocial risks factors in self-employed workers. The scale can help medical advisors to assess psychosocial risk factors that make self-employed workers at risk of work disability or sickness absence. More research is needed to investigate the predictive validity of the scale.

Keywords: Reliability, validity, entrepreneur, self-employed, stress, job demands

1. Introduction

In about half of the current European Union Member States, the proportion of self-employed workers in the working-age population has increased

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over the last decade [1]. In the European Union almost 33 million people (15 percent) of workers are entrepreneurs [1]. The rise of self-employed workers may be at least partially attributable to the increase in outsourcing and freelance work in the last decade. Although some individuals become self-employed out of necessity (e.g., job loss), others come to self-employment for other reasons (e.g., opportunity; dislike the idea of having a boss) [2]. Research on self-employed workers in Finland suggests that, compared with 'opportunity entrepreneurs', 'necessity entrepreneurs' are less satisfied with self-employment [3], which can be associated with increased stress. The definition of self-employment and entrepreneurship overlap. Both terms generally refer to generating an income without being an employee. Entrepreneurs can be regarded as a 'subgroup' of self-employed workers who create or maintain their own business.

Although systematic research is scarce, some studies examined differences between self-employed workers and employees, such as job satisfaction, autonomy and mental health in self-employment [4, 5]. However, some self-employed workers experience also greater pressure associated with owning a small business [6]. Uncertainty about income is a common background stressor in the self-employed. Other specific stressors reported are: slow-downs in business, reputational threat, betrayal, unreasonable customers, and serious illness (because of its impact on business and the lack of backup) [2].

Self-employed workers have largely been missing from research in occupational health [7]. Screening tools to assess psychosocial risk factors are predominantly developed and normed for employees. In a recent study, the Work and Well-Being Inventory (WBI) (in Dutch: VAR-2), a broad screening tool to assess psychosocial risks factors in employees, was adapted and evaluated for self-employed workers [5]. However, though the norms are now suitable for self-employed workers, specific stressors related to self-employment are still missing.

In the Netherlands, self-employed workers can rely on occupational disability insurance if they have a medical condition that limits their work ability. Medical advisors will then evaluate the disability claim of these workers. Unsystematic observations by these medical advisors have revealed that 'not being a real entrepreneur' can be an important risk factor for job strain in self-employed workers which can even cause work disability. This subset of self-employed workers has a higher risk of developing stress symptoms

because they do not have the skills needed to run a business (i.e., having difficulty in coping with the responsibilities of self-employment, do not have the discipline to keep proper accounts, etc.).

Following these non-systematic observations by the medical advisors, a qualitative explorative study was carried out to identify the specific stressors and risk factors are that can make the self-employed incapable of working [8]. Self-employed workers varying in type of business and demographic background (i.e., entrepreneurs working in small business, liberal professionals, blue color workers working for themselves, etc.) were interviewed in this study. This resulted in 12 themes relating to stressors that self-employed workers face and the necessary skills to deal with. According to these self-employed workers financial uncertainty, conflict of interest, large responsibility, high number of working hours, managing tasks, and administrative burden were the major themes they faced. Relevant personality traits for successful entrepreneurship were: resistance to stress, being all-round, flexible, a good communicator, good leadership, and the ability to set limits [8].

If we compare the results of our qualitative study [8] with the results of qualitative study of Schonfeld [2] we see both similarities and differences. Financial uncertainty appeared to be one of the most important stressors of the self-employed in both studies. Schonfeld also found that external threats such as reputational threat, betrayal and unreasonable customers were stressful. Dutch interviewed self-employed people [8] indicated that they suffer most from the pressure of running their own business, such as bearing a great responsibility, high number of working hours and managing tasks. Schonfeld [2] identified some specific coping strategies self-employed workers employed to lower the impact of the stressors such as seeking alternative ways to improve their earnings and changing business practices. Our interviews also showed that responding flexibly to change is an important way of managing stressors [8].

Frese and Gielnik [9] have described a psychological model of entrepreneurship; the action-characteristics model of entrepreneurship. This model describes the personality, motivational/affective antecedents and action characteristics that contribute to entrepreneurial success. Although this model does not elaborate on the stressors of the self-employed, it does underline the importance of a 'readiness for action' attitude entrepreneurs must possess in order to achieve success. Personality characteristics described by this model include: risk propensity,

innovativeness, stress tolerance and achievement motivation. This was also acknowledged by our interviewed self-employed workers. To date, one may assume that entrepreneurs lacking these characteristics are at risk to develop stress.

The results of the qualitative study [8] we carried out served as input for the construction of a scale of entrepreneurship that we wanted to add to the WBI version for the self-employed. The aim of this study was (1) the construction of a simple scale that quickly provides insight into whether the entrepreneur is at risk of developing stress or other psychological complaints because the self-employed person lacks the necessary characteristics that a self-employed person must possess; (2) to investigate the psychometric properties (reliability and construct, concurrent, and incremental validity) of this new developed scale.

2. Materials and methods

2.1. Design

The study uses a cross sectional design. The entrepreneurship scale and the external measures were administered online in October 2017. The entrepreneurship scale was administered twice with a two-week time interval to determine the test-retest reliability. During the first test administration the participants were asked if they were willing to complete the test again.

2.2. Participants

The participants were derived from two private disability insurance companies. The participants approached are a random sample and a representation of the two populations: the vast majority are healthy and working and a small proportion will be incapacitated. The two private disability insurance companies (A and B) differ to some degree in the type of customers. Insurance company A focuses mainly on white collar workers, whereas insurance company B focuses mainly on blue color workers and owners of small businesses. Together they provide a reasonable reflection of the population of self-employed persons in the Netherlands. 8.000 people of insurance company A and 2.370 people of insurance company B were invited to participate in the survey in the fall of 2017. The participants were informed by the objective of the study and invited to fill questionnaires by e-mail if they agreed to participate. Participation in the study was voluntary and anonymous. Based

on previous surveys, we expected a response rate of about 5% – 10%. Informed consent was obtained from all individual participants included in the study. The study was approved by the Medical Ethical Committee of the VU University Medical Center (No: 2016.437). The filled in questionnaires were only accessible to the researchers (L.V. and F.S), and not to the professionals of insurance companies A and B. The non-responders did not receive a reminder to fill in the questionnaire. The sample was divided into three groups: business owners (B); owners of small and medium sized businesses and blue color workers working for themselves); liberal professions (L); and medical practitioners (M).

2.3. Measures

Construction of the entrepreneurship scale. In an earlier study the existing scales of the Work and Well-being Inventory (WBI) (in Dutch: VAR-2) were adapted and norms were established for self-employed workers [5]. The conducted qualitative study provided the insight that an extra scale should be added to the WBI-version for self-employed workers [8] to measure the specific issues of this group. The answering categories for the items of the entrepreneurship scale are the same as the other WBI-items. The respondent was asked to judge each item to which extent he or she agrees with it. The response categories are: ‘not’, ‘somewhat’, ‘mostly’ and ‘fully.’

In a pilot study prior to the current study, the 12 themes resulting from the qualitative study were converted into 33 items and further examined. The following steps were taken. First, correlations were calculated between all items and between the items and the total score of the scale. Items with a correlation < 0.30 with the total score of the scale were removed. Items that correlated too strongly with each other (> 0.80) were also removed to prevent item redundancy. The result was a final set of 15 items. With an exploratory factor analysis, the heterogeneity of the scale was investigated. The exploratory factor analysis showed that the scale is heterogeneous in terms of content and can be further divided into 4 subscales: Entrepreneurial attitude (4 items), Management skills (3 items), Entrepreneurial resilience (5 items), and Financial health (3 items). Thus, the Entrepreneurship full scale is a composition of the four subscales and is based on a model in which entrepreneurship is a distinguishable attribute composed of different traits [9]. The items are shown

in the Appendix. In contrast to the other three subscales, the items of the 'Entrepreneurial resilience scale' are negatively stated (see Appendix). Therefore, we scored these items in the opposite direction so that all of the four scales are in the same (positive) direction. Lower scores on the Entrepreneurship (full) scale indicate a reduced suitability for entrepreneurship, and higher scores indicate more resilience to the challenges of being self-employed.

External measures. The following measures were used to test the predictive validity of the entrepreneurship scale.

Depression Anxiety Stress Scale (DASS). The stress scale of the 21-item version of the Dutch adaptation of the DASS was used [10]. Participants rated the extent to which they had experienced each symptom over the previous week on a four-point Likert scale ranging from 0 (did not apply to me at all) to 3 (applied to me very much, or most of the time). The psychometric properties of the DASS has been shown to be suitable for use in an occupational health care setting [11].

Job Content Questionnaire (JCQ). The Dutch version of the JCQ was used for the measurement of job strain [12]. The JCQ has been developed to test the job-demand-control-support (JDC-S) model and has dominated research on occupational stress in employees [13]. The psychological demands scale was used in this study as an external measure for job strain. The JCQ has not been validated for the self-employed.

Entrepreneurial Job Demands Scale (EJDS) [14]. The EDJS was used to examine job strain of entrepreneurs. The EJDS captures three dimensions of entrepreneurial job demands: 'time' (5 items; $\alpha = 0.86$), 'uncertainty & risk' (6 items; $\alpha = 0.76$), and 'responsibility' (3 items; $\alpha = 0.67$).

Work and Well-Being Inventory (WBI) [5]. The WBI is a multidimensional screening tool that is used within occupational health care and rehabilitation and has 82 items distributed among 13 scales. The WBI has been validated for healthy employees, sick-listed employees and rehab patients, and recently also for self-employed workers [5, 15]. The job strain, control and stress scales of the WBI were used to test the incremental validity of the new added entrepreneurship scale (see statistical analysis). Alpha of job strain (8 items) and stress (6 items) are 0.84 and alpha of control (5 items) is 0.89 for the self-employed [5]. The WBI stress scale correlates 0.71 with the Depression Anxiety Stress Scale (DASS) in self-employed workers, and correlates 0.71 with the 4-Dimensional Symptom Questionnaire (4DSQ) distress scale in

employees [5, 14]. The WBI-job strain scale correlates 0,62 with JCQ Psychological demands in self-employed workers and 0,71 in employees [5, 14]. The WBI control scale correlates 0.74 with JCQ decision latitude in the self-employed [5].

The WBI was filled in by all participants of this study. The DASS, JCQ and EDJS was filled in by subsamples of respectively 115, 90 and 118 participants.

2.4. Statistical analysis

The internal consistency of the entrepreneurship scale (15 items) and its four subscales were examined by means of Cronbach's alpha. Values of 0.70 – 0.90 were considered acceptable [16].

The test-retest reliability was tested by calculating the Intraclass Correlation Coefficients (ICC) in a subsample of 150 persons of the sample of insurance company A. The time between the first and second test administration was 14 days. For the calculation of ICC a two-way mixed model with absolute agreement was used. ICC of 0.40 – 0.75 were considered fair, while $ICC > 0.75$ were considered excellent [15].

In addition, it was tested whether the full scale and subscales follow a normal distribution by performing a One-Sample Kolmogorov–Smirnov test. We assumed a normal distribution. Possible floor and ceiling effects were also identified. Floor or ceiling effects are considered to be present if $> 15\%$ of the participants achieve the lowest or highest possible score respectively [16].

The construct validity was first examined by means of performing a confirmative factor analysis (CFA). CFA was conducted to test a 1– to 4-factor model and a bi-factor model for the 15 items. The comparative fit index (CFI), Tucker-Lewis Index (TLI) and Root Mean Square Error of Approximation (RMSEA) were used to evaluate the fit of the model. $CFI > 0.95$, $TLI > 0.95$ and $RMSEA < 0.06$ are recommended as good models [17].

The construct validity was also investigated by comparing groups of self-employed people who differ in the extent to which we can regard them as 'real' entrepreneurs. Three groups were compared: business owners (B); liberal professions (L); and medical practitioners (M). We assumed the mean score of $B > L > M$ and tested this hypothesis by performing ANOVA's for the entrepreneurship full scale and the four subscales.

The concurrent validity was examined by relating the entrepreneurship scale to two outcome measures:

job strain (JCQ and EDJS) and stress (DASS). Self-employed workers lacking entrepreneurship were assumed to be prone to increased levels of job strain and stress. Thus, negative correlations (Pearson r) were hypothesized between the entrepreneurship full scale and subscales and job strain (WBI and EJDS) and stress (DASS).

Finally, the incremental validity of the Entrepreneurship (full) scale was examined. The entrepreneurship scale has incremental validity if this scale predicts the level of stress of the self-employed over and above the amount of variance shared between the WBI-measures of job strain, control and stress. Job strain and control are the most important and most studied psychosocial risk factors for increased stress in employees. Job demands and control were included in the regression analysis both as independent terms as well as an interaction term (job demands \times control) since the job demands control model predicts that, in particular, the combination of high work pressure and low control is associated with stress [18]. The incremental validity was examined by means of hierarchical multiple regression analysis. ΔR^2 was calculated for each independent variable that was consecutively added to the regression analysis with stress (WBI) as the dependent variable. Two regression analyses were performed. In the first hierarchical multiple regression analysis entrepreneurship was entered as the last variable, and in the second analysis entrepreneurship was entered as the first variable. By this procedure it is possible to reveal the incremental value of entrepreneurship to the traditional predictors of job strain and control in the prediction of stress and vice versa.

3. Results

3.1. Final sample

The response rate was 6,5% resulting in a final sample of 676 participants. A subsample of 150

Table 1
Sample characteristics

Mean age in years (SD)	46.8 (9.3)
Female sex% (N)	43.0 (291)
Medically disabled (off work) % (N)	5.0 (34)
Type of self-employment	
Business owners% (N)	15.7 (106)
Liberal professions% (N)	40.4 (273)
Medical practitioners% (N)	43.9 (297)
Total	676

subjects filled in the questionnaire twice with a mean interval of 14 days (range: 10–29 days). The sample characteristics are shown in Table 1. The number of business owners ($N = 106$) was lower compared to liberal professions ($N = 273$), and to medical practitioners ($N = 297$). This was partly due to a slightly lower response rate of business owners, but mostly due to the lower prevalence of business owners in the largest sample (insurance company A; $N = 8.000$) compared to the other sample (insurance company B; $N = 2.370$). The three samples of self-employed workers were equal in terms of age, but not with regard to sex: men were clearly more prevalent among business owners ($X^2 = 34.1$; $p < 0.001$).

3.2. Reliability

Cronbach's alpha was good for the full scale and sufficient for two subscales, but poor for two subscales (Table 3). The stability of all scales was excellent (all ICC's > 0.75). The full scale appears to follow a normal distribution ($KS-Z = 1.32$; $p > 0.05$) with no floor or ceiling effects (both $< 15\%$). The financial health subscale has a clear ceiling effect ($> 15\%$ of participants obtain the maximum score (Table 2).

3.3. Construct validity

Confirmative factor analysis. The results of the confirmative factor analysis are shown in Table 3. A bi-factor model shows an excellent fit with the data.

Table 2
Reliability parameters of the entrepreneurship scale

	Number of items	Cronbach's alpha	Test-retest reliability (ICC) ^a	95% CI	KS-Z	% at floor	% at ceiling
Entrepreneurship (full scale)	15	0.84	0.95	0.93–0.96	1.32	0.0	0.4
Subscales							
Entrepreneurial attitude	4	0.76	0.91	0.88–0.94	2.20	1.0	1.2
Management skills	3	0.60	0.88	0.84–0.92	2.85	0.6	9.5
Entrepreneurial resilience	5	0.68	0.92	0.89–0.94	3.36	0.1	6.8
Financial health	3	0.87	0.90	0.86–0.93	4.85	0.7	34.0

ICC Intraclass Correlation Coefficient; KS-Z Kolmogorov–Smirnov Z ^aSubsample ($N = 150$) of total population ($N = 676$).

Table 3
Results of confirmative factor analysis (CFA)

Model	CFI ^a	TLI ^a	RMSEA ^a
1-Factor model	0.60	0.53	0.14
2-Factor model	0.84	0.81	0.09
3-Factor model	0.84	0.81	0.09
4-Factor model	0.92	0.90	0.07
Bi-factor model	0.99	0.98	0.05

CFI comparative fit index; TLI Tucker-Lewis index; RMSEA root mean square error of approximation ^aCFI>0.95, TLI>0.95 and RSMEA < 0.06 are recommended as good models [17].

The low CFI (0.60) for the one-factor model implies that the Entrepreneurship scale is rather multidimensional instead of one-dimensional. The bi-factor model shows an excellent fit with the data (Table 3). The bi-factor model represents a general construct

comprised of 4 interrelated domains, thus supporting the structure of one full scale and 4 subscales. The bi-factor model is shown in Fig. 1. The item with the highest loading (0.74) on the full scale was “I feel like a real entrepreneur” thus adding extra support for both the construct validity and content validity of the Entrepreneurship scale (Fig. 1). The correlations between the subscales are shown in Table 4. All correlations are significant at $p < .001$. The range of the correlations (0.25–0.52) indicates that the subscales tap both some unique and some shared variance which is in line with the bi-factor model.

Validation with group differences. Business owners (B; N=106) obtained the highest mean score on the Entrepreneurship scale (M=54.1; SD=6.5) followed by liberal professions (L; N=273)

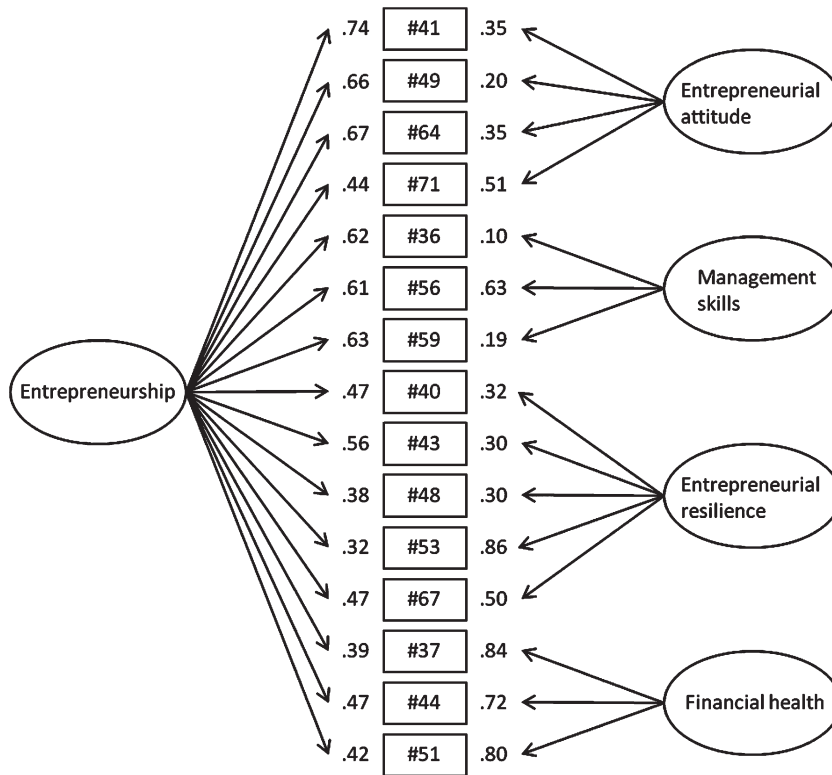


Fig. 1. Bi-factor model of the Entrepreneurship scale.

Table 4
Correlations* (Pearson r) between the subscales

	Entrepreneurial attitude	Management skills	Entrepreneurial resilience	Financial health
Entrepreneurial attitude		0.52	0.40	0.25
Management skills			0.45	0.41
Entrepreneurial resilience				0.29
Financial health				

*All correlations are significant at $p < 0.001$.

Table 5
Mean scale score of business owners, liberal professions and medical practitioners on the entrepreneurship full scale and subscales

	Business owners (N = 106)		Liberal Professions (N = 273)		Medical practitioners (N = 284)		F
	Mean	SD	Mean	SD	Mean	SD	
Entrepreneurship (full scale)	54.1	6.5	52.8	7.5	49.3	6.9	25.2**
<i>Subscales</i>							
Entrepreneurial attitude	11.0	2.3	10.6	2.4	8.7	2.5	57.2**
Management skills	9.2	1.8	9.1	1.9	8.6	1.8	6.2*
Entrepreneurial resilience	17.1	2.5	16.5	2.5	15.3	2.7	28.9**
Financial health	9.9	2.0	9.9	2.2	10.0	1.8	0.8

* $p < 0.01$; ** $p < 0.001$.

($M = 52.8$; $SD = 7.5$). Medical practitioners (M ; $N = 284$) obtained the lowest mean score ($M = 49.3$; $SD = 6.9$). An ANOVA showed the mean differences between groups to be statistically significant ($F = 25.2$; $p < 0.001$) and thus conforming the hypothesis of $M(B) > M(L) > M(M)$, see Table 5.

3.4. Concurrent validity

Correlations (Pearson r) between the Entrepreneurship scale and the external measures of stress

(DASS) and job demands (JCQ and EDJS) are shown in Table 6. A substantial negative relationship appeared between Entrepreneurship (full scale) and the outcome measures which support the hypothesis that self-employed workers possessing less entrepreneurial capabilities experience more stress and work pressure. Of the four subscales, Entrepreneurial resilience had the highest correlation with all outcome measures. Thus, a low level of entrepreneurial resilience is strongly associated with higher levels of stress and work pressure. No

Table 6
Correlations (Pearson r) between the entrepreneurship scale and external measures of stress and job demands

	Stress (DASS)	Psychological demands (JCQ)	Entrepreneurial job demands scale (EJDS)		
			Time	Uncertainty & risk	Responsibility
Entrepreneurship (full scale)	-0.46**	-0.33**	-0.33**	-0.67**	0.05
<i>Subscales</i>					
Entrepreneurial attitude	-0.33**	-0.15	-0.03	-0.41**	0.11
Management skills	-0.23**	-0.14	-0.24**	-0.43**	0.16
Entrepreneurial resilience	-0.45**	-0.43**	-0.47**	-0.67**	-0.18
Financial health	-0.27**	-0.22*	-0.21*	-0.41**	0.09

DASS Depression Anxiety Stress Scales; JCQ Job Content Questionnaire. * $p < 0.05$; ** $p < 0.01$.

Table 7
Incremental validity of the entrepreneurship scale over job strain and control in the prediction of stress. Results of hierarchical multiple regression analysis with stress as the dependent variable

	Business owners (N = 106)			Liberal Professions (N = 273)			Medical practitioners (N = 284)		
	R ²	ΔR^2	ΔF	R ²	ΔR^2	ΔF	R ²	ΔR^2	ΔF
<i>Job strain and control first</i>									
1. Job strain	0.22	0.22	29.9**	0.25	0.25	89.8**	0.25	0.25	100.6**
2. Control	0.23	0.01	1.5	0.26	0.01	3.5	0.28	0.03	10.2*
3. Job strain x control	0.24	0.01	0.2	0.26	0.00	2.0	0.31	0.03	10.9*
4. Entrepreneurship	0.32	0.08	12.5*	0.33	0.07	27.7**	0.35	0.04	20.7**
<i>Entrepreneurship first</i>									
1. Entrepreneurship	0.21	0.21	27.2**	0.19	0.19	61.8**	0.19	0.19	70.7**
2. Job strain	0.32	0.11	16.9**	0.33	0.14	57.2**	0.32	0.13	55.8**
3. Control	0.32	0.00	0.01	0.33	0.00	0.04	0.33	0.01	2.3
4. Job strain x control	0.32	0.00	0.17	0.33	0.00	1.8	0.35	0.02	10.6*

* $p < 0.01$; ** $p < 0.001$.

correlations were observed with the EDJS-subscale responsibility.

3.5. Incremental validity

Table 7 shows the results of the two performed hierarchical multiple regressions analyses. The results showed that the total amount of explained experience (R^2) is about the same for all three groups (between 0.32 and 0.35) but with a different structure. In all three groups of self-employed workers entrepreneurship added a significant amount of unique variance supporting the incremental validity of the scale. However, control did not add any variance in addition to entrepreneurship for the business owners and liberal professions whereas it still did for the medical practitioners.

4. Discussion

4.1. Main findings

We developed a new scale entitled 'Entrepreneurship' with four subscales (Entrepreneurial attitude, Management skills, Entrepreneurial resilience and Financial health) for the WBI screening tool to assess psychosocial risk factors for self-employed workers based on the themes that had emerged from a previous qualitative study with these type of workers [8]. The entrepreneurship scale and subscales showed high scores of test and retest reliability, of construct validity and of concurrent validity. The scales followed a normal distribution without floor and ceiling effects, except for the subscale Financial health. Compared to the original WBI scales for job strain and control to predict stress, the new Entrepreneurship scale showed incremental validity. That is, the entrepreneurship scale increased the prediction of stress over that of job strain and control. This finding illustrates that self-employed workers face different challenges and need other skills compared to employees in order to maintain a healthy working life.

4.2. Comparison with literature

The new scale for entrepreneurship, and in particular the subscale 'Entrepreneurial resilience,' showed significant correlations with two subscales within the Entrepreneurial Job Demands Scale (EJDS) by

Dijkhuizen et al. [18], namely the "Uncertainty & risk scale" and the 'Time' scale. There was no correlation with the 'Responsibility' scale of the EJDS. The reason for this is not yet clear. Dijkhuizen et al. observed that the EDJS 'Time' scale obtained absent or very low correlations with the outcome measures in their study [18]. Although, there is some overlap between the EJDS and our new Entrepreneurial scale, there are also some relevant differences. Both scales deal with potential stressors of entrepreneurs. However, the development of the EDJS was based on the literature and on conversations with business owners, and focuses on job demands of this type of self-employed workers. Whilst the scale of the current study was mainly based on the previous qualitative study by Lek et al. [8] with different types of self-employed workers (i.e., entrepreneurs working in small business, liberal professionals, blue color workers working for themselves, etc.) and focuses on the (long term) ability to work in a healthy way. Another difference concerns entrepreneurial attitudes and skills. Whereas the EDJS focuses on job demands of entrepreneurs, the Entrepreneurship scale of this study on the other hand, also assesses the ability to deal with these challenges (entrepreneurial attitudes and skills).

We found that the scale Entrepreneurship, and in particular the subscale Entrepreneurial resilience, was negatively correlated with stress, job demands and with psychological demands. This finding demonstrates that indeed not everybody is suitable for self-employment. This is in line with the conclusion of Kautonen et al. [3] who studied self-employed workers in Finland and suggested that there is a difference between those who choose for the opportunity to become an entrepreneur, and those who cannot find a job as an employee and have to become an entrepreneur out of necessity. However, they also suggested that, on the other hand, financial health over time can improve satisfaction with entrepreneurship, and that therefore training business skills may be helpful.

Dijkhuizen et al. [19] reported that well-being is a key factor for long term subjective financial and personal success as an entrepreneur. This finding illustrates that for society as a whole, for the insurance company, and for the individual self-employed worker stress is a relevant factor and can influence long term business success. In the current cross-sectional study, we found a negative correlation between the Entrepreneurship scale and stress, indicating that self-employed workers who score high on the

Entrepreneurship scale experience less stress. Combining the results of both studies one may cautiously conclude that those who are fit to be self-employed are less stressed by entrepreneurship and therefore have a greater chance of being successful as entrepreneurs in the long term.

4.3. Strengths and limitations

To our knowledge, this is the first time an entrepreneurship scale has been developed and validated for different types of self-employed workers incorporating both the necessary skills and attitude as well as potential stressors to predict psychosocial stress within this group. For the validation of the scale we used a rather large group of 676 self-employed workers. However, a potential limitation of this study may be the low response rate (6.5%) capturing only a selection of the self-employed worker in the Netherlands, although this was still within the anticipated response rate of 5% and 10% that was expected beforehand. It is important to note that participants were not rewarded for participation and the self-employed are always quite busy with work. Although low, a response rate of 6.5% is, again, still in line with what we expected. On the other hand, we cannot rule out a selection bias regarding whether or not to participate.

Another potential limitation for further generalizability is that we included only workers who had a disability insurance with these two companies. We know that only a limited percentage (up to 33.5 %) of all self-employed workers have this type of insurance [20], limiting generalizability to other self-employed workers. This is an important limitation of the present study and further examination of this scale in other samples is needed.

A final limitation that we would like to mention is the ceiling effect of the Financial health subscale. This subscale may not fully capture the breadth of the way in which the self-employed perceive their financial situation. At this stage, it is not yet clear whether a third of the self-employed are indeed fully satisfied with the financial health of their business or whether this subscale does not provide an accurate picture. However, there was virtually no floor effect for financial health and this is perhaps even more important because the main purpose of the scale is to recognize people with financial problems. Finally, a group of medical practitioners was over-represented in the current study. We were able to overcome some

of the drawbacks of this by carrying out a number of analyses for the three groups of self-employed persons separately. However, when calculating the norms for the entrepreneurship scale, it is important to weight the different groups of self-employed workers in order to obtain a reasonable representation.

4.4. Practical implications and further research

Some factor loadings on the subscales are on the low side. Real low factor loadings on the main scale (Entrepreneurship), on the other hand, do not occur. Most vary between 0.40 and 0.60. Our interpretation of this is that the item allocation to the subscales is somewhat arbitrary. The low values for Cronbach's alpha of the Management skills and Entrepreneurial resilience scales match the above. They cannot be applied clinically stand-alone. The small number of items in combination with the heterogeneity of the items appear to be responsible for the relatively low values mentioned. On the other hand, the bi-factor model proved to be stronger than a one-factor model. This is not surprising because, by the nature of this concept, entrepreneurship is not a one-dimensional concept either. The fact that the items therefore show a large variation in content means that the scale is clinically 'rich' and will also be better able to provide a reasonable representation of the characteristics of the entrepreneur in reality. However, an open question is whether this reflects the true nature of the heterogeneity of entrepreneurship or whether this implies that we do not have a psychometrically sound scale. With regard to clinical application, the method which is most appropriate and take into account the above arguments is to interpret only the total score of the main scale (Entrepreneurship). The subscales can be used in a supportive way to gain more insight into which aspects of entrepreneurship are at stake in the case of low scores, but should not be interpreted stand-alone.

The entrepreneurship scale can be used in the daily practice of health professionals dealing with self-employed workers in combination with the other WBI scales to screen for risk factors of stress. For these health professionals a screening tool that can not only capture personal or social reasons for stress, but also particular risk factors of self-employment will be of additional value. Future studies should focus on the predictive value of the adapted WBI for self-employed workers, and on the added value of intervening based on these WBI scores.

5. Conclusion

We have developed a reliable and valid scale to assess psychosocial risk factors that increase the risk of the self-employed becoming incapacitated for work. This scale can be used in the daily practice of occupational- and insurance health practitioners. More research is needed to further examine the validity of the scale and to assess its predictive value.

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Conflict of interest

None to report.

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Table Appendix

Items of the Entrepreneurship scale	
Item no.	Item
Entrepreneurial attitude	
#41	I feel like a real entrepreneur
#49	I have a good sense of what is going on in the market
#64	I am good at negotiation
#71	I dare to take financial risks
Management skills	
#36	I like to be in charge
#56	My business is well organized
#59	I am good at planning and organizing
Entrepreneurial resilience	
#40	I strongly dislike administration and management tasks
#43	I would rather be an employee of a business
#48	I have difficulty delegating tasks
#53	It takes too much time and energy to manage my business
#67	The responsibilities of being self-employed is a heavy burden
Financial health	
#37	My business is in good financial shape
#44	My business accountancy is in order
#51	My business is performing well