

## Development and Validation of the Entrepreneurial Work Ability Scale

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The main purpose of this study is to develop and validate a scale for measuring work ability among entrepreneurs. The Entrepreneurial Work Ability Scale (EWAS), consisting of eight items, was developed based on a thorough literature study and an elaborate analysis of its psychometric qualities. The factor structure, reliability, and criterion validity of the scale were examined in two studies using two separate samples (study 1  $N = 2452$ , study 2  $N = 201$ ) of entrepreneurs in the Netherlands. Our results demonstrate that the newly developed scale is reliable, captures one factor, and shows criterion validity. As predicted, job demands uncertainty and risk, and workload, appeared to be negatively related to entrepreneurial work ability, while autonomy and personal resources were positively related to work ability. In turn, entrepreneurial work ability relates positively to entrepreneurial personal financial success and to personal fulfillment. From our empirical work, we conclude that the EWAS is a psychometrically sound instrument that can be used for further investigating determinants of entrepreneurial success within the theoretical framework of the Job Demands-Resources Model. Besides, the EWAS is a useful tool for entrepreneurs, business coaches, and institutions that want to help preserve and improve the work ability among entrepreneurs.

*Key words:* entrepreneurs, entrepreneurial work ability, entrepreneurial success, entrepreneurial job demands, entrepreneurial resources

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## Introduction

In the 1980s, the work ability construct was developed by Ilmarinen and colleagues of the Finnish Institute of Occupational Health, and aimed to determine factors that predicted early departure from the workforce (see for example Ilmarinen et al., 1991a; Tuomi et al., 1997; Tuomi et al., 1998). These researchers defined work ability as the mental and physical ability to function at work, now and in the future, and argued that an individual's work ability is determined by one's personal resources (such as physical and mental health) in relation to one's work characteristics (Ilmarinen, 2001). Work ability is also referred to as one's job-related functional capacity. As work ability depends on both personal resources and work characteristics, it can differ greatly across individuals and across occupations.

Work ability is shown to be conceptually distinct from related concepts such as employability, disability, resilience, and self-efficacy (Fleuren et al., 2020; Mache et al., 2013; McGonagle et al., 2015) and predicts important work outcomes such as sickness absence, exhaustion, disability status, turnover intentions, company performance, and early retirement (Camerino et al., 2006; McGonagle et al., 2015; Sell, 2009; Von Bonsdorff et al., 2010; Von Bonsdorff et al., 2018).

Regarding the latter, as the workforce is aging, it is important to prevent early retirement to safeguard the necessary labor supply and to ensure a solid financing of pension systems (Pak et al., 2019). To get a better picture of who is at risk for dropping out, in the 1980s, the above-mentioned researchers from the Finnish Occupational Health Institute developed a work ability measure to evaluate the ability to work well until the official retirement age, and to predict early retirement (i.e., the Work Ability Index; see for example

Ilmarinen et al., 1991a; Tuomi et al., 1997, Tuomi et al., 1998). Having high levels of work ability means that the individual worker is competent to manage the work, given their job demands and the available resources (Ilmarinen et al., 2008; McGonagle et al., 2014).

Besides a reduced risk of early retirement, high levels of work ability are associated with positive outcomes, such as life and job satisfaction, productivity, and quality of work, sickness absence, disability status, turnover intention (e.g., Seitsamo & Ilmarinen, 1997; Sjögren-Rönkä et al., 2002; Tuomi et al., 2001). As a result, the work ability measure quickly became popular in both research and practice, and due to its predictive power, research on this construct has expanded rapidly over the past decennia (Cadiz et al., 2019).

Despite the popularity of the construct, the vast majority of studies about work ability to date, are executed among people working in a paid job (e.g., Bacci et al., 2024; Fischer et al., 2006; Slowiak & McDonough, 2024). Notwithstanding the fact that contemporary labor markets are characterized by a considerable number of entrepreneurs (Global Entrepreneurship Monitor, 2025), work ability has been hardly studied among this category of the working population. There are a few exceptions in this regard, comprising of studies wherein the work ability between entrepreneurs and employees was compared (Rietveld et al., 2015; Saarni et al., 2008). This is striking as, in terms of their job demands and resources, entrepreneurs are in many ways different from people working in a paid job (Sewdas et al., 2018; Stephan & Roesler, 2010). For example, entrepreneurs experience greater autonomy, more uncertainty and risk, different stressors, and more time flexibility since they work in their own business (Baron, 2004; Lerman et al., 2021; Prottas & Thompson, 2006; Schonfeld & Mazzola, 2015). In particular, autonomy is a resource that is highly

specific to entrepreneurs as they run their own business independently (Tomy & Pardede, 2018). In the study by Van den Berg et al. (2009), a lack of autonomy was linked to poor work ability, thereby showing the relevance of this job resource. In the study of McGonagle and associates (2015), personal resources proved to be of importance in understanding self-perceived work ability. Previous research in this field also showed positive relationships between personal resources and work performance (e.g., Luthans et al., 2006, 2007a, 2007b). Additionally, as entrepreneurs run their own business, they constantly have to cope with the feeling that they have to be available for the business 24/7, and with a high workload (Dijkhuizen et al., 2014; Dijkhuizen et al., 2016; Hay et al., 2025; Stephan & Roesler, 2010). In addition, uncertainty and risk, and responsibility were specific job demands that explained considerable variation in work-related strain and well-being for entrepreneurs, over and above more common measures of job demands, such as emotional load and task complexity. In other words, to stay in business, entrepreneurs need to have the capacity to perform their job effectively, considering the demands and challenges of the work context and their personal resources (Ilmarinen et al., 2008). Moreover, entrepreneurs are often underinsured, which means that sickness absenteeism and early retirement would come at a great personal cost (e.g., Murgia & Pulignano, 2021). Therefore, getting more insight into the factors that drive or undermine work ability amongst entrepreneurs is of utmost importance.

The measures used mostly for research on work ability to date, are the Work Ability Index (WAI) of the Finnish Institute of Occupational Health (Ilmarinen et al., 1991a, 1991b; Tuomi et al., 1998), and the scale for perceived work ability of McGonagle et al. (2015). The WAI is a long questionnaire with 59 items, which is avail-

able in many languages. However, the review by Cadiz et al. (2019) addressed serious concerns related to its construct validity and psychometric qualities, as well as to the more practical constraint of the large number of items.

The scale of McGonagle et al. (2015) is very short, comprising four generic items that focus solely on the perceptions that people have of their own work ability. This scale overcomes many of the problems related to the WAI, however, more empirical research is needed to ensure the validity of this measure across different populations (Cadiz et al., 2019; McCarthy et al., 2024). Moreover, just like the WAI, the measure by McGonagle and associates (2015) does not capture the peculiarities that are inherent to the field of entrepreneurship.

Therefore, we argue that the existing measures may not fully capture the unique challenges faced by entrepreneurs, whose working conditions, stressors, job demands and resources, personal traits, and performance measures differ from those of people working in a paid job (e.g., Dijkhuizen et al., 2016; Stephan, 2018). As the role of entrepreneurs is of high importance in light of a country's economy (Van Praag & Versloot, 2007), it is crucial that entrepreneurs are able to meet their specific job demands and continue working. Our empirical work is intended to enhance the scholarly understanding of self-perceived work ability by developing and testing a new short measure for the working population of entrepreneurs by testing the following research question: To what extent is the Entrepreneurial Work Ability Scale (EWAS) a valid and reliable measure of work ability amongst entrepreneurs?

Specifically, in Study 1, based on specific entrepreneurial job demands, we developed a scale for self-perceived work ability for entrepreneurs, and assessed its construct validity. In Study 2, we investigated the criterion validity of the scale using the Job Demands-Re-

sources (JD-R) Model (Demerouti et al., 2001) as its underlying theoretical framework to examine the interrelatedness between work ability and job demands, resources, and entrepreneurial success, as was previously investigated in research among employees (e.g., Cadiz et al., 2019). Our paper concludes with a discussion of the two studies, a reflection on its limitations and recommendations for future work in this field, and an outline of its practical implications.

### Conceptual Model

Previous research on work ability among employees (Brady et al., 2020; McGonagle et al., 2014) have examined job demands and job resources as possible predictors for work ability, building on the JD-R Model of Demerouti and associates (2001). Analogously, the review by Cadiz et al. (2019) also indicated that the JD-R Model may be a useful theoretical framework to study the phenomenon of work ability as the construct is conceptualized as a balance between job demands and resources. Specifically, the JD-R Model describes the relationship between job demands, resources, and work-related strain and work engagement via a health impairment process and a motivational process. Job demands are the most important predictors of outcomes in the health impairment chain, such as exhaustion, health complaints, and work-related strain (Bakker et al., 2014). For entrepreneurs, we know from previous research that certain specific job demands are important job demands that are highly prevalent in their profession, namely uncertainty and risk, workload, and 24/7 time demands (Dijkhuizen et al., 2014). These job demands were positively related to work-related strain (Dijkhuizen et al., 2016).

Job resources, on the other hand, show positive relationships with work ability (Brady et al., 2020). A resource that is particular-

ly important for entrepreneurs is autonomy (Dijkhuizen et al., 2016). Furthermore, in our conceptual model we include personal resources, referring to positive self-evaluations of an individual's strengths (Bakker et al., 2004), which comprises an important extension of the original JD-R Model.

McGonagle et al. (2014, 2015) also argued that the JD-R Model (Demerouti et al., 2001) may be applied to understand the determinants and outcomes of perceptions of work ability. Specifically, McGonagle et al. (2015) included outcome variables such as absence, disability leave, and retirement. In a similar vein, in the study of Brady et al. (2020), who also adopted a JD-R lens in their work, job attitudes, performance, motivation, strain, exit intentions, and exit behaviors were included as dependent variables. However, the empirical work by these scholars has been conducted among employees. We posit that for entrepreneurs, it is more appropriate to center the dependent variables around the phenomenon of entrepreneurial success as performance outcome of work ability (Dijkhuizen et al., 2016).

There are different approaches to assess and evaluate entrepreneurial success (Wach et al., 2016). According to previous research based on the JD-R Model (Demerouti et al., 2001) among entrepreneurs by Dijkhuizen et al. (2016.), both objective and personal success appear to be meaningful dependent variables for performance measurement. Objective success refers to measurable business outcomes (Van Praag & Versloot, 2007), while personal, that is subjective, success relates to personal development, flexibility of planning your own work, and a good work-life balance (Rauch & Frese, 2007; Wach et al., 2016). Personal success can be divided into personal financial success and personal fulfillment (Dijkhuizen et al., 2016).

Based on the theoretical outline given above, we have developed the conceptual model that is depicted in Figure 1.

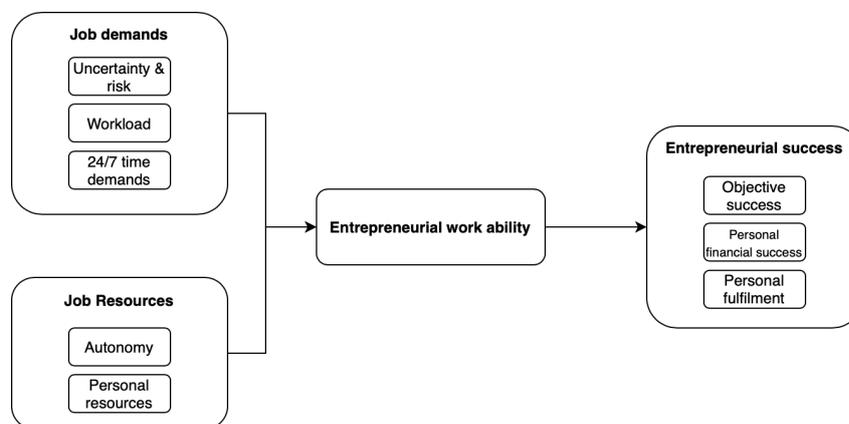


Figure 1 Conceptual model.

### Study 1 Scale Construction

Study 1 allowed for the construction of the new scale for entrepreneurial work ability and to assess its construct validity.

#### Method

##### Procedure and Sampling

For the construction of the Entrepreneurial Work Ability Scale (EWAS), entrepreneurial job demands were operationalized into specific items to measure the entrepreneurs' ability to cope with demands that are specific for their profession (see Table 1, Items 5, 6, and 7). Some other items (Items 1, 2, 3, and 4) are adapted from the four-item scale of McGonagle (2015) on physical and mental work ability. Item 8 is added and comprises the entrepreneur's perception on their future work ability. All eight items were originally formulated in Dutch and the translation-back translation methodology by Brislin (1970) has been used for the English version shown in Table 1. Respondents were informed that they will be presented with a number of

statements and that they can indicate the extent to which they agree with them. A five-point Likert scale was used (1 = totally disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = totally agree) for all items.

The scale was included in a questionnaire that was sent out between January and April 2024 to solo self-employed entrepreneurs who were members of a Dutch trade association in the health care sector. As entrepreneurs have high self-awareness, self-reporting is an acceptable method for data collection in our study (Rhee & White, 2007). The final sample consisted of 2,452 solo self-employed entrepreneurs who account for 68 percent of the Dutch entrepreneurial population (Centraal Bureau voor de Statistiek, 2024). Solo self-employed entrepreneurs are the largest subgroup of entrepreneurs in the Netherlands and were therefore targeted for Study 1. Gender was divided as 77.1% female, 22.6% male, and 0.3% unknown in our sample, which is in contrast with the 63% male and 37% female entrepreneurs in the Dutch entrepreneurial population as a whole (KVK, 2022). This difference is due to the high presence of women working in the health care sector. The average age of the respondents is 46.7 years (SD = 12.6). The major-

Table 1 *Entrepreneurial Work Ability Scale (N = 2,452)*

EWAS Item	M	SD	Factor loading	
			Study 1	Study 2
1. I can cope well with the physical demands of my work.	4.04	.87	.66	.69
2. I can cope well with the mental demands of my work.	4.16	.76	.75	.73
3. I can cope well with my work in terms of difficulty.	4.32	.71	.76	.86
4. I have more than enough energy to perform my work well.	4.17	.76	.78	.77
5. I can perform the tasks that are involved in my work well.	4.35	.66	.83	.86
6. I can cope well with the uncertainty and risks that my work entails.	4.05	.78	.70	.72
7. I can cope well with the responsibilities that my work entails.	4.38	.63	.80	.84
8. In three years, my knowledge and skills are still suitable for my work.	4.27	.74	.66	.65

ity of respondents holds vocational education (68.0%), and 31.9% of the respondents holds a master (5.5%) or bachelor (26.4%) degree.

### Results

To assess the construct validity of the EWAS, an exploratory factor analysis and reliability analysis were conducted. Principal component factor analysis with Varimax rotation was used to examine the factor structure (Table 1). The results indicated one principal factor of work ability (Eigenvalue = 4.43; variance percentage = 55.38%). The Kaiser-Meyer-Olkin value for the items together was .90, thereby exceeding the recommended value of .60; Cronbach's  $\alpha = 0.88$ . Study 1 demonstrates the reliability and construct validity of the EWAS.

#### Study 2 Testing Criterion Validity

The next step in the validation of the EWAS, was to measure the relationship between work ability,

on the one hand, and job demands, resources, and entrepreneurial success, on the other hand, to test the newly developed measure's criterion validity.

In the conceptual model for testing the criterion validity of the EWAS (Figure 1), the entrepreneurial job demands uncertainty and risk, workload, and 24/7 time demands (Dijkhuizen et al., 2014) are incorporated. In line with previous studies (Baluku et al., 2018; Brady et al., 2020; McGonagle et al., 2015), both autonomy and personal resources are considered as the predictive resources in our model. Moreover, building on earlier work in this domain (Brady et al., 2020; McGonagle et al., 2015), entrepreneurial work ability is the predictor of objective and subjective, personal, entrepreneurial success (Dijkhuizen et al., 2016).

### Method

#### Procedure and Sampling

In Study 2, Dutch entrepreneurs with a disability insurance from a Dutch insurance com-

pany were included to test the construct validity of our newly developed measure among a different group of entrepreneurs from the one included the sample of Study 1. The questionnaires were filled in between June and September 2024. The final sample included 201 respondents, with an average age of 52.2 years ( $SD = 7.7$ ). Among these respondents, 56.7% are men and 42.3% are women. The majority of respondents holds a master's degree (58.7%), followed by a bachelor's degree (23.4%). Of all entrepreneurs included in this sample, 31.8% have one or more employees working in their company, and 68.2% is self-employed which is similar to the total Dutch population of entrepreneurs.

### Measures

The job demands uncertainty and risk (6 items) and 24/7 time demands (3 items) were measured with the Entrepreneurial Job Demands Scale (Dijkhuizen et al., 2014) using a 4-point scale ranging from 1 = (almost) never to 4 = (almost) always. Workload was measured by the scale of Van Veldhoven et al. (2002), using a 4-point scale ranging from 1 = (almost) never to 4 = (almost) always. An example item of uncertainty and risk is: "Do you find it difficult to make decisions for your business?" (Cronbach's  $\alpha$  was 0.80). For 24/7 time demands, one of the items is: "Is it like being with your business 24 hours a day?" (Cronbach's  $\alpha$  was 0.87). Workload was measured with 4 items, with an example item being: "Do you need to hurry?" (Cronbach's  $\alpha$  was 0.85).

The measure for autonomy, being the first indicator of resources, comprises three items (Dijkhuizen et al., 2014), measured on a 4-point scale ranging from 1 = (almost) never to 4 = (almost) always. An example item is: "Can you decide whether your company carries out activities?" (Cronbach's  $\alpha$  was 0.80). Personal resources were measured with the

PsyCap scale developed by Luthans and associates (2007a) comprising four states: optimism (4 items, e.g., "I am always optimistic about my future", Cronbach's  $\alpha$  was 0.61), self-efficacy (4 items, e.g., "I am able to successfully overcome many challenges", Cronbach's  $\alpha$  was 0.90), hope (4 items, e.g., "There are many ways around every problem I have now", Cronbach's  $\alpha$  was 0.78), and resilience (4 items, e.g., "It doesn't take me long to recover from a stressful event", Cronbach's  $\alpha$  was 0.79). The items were scored on a 6-point scale ranging from 1 = totally disagree to 6 = totally agree. The lower Cronbach's alpha for optimism corresponds with the outcomes of previous studies (e.g., Dawkins et al., 2013).

**Dependent variables.** To measure entrepreneurial success, both objective success and personal, that is subjective, success measures were taken into account. Objective success was measured with three items: expected change over the next twelve months in number of employees, turnover, and profit (Dijkhuizen et al., 2016; Cronbach's  $\alpha$  was 0.70). Objective success was measured on a 3-point scale: 1 = decline (of respectively number of employees, turnover or profit), 2 = unchanged (*idem*), 3 = rise (*idem*). Personal success was measured with two constructs: personal financial success (three items; Cronbach's  $\alpha$  was 0.81) and personal fulfillment (five items; Cronbach's  $\alpha$  was 0.75). An example item of personal financial success is: "income security for you (and your family)" and an item of personal fulfillment is "purposeful work". Personal success was scored on a 5-point scale ranging from 1 = totally not achieved to 5 = totally achieved.

**Control variables.** Based on the insights from previous work in the domain of entrepreneurial success (Dijkhuizen et al., 2016; 2018), Study 2 included age, gender, education level, working hours, and number of years in entrepreneurship as control variables.

## Results

For this sample, the reliability, using Cronbach's  $\alpha$ , of the EWAS was 0.89, the principal component factor analysis (Table 1) showed one factor (Eigenvalue = 4.72; variance percentage = 59.04%), which is consistent with the outcomes of Study 1. Item level statistics are shown in Table 2. Furthermore, confirmatory factor analysis and correlation analyses were conducted to explore the relationships between the model variables. Confirmatory Factor Analysis (CFA) showed a good fit ( $\chi^2(20) = 82.291$ ,  $p < .001$ , CFI = .922, SRMR = .050).

In Table 3 the descriptives and correlations are included. Entrepreneurial work ability showed significant correlations with the job demands uncertainty and risk ( $r = -.44$ ,  $p < .001$ ), and workload ( $r = -.26$ ,  $p < .001$ ), but not with 24/7 time demands ( $r = -.13$ ,  $p = .076$ ). Furthermore, there were significant correlations between the resources autonomy ( $r = .26$ ,  $p < .001$ ) and personal resources ( $r = .60$ ,  $p < .001$ ), on the one hand, and work ability, on the other hand. Work ability, in turn, was significantly correlated with personal financial success ( $r = .32$ ,  $p < .001$ ) and personal fulfillment ( $r = .44$ ,  $p < .001$ ). For the correlation analysis, in line with previous research, the four states of personal resources were collapsed into one construct. None of the cor-

relations exceeds .70 and all the VIF values are between 1.04 and 1.63, so well below the value of 10, which indicates there is no issue of multicollinearity.

Hierarchical multiple regression was used to assess whether job demands and resources predict work ability, after controlling for age, gender, education level, working hours, and number of years in entrepreneurship (Table 4 reporting the beta coefficients). Including the control variables explains 9.7% of the variance (Model 1). After including job demands and resources in the model (Model 2), 46.4% of the variance was explained ( $F(10, 158) = 13.69$ ). The  $R$  square change value is .37 ( $F$  change (5, 158) = 21.68,  $p < .001$ ). Thus, job demands and resources explain an additional 37% of the variance in work ability. Especially personal resources made significant contributions to the prediction of work ability.

Table 5 indicates the outcomes of the hierarchical multiple regression to assess the potential of work ability to predict entrepreneurial success, after controlling for age, gender, education level, working hours, and number of years in entrepreneurship. The control variables (Model 1, reporting the beta coefficients) explain 4% of variance in objective success, 7% of personal financial success, and 6% of personal fulfillment. After including work ability (Model 2, reporting the beta coefficients), the model explains 4% of the objective success

Table 2 *Item statistics*

EWA items	Mean	SD	Skewness	Kurtosis
1.	4.34	.75	-1.13	1.18
2.	4.16	.77	-.86	.74
3.	4.44	.65	-.99	.94
4.	3.99	.91	-.73	.06
5.	4.32	.66	-.80	1.01
6.	4.02	.79	-.94	1.41
7.	4.29	.67	-1.09	3.10
8.	4.22	.73	-1.05	2.15

Table 3 Descriptive statistics and correlations

Variable	n	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age	197	52.16	7.72													
2. Entrepreneurial work ability	182	33.78	4.53	.05												
<i>Job demands</i>																
3. Uncertainty and risk	186	9.05	2.51	-.05	-.44**											
4. Workload	187	8.74	2.65	-.14	-.26**	.22**										
5. 24/7 time demands	186	6.08	2.41	-.05	-.13	.29**	-.45**									
<i>Resources</i>																
6. Autonomy	184	17.26	3.37	.03	.46**	-.48**	-.28**	-.23**	.18*	.57**	.48**	.62**				
7. Optimism	185	18.24	2.83	-.00	.46**	-.40**	-.25**	-.13	.19*							
8. Self-efficacy	185	19.58	2.59	.01	.52**	-.31**	-.07	-.05	.13	.51**						
9. Hope	184	17.81	2.96	.02	.53**	-.52**	-.23**	-.15*	.43**	.52**	.59**					
10. Resilience	184	17.26	3.37	.03	.46**	-.48**	-.28**	-.23**	.18*	.57**	.48**	.62**				
<i>Entrepreneurial success</i>																
11. Objective success	177	6.58	1.37	-.10	.03	-.08	.03	.01	.09	.02	.10	.16*	.09			
12. Personal financial success	176	11.45	2.14	.10	.32**	-.36**	.01	-.17*	.08	.21**	.27**	.27**	.24**	.03		
13. Personal fulfillment	176	19.46	2.97	.17*	.44**	-.44**	-.38**	-.34**	.33**	.35**	.21**	.49**	.34**	-.02	.29**	

Table 4 Hierarchical multiple regression analysis of the determinants of work ability

Variables	Work ability	
	Model 1	Model 2
<i>Control variables</i>		
Age	.11	.01
Gender	-.12	.03
Education level	.16*	.17**
Working hours	.14	.23**
Number of years entrepreneurship	-.20*	-.04
<i>Job demands</i>		
24/7 time demands		-.05
Uncertainty and risk		-.12
Workload		-.16*
<i>Resources</i>		
Autonomy		.07
Personal resources		.45***
R <sup>2</sup>	.10	.46
Δ R <sup>2</sup>	.10	.37

Note. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

( $F(6,157) = 1.1$ ; ns), 14% of personal financial success ( $F(6, 156) = 4.1$ ,  $p < .001$ ), and 26% of personal fulfillment ( $F(6, 156) = 9.05$ ;  $p < .001$ ).

### Discussion and Conclusion

Via this research we extend the knowledge on work ability among entrepreneurs, by developing and validating a work ability scale for entrepreneurs (EWAS). In Study 1 the EWAS was developed and tested in a large sample of entrepreneurs and the scale proved to be reliable, indicating one factor. In Study 2 the reliability and factor analysis were confirmed in a different group of entrepreneurs. The cri-

terion validity of the EWAS was studied using the JD-R Model as in previous studies (Brady et al., 2020; McGonagle et al., 2015). The results show significant relationships with job demands, resources, and personal success, except for 24/7 time demands and objective success, suggesting that this new scale is valid and can be useful for assessing work ability among entrepreneurs. The job demand 24/7 time demands has no significant correlation with work ability. This may be attributed to the nature of entrepreneurship where the business is always around in the daily life. Therefore, the entrepreneur possibly is not experiencing the 24/7 time demand as challenging, as it is part of the job and entrepre-

Table 5 Hierarchical multiple regression analysis of the entrepreneurial success dimensions

Variables	Objective success		Personal financial success		Personal fulfillment	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
<i>Control variables</i>						
Age	-.12	-.12	.14	.11	.26**	.21*
Gender	-.08	-.08	-.14	-.11	-.03	.03
Education level	.08	.08	.14	.10	-.05	-.12
Working hours	.13	.13	.07	.03	-.10	-.16*
Age enterprise (a)	-.01	-.02	-.16	-.11	-.16	-.07
<i>Work ability</i>		-.01		.27***		.47***
R <sup>2</sup>	.04	.04	.07	.14	.06	.26
Δ R <sup>2</sup>	.01	.00	.04	.10	.03	.23

Note. (a) Age enterprise is the number of years the respondent is working as an entrepreneur.  
\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

neers develop personal mastery of this job demand (Lerman et al., 2020). The positive correlation between autonomy and work ability is in line with Sewdas et al. (2018). For autonomy and personal resources, stronger correlations were also found in this study, compared to the study of Brady et al. (2020) and McGonagle et al. (2015), highlighting the important role resources play in supporting entrepreneurs in a demanding work context. Correlations of work ability with especially personal success, both personal financial success and personal fulfillment, as a measure of entrepreneurial success were strong.

The hierarchical multiple regression analysis shows that job demands and resources explain 37% of the variance in work ability, which is slightly higher compared to the McGonagle et al. (2015) scale (ranging from 21 to 28% of explained variance), but their results show a similar pattern compared to our results. Personal resources were the strongest predictors; we took slightly different personal resources into consideration compared to McGonagle et al. (2015), which might explain

this difference. In addition, the education level and number of working hours influence work ability. The higher the education and the more hours the entrepreneur works, the more competent he or she is to execute the tasks. In the regression analysis of work ability as predictor of entrepreneurial success, the results show that objective success is not predicted by work ability, but personal financial success (14% of variance) and personal fulfillment (26% of variance) are. Furthermore, age is an important predictor for personal fulfillment, which is in line with previous research of Kibler et al. (2024) who found that with increasing biological age, entrepreneurs experience less emotional exhaustion due to their enhanced psychological capital. This shows that our new work ability construct for entrepreneurs has similar predictors and outcomes compared to existing work ability constructs for employees.

Furthermore, our results imply that entrepreneurial work ability is closely tied to how entrepreneurs perceive their personal success. The lack of relationship between work

ability and objective success can be explained by the way objective success was measured in the questionnaire. It might be difficult for entrepreneurs to assess their future turnover and profit while operating in a very challenging and dynamic work environment with continuous uncertainty. In future studies, objective performance results of current turnover and profit can be included, and health outcomes such as disability or retirement intentions, which more closely resemble the outcomes that McGonagle et al. (2015) took into consideration, should be investigated.

This study thus contributes to existing literature by developing and validating a specific measure of work ability for entrepreneurs. Maintaining work ability is essential for entrepreneurial success. Job demands and resources play an important role in work ability. Reducing the effect of job demands by assisting entrepreneurs in how to cope with them is important. On the other hand, increasing autonomy and personal resources will help entrepreneurs to prevail or enhance work ability. The EWAS is a valuable tool for future academic research and can be used as an assessment tool for entrepreneurs. Furthermore, the EWAS can be used as a tool by e.g. business trainers and coaches in their interventions when working with entrepreneurs.

#### Limitations and Further Research

There are several limitations to take into account. The EWAS only considered subjective indicators and not objective indicators (e.g., diagnosed health conditions) as is included in the WAI (Ilmarinen et al., 2005). Potential biases related to self-report measures are possible. The criterion validity of the EWAS was tested with cross sectional studies with a limited number of respondents. Future longitudinal research is recommended to investigate the longer term effects of work ability on en-

trepreneurial success, among a larger group of entrepreneurs. Furthermore, the study relied on self-reported data which may lead to a certain bias, such as common method bias. Future research might consider incorporating data from different sources, such as financial and health data to mitigate this issue and to capture a more complete picture of entrepreneurial work ability.

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#### References

- Bacci, G., Viotti, S., Guidetti, G., Sottimano, I., Simondi, G., Caligaris, M., & Converso, D. (2024). Work ability and its correlates with workers aging among blue-collar workers in a manufacturing company. *Journal of Occupational and Environmental Medicine*, 66(2), 54–60. <https://dx.doi.org/10.1097/JOM.0000000000003015>
- Bakker, A. B., Demerouti, E., & Verbeke W. (2004). Using the job demands–resources model to predict burnout and performance. *Human Resource Management*, 43, 83–104. <https://doi.org/10.1002/hrm.20004>
- Bakker, A. B., Demerouti, E., & Sanz-Vergel, A. I. (2014). Burnout and work engagement: The JD-R approach. *Annual Review of Organizational Psychology and Organizational Behavior*, 1, 389–411. <https://doi.org/10.1146/annurev-orgpsych-031413-091235>
- Baluku, M. M., Kikooma, J. F., & Otto, K. (2018). Positive mindset and entrepreneurial outcomes: The magical contributions of psychological resources and autonomy. *Journal of Small Business & Entrepreneurship*, 30(6), 473–498. <https://doi.org/10.1080/08276331.2018.1459017>
- Baron, R. A. (2004). The cognitive perspective: A valuable tool for answering entrepreneurship's

- basic “why” questions. *Journal of Business Venturing*, 19, 221–239. [https://doi.org/10.1016/S0883-9026\(03\)00008-9](https://doi.org/10.1016/S0883-9026(03)00008-9)
- Brady, G. M., Truxillo, D. M., Cadiz, D. M., Rineer, J. R., Caughlin, D. E., & Bodner, T. (2020). Opening the black box: Examining the nomological network of work ability and its role in organizational research. *Journal of Applied Psychology*, 105(6), 637–670. <https://doi.org/10.1037/apl0000454>
- Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-cultural Psychology*, 1(3), 185–216. <https://doi.org/10.1177/135910457000100301>
- Cadiz, D. M., Brady, G., Rineer, J. R., & Truxillo, D. M. (2019). A review and synthesis of the work ability literature. *Work, Aging and Retirement*, 5(1), 114–138. <https://doi.org/10.1093/workar/way010>
- Camerino, D., Conway, P. M., Van der Heijden, B. I. J. M., Estryng-Behar, M., Consonni, D., Gould, D., & Hasselhorn, H. (2006). Low-perceived work ability, ageing and intention to leave nursing: A comparison among 10 European countries. *Journal of Advanced Nursing*, 56, 542–552. <https://doi.org/10.1111/j.1365-2648.2006.04046.x>
- Centraal Bureau voor de Statistiek, CBS. (2024, August 9). *Bijna 1 miljoen ondernemers erbij sinds 2010*. Centraal Bureau Voor de Statistiek. <https://www.cbs.nl/nl-nl/nieuws/2024/32/bijna-1-miljoen-ondernemers-erbij-sinds-2010>
- Dawkins, S., Martin, A., Scott, J., & Sanderson, K. (2013). Building on the positives: A psychometric review and critical analysis of the construct of Psychological Capital. *Journal of Occupational and Organizational Psychology*, 86, 348–370. <https://doi.org/10.1111/joop.12007>
- 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. <https://doi.org/10.1037//0021-9010.86.3.499>
- Dijkhuizen, J., Gorgievski, M., Van Veldhoven, M., & Schalk, R. (2018). Well-being, personal success and business performance among entrepreneurs: A two-wave study. *Journal of Happiness Studies*, 19(8), 2187–2204. <https://doi.org/10.1007/s10902-017-9914-6>
- Dijkhuizen, J., Gorgievski, M., Van Veldhoven, M., & Schalk, R. (2016). Feeling successful as an entrepreneur: A job demands-resources approach. *International Entrepreneurship and Management Journal*, 12(2), 555–573. <https://doi.org/10.1007/s11365-014-0354-z>
- Dijkhuizen, J., Van Veldhoven, M., & Schalk, R. (2014). Development and validation of the Entrepreneurial Job Demands Scale. *International Journal of Knowledge, Innovation and Entrepreneurship*, 2, 70–89. [https://www.journal.ijkie.org/IJKIE\\_April2014\\_DIJKHUIZEN\\_VAN%20VELDHOVEN\\_SCHALK%20\\_4.pdf](https://www.journal.ijkie.org/IJKIE_April2014_DIJKHUIZEN_VAN%20VELDHOVEN_SCHALK%20_4.pdf)
- Fischer, F. M., Borges, F. N. S., Rotenberg, L., Latorre, M. R. D. O., Soares, N. S., Rosa, P. L. F. S., & Landsbergis, P. (2006). Work ability of health care shift workers: What matters? *Chronobiology Journal*, 23, 1165–1179. <https://doi.org/10.1080/07420520601065083>
- Fleuren, B. P. I., De Grip, A., Jansen, N. W. H., Kant, I., & Zijlstra, F. R. H. (2020). Unshrouding the sphere from the clouds: Towards a comprehensive conceptual framework for sustainable employability. *Sustainability*, 12(16), 6366. <https://doi.org/10.3390/su12166366>
- Global Entrepreneurship Monitor (2025). *Global Entrepreneurship Monitor 2024/2025 Global Report: Entrepreneurship Reality Check*. London: GEM.
- Hay, G., Ward, M. K., van Doorn, S., Parker, S., & Schepis, D. (2025). The role of work design in entrepreneurship: A review and meta-framework. *Journal of Business Research*, 189, 115156. <https://doi.org/10.1016/j.jbusres.2024.115156>
- Ilmarinen, J., Gould, R., Järviskoski, A., & Järvisalo, J. (2008). Diversity of work ability. In R. Gould, J. Ilmarinen, J. Järvisalo, & S. Koskinen (Eds.), *Dimensions of work ability: Results of the Health 2000 survey* (pp. 13–24). Helsinki: Finnish Institute of Occupational Health.
- Ilmarinen, J. (2001). Functional capacities and work ability as predictors of good 3rd age. In K. Shiraki, S. Sagawa, & K. Mohamed Yousef (Eds.), *Physical fitness and health promotion in active ageing* (pp. 61–80). Backhuys Publishers.
- Ilmarinen, J., Tuomi, K., Eskelinen, L., Nygård, C. H., Huuhtanen, P., & Klockars, M. (1991a). Background and objectives of the Finnish research project on aging workers in municipal occupations. *Scandinavian Journal of Work, Environment and Health*, 17(Suppl. 1), 7–11. <https://www.jstor.org/stable/40965939>

- Ilmarinen, J., Tuomi, K., Eskelinen, L., Nygård, C. H., Huuhtanen, P., & Klockars, M. (1991b). Summary and recommendations of a project involving cross-sectional and follow-up studies on the aging worker in Finnish municipal occupations (1981–1985). *Scandinavian Journal of Work, Environment and Health*, 17(Suppl. 1), 135–141. <https://www.jstor.org/stable/40965955>
- Ilmarinen, J., Tuomi, K., & Seitsamo, J., (2005). New dimensions of work ability. *International Congress Series*, 1280, 3–7. <https://doi.org/10.1016/j.ics.2005.02.060>
- Kujala, V., Tammelin, T., Remes, J., Vammavaara, E., Ek, E., & Laitinen, J. (2006). Work ability index of young employees and their sickness absence during the following year. *Scandinavian Journal of Work Environment & Health*, 32(1), 75–84. <https://www.jstor.org/stable/40967546>
- KVK (2022, March 8). *Aandeel vrouwelijke ondernemers stijgt verder*. <https://www.kvk.nl/pers/internationale-vrouwendag-2022-aandeel-vrouwelijke-ondernemers-stijgt-verder/>
- Lerman, M. P., Munyon, T. P., & Williams, D. W. (2021). The (not so) dark side of entrepreneurship: A meta-analysis of the well-being and performance consequences of entrepreneurial stress. *Strategic Entrepreneurship Journal*, 15(3), 377–402. <https://doi.org/10.1002/sej.1370>
- Luthans, F., Avey, J. B., Avolio, B. J., Norman, S. M., & Combs, G. M. (2006). Psychological capital development: Towards a micro-intervention. *Journal of Organizational Behavior*, 27, 387–393. <https://doi.org/10.1002/job.373>
- Luthans, F., Avolio, B. J., Avey, J. B., & Norman, S. M. (2007). Positive psychological capital: Measurement and relationship with performance and satisfaction. *Personnel Psychology*, 60, 541–572. <https://doi.org/10.1111/j.1744-6570.2007.00083.x>
- Luthans, F., Youssef, C. M., & Avolio, B. J. (2007). *Psychological capital: Developing the human competitive edge*. Oxford University Press.
- Mache, S., Danzer, G., Klapp, B. F., & Groneberg, D. A. (2013). Surgeons' work ability and performance in surgical care: Relations between organisational predictors, work engagement and work ability. *Langenbeck's Archives of Surgery*, 398, 317–325. <https://doi.org/10.1007/s00423-012-1044-3>
- Martinez, M. C., & Fischer, F. M. (2019). Work ability and job survival: Four-year follow-up. *International Journal of Environmental Research and Public Health*, 16(17), 3143. <https://doi.org/10.3390/ijerph16173143>
- McCarthy, G. S., Truxillo, D. M., O'Shea, D. E., Brady, G. M., & Cadiz, D. M. (2024). The development and validation of a Multidimensional Perceived Work Ability Scale. *Journal of Occupational Health Psychology*, 29(2), 90–112. <https://doi.org/10.1037/ocp0000373>
- McGonagle, A. K., Barnes-Farrell, J. L., Di Milia, L., Fischer, F. M., Hobbs, B. B. B., Iskra-Golec, I., Kaliterna, L., & Smith, L. (2014). Demands, resources, and work ability: A cross-national examination of health care workers. *European Journal of Work and Organizational Psychology*, 23(6), 830–846. <https://doi.org/10.1080/1359432X.2013.819158>
- McGonagle, A. K., Fisher, G. G., Barnes-Farrell, J. L., & Grosch, J. W. (2015). Individual and work factors related to perceived work ability and labor force outcomes. *Journal of Applied Psychology*, 100(2), 376–398. <https://doi.org/10.1037/a0037974>
- Murgia, A., & Pulignano, V. (2021). Neither precarious nor entrepreneur: The subjective experience of hybrid self-employed workers. *Economic and Industrial Democracy*, 42(4), 1351–1377. <https://doi.org/10.1177/0143831X19873966>
- Pak, K., Kooij, D., De Lange, A. H., & Van Veldhoven, M. J. P. M. (2019). Human Resource Management and the ability, motivation and opportunity to continue working: A review of quantitative studies. *Human Resource Management Review*, 29, 336–352. <https://doi.org/10.1016/j.hrmmr.2018.07.002>
- Prottas, D. J., & Thompson, C. A. (2006). Stress, satisfaction, and the work-family interface: A comparison of self-employed business owners, independents, and organizational employees. *Journal of Occupational Health Psychology*, 11, 366–378. <https://doi.org/10.1037/1076-8998.11.4.366>
- Rauch, A., & Frese, M. (2007). Let's put the person back into entrepreneurship research: A meta-analysis on the relationship between business owners' personality traits, business creation, and success. *European Journal of Work and Organizational Psychology*, 16(4), 353–385. <https://doi.org/10.1080/13594320701595438>
- Reeuwijk, K. G., Robroek, S. J. W., Niessen, M. A. J., Kraaijenhagen, R. A., Vergouwe, Y., & Burdorf, A. (2015). The prognostic value of the work ability in-

- dex for sickness absence among office workers. *PLoS ONE*, 10(5), e0126969. <https://doi.org/10.1371/journal.pone.0126969>
- Rhee, K. S., & White, R. J. (2007). The emotional intelligence of entrepreneurs. *Journal of Small Business and Entrepreneurship*, 20(4), 409–425. <https://doi.org/10.1080/08276331.2007.10593408>
- Rietveld, C. A., Van Kippersluis, H., & Thurik, A. R. (2015). Self-employment and health: Barriers or benefits? *Health Economics*, 24(10), 1302–1313. <https://doi.org/10.1002/hec.3087>
- Saarni, S., Saarni, E. S., & Saarni, H. (2008). Quality of life, work ability, and self employment: A population survey of entrepreneurs, farmers, and salary earners. *Occupational and Environmental Medicine*, 65(2), 98–103. <https://doi.org/10.1136/oem.2007.033423>
- Schonfeld I. S., & Mazzola, J. J. (2015). A qualitative study of stress in individuals self-employed in solo businesses. *Journal of Occupational Health Psychology*, 20(4), 501. <https://doi.org/10.1037/a0038804>
- Seitsamo, J., & Ilmarinen, J. (1997). Life-style, aging and work ability among active Finnish workers in 1981–1992. *Scandinavian Journal of Work, Environment and Health*, 23(Suppl. 1), 20–26. <https://www.jstor.org/stable/40966688>
- Sell, L. (2009). Predicting long-term sickness absence and early retirement pension from self-reported work ability. *International Archives of Occupational and Environmental Health*, 82, 1133–1138. <https://doi.org/10.1007/s00420-009-0417-6>
- Sewdas, R., Tamminga, S. J., Boot, C. R. L., Van den Heuvel, S. G., De Boer, A. G., & Van der Beek, A. J. (2018). Differences in self-rated health and work ability between self-employed workers and employees: Results from a prospective cohort study in the Netherlands. *PLoS ONE*, 13(11), e0206618. <https://doi.org/10.1371/journal.pone.0206618>
- Sjögren-Rönkä, T., Ojanen, M., Esko, L., Mustalampi, S. T., & Mälkiä, E. A. (2002). Physical and psychosocial prerequisites of functioning in relation to work ability and general subjective well-being among office workers. *Scandinavian Journal of Work, Environment and Health*, 28(3), 184–190. <https://www.jstor.org/stable/40967194>
- Slowiak, J. M., & McDonough, M. (2024). Job burn-out, work health management interference, and organizational health climate among employees with varied levels of work ability. *Journal of Occupational Rehabilitation*, 20240430, 1–14. <https://doi.org/10.1007/s10926-024-10198-8>
- Stephan, U. (2018). Entrepreneurs' mental health and well-being: A review and research agenda. *Academy of Management Perspectives*, 32(3), 290–322. <https://doi.org/10.5465/amp.2017.0001>
- Stephan, U., Rauch, A., & Hatak, I. (2023). Happy entrepreneurs? Everywhere? A meta-analysis of entrepreneurship and wellbeing. *Entrepreneurship Theory and Practice*, 47(2), 553–593. <https://doi.org/10.1177/10422587211072799>
- Stephan, U., & Roesler, U. (2010). Health of entrepreneurs versus employees in a national representative sample. *Journal of Occupational and Organizational Psychology*, 83(3), 717–738. <https://doi.org/10.1348/096317909X472067>
- Tomy, S., & Pardede, E. (2018). From uncertainties to successful start ups: A data analytic approach to predict success in technological entrepreneurship. *Sustainability*, 10, 602. <https://doi.org/10.3390/su10030602>
- Tuomi, K., Huuhtanen, P., Nykyri, E., & Ilmarinen, J. (2001). Promotion of work ability, the quality of work and retirement. *Occupational Medicine*, 51(5), 318–324. <https://doi.org/10.1093/occmed/51.5.318>
- Tuomi, K., Ilmarinen, J., & Jahkola, A., et al. (1998). *Work ability index. 2<sup>nd</sup> revised ed.* Finnish Institute of Occupational Health.
- Tuomi, K., Ilmarinen, J., Martikainen, R., & Klockars, M. (1997). Aging, work, life-style and work ability among Finnish municipal workers in 1981–1992. *Scandinavian Journal of Work Environment & Health*, 23(Suppl. 1), 58–65. <https://www.jstor.org/stable/40966692>
- Van den Berg, T. I. J., Elders, L. A. M., De Zwart, B. C. H., & Burdorf, A. (2009). The effects of work-related and individual factors on the Work Ability Index: A systematic review. *Occupational & Environmental Medicine*, 66, 211–220. <https://doi.org/10.1136/oem.2008.039883>
- Von Bonsdorff, M. E., Huuhtanen, P., Tuomi, K., & Seitsamo, J. (2010). Predictors of employees' early retirement intentions: An 11-year longitudinal study. *Occupational Medicine*, 60, 94–100. <https://doi.org/10.1093/occmed/kqp126>
- Von Bonsdorff, M. E., Zhou, L., Wang, M., Vanhala, S., von Bonsdorff, M. B., & Rantanen, T. (2018). Employee age and company performance: An integrated

- model of aging and human resource management practices. *Journal of Management*, 44, 3124–3150. <https://doi.org/10.1177/0149206316662314>
- Vänni, K., Virtanen, P., Luukkaala, T., & Nygård, C. (2012). Relationship between perceived work ability and productivity loss. *International Journal of Occupational Safety and Ergonomics*, 18(3), 299–309. <https://doi.org/10.1080/10803548.2012.11076946>
- Van Praag, C. M., & Versloot, P. H. (2007). What is the value of entrepreneurship? A review of recent research. *Small Business Economics*, 29, 351–382. <https://doi.org/10.1007/s11187-007-9074-x>
- Van Veldhoven, M., Meijman, T. F., Broersen, J. P. J., & Fortuin, R. J. (2002). *Handleiding VBBA*. SKB Vragenlijst Services Amsterdam.
- Wach, D., Stephan, U., & Gorgievski, M. (2016). More than money: Developing an integrative multi-factorial measure of entrepreneurial success. *International Small Business Journal*, 34(8), 1098–1121. <https://doi.org/10.1177/0266242615608469>