

This is an electronic reprint of the original article. This reprint may differ from the original in pagination and typographic detail.

---

## Occupational self-efficacy and work engagement associated with work ability among an ageing work force

Wallin, Stina; Rauhala, Auvo; Fjellman-Wiklund, Annacristine; Nyman, Pia; Fagerström, Lisbeth

*Published in:*  
WORK

*DOI:*  
[10.3233/WOR-213595](https://doi.org/10.3233/WOR-213595)

Published: 01/01/2021

*Document Version*  
Accepted author manuscript

[Link to publication](#)

*Please cite the original version:*

Wallin, S., Rauhala, A., Fjellman-Wiklund, A., Nyman, P., & Fagerström, L. (2021). Occupational self-efficacy and work engagement associated with work ability among an ageing work force: A cross-sectional study. *WORK*, 70(2), 591-602. <https://doi.org/10.3233/WOR-213595>

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

### Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

1 **Title**

2 Occupational self-efficacy and work engagement associated with work ability among an  
3 ageing work force: a cross-sectional study

4

5 **Authors**

6 Stina Wallin, MSc<sup>a</sup>, Auvo Rauhala, PhD<sup>a,b</sup>, Annacristine Fjellman-Wiklund, PhD<sup>c</sup>, Pia Nyman,  
7 PhD<sup>d</sup>, Lisbeth Fagerström, PhD<sup>a,c</sup>

8

9 <sup>a</sup>Faculty of Education and Welfare Studies, Health Sciences, Åbo Akademi University, Vaasa,  
10 Finland, <sup>b</sup>Vaasa Central Hospital, Vaasa, Finland, <sup>c</sup>Department of Community Medicine and  
11 Rehabilitation, Physiotherapy, Umeå University, Umeå, Sweden, <sup>d</sup>Department of Social  
12 Services and Healthcare, Pietarsaari, Finland, and <sup>e</sup>Faculty of Health and Social Sciences,  
13 University of South-Eastern Norway, Drammen, Norway.

14

15 **Corresponding author**

16 Stina Wallin, Faculty of Education and Welfare Studies, Health Sciences, Åbo Akademi  
17 University, PO Box 311, FI-65101, Vaasa, Finland

18 E-mail: [stina.wallin@abo.fi](mailto:stina.wallin@abo.fi).

19

20

21

22

23

24

25

26 **Abstract**

27 **BACKGROUND:** Occupational self-efficacy (OSE) is an appropriate adaption capability to  
28 react to continuous changes in work life today. While self-efficacy is an important component  
29 in work context, there is less knowledge regarding older workers' OSE.

30 **OBJECTIVE:** This study examined the relationship between work ability, OSE and work  
31 engagement among a middle-aged workforce, and whether there were any differences  
32 between age groups and between professionals in different work context.

33 **METHODS:** Data were collected by questionnaire, which included Work Ability Index  
34 (WAI), Occupational Self-Efficacy Scale, and Utrecht Work Engagement Scale.

35 **RESULTS:** A total of 359 home care workers and engineers (response rate 43%)  
36 participated. The average age was 54 (SD  $\pm 5.3$ ) years, 69% were women. The results of  
37 logistic regression analyses revealed an association between WAI, OSE (OR 0.66; 95%CI  
38 0.52 to 0.86) and work engagement (OR 0.61; 95%CI 0.47 to 0.78). Higher OSE and work  
39 engagement were related to higher work ability. No difference in OSE (5.9;  $\pm 0.8$ ) between  
40 professional groups was seen, but the home care workers scored considerably higher work  
41 engagement (5.1;  $\pm 0.9$ ) than the engineers (4.5;  $\pm 1.3$ ).

42 **CONCLUSIONS:** Improving OSE could be worthwhile to support work ability among  
43 middle-aged workers, despite dissimilarities in work context and educational level.

44

45 **Keywords:** self-concept, middle-aged, occupational gerontology, occupational health

46

47

48

49

## 50 **1. Introduction**

51 Western societies are undergoing continuous change, including citizens' work life [1].  
52 Workers with an appropriate adaption capability are more likely to develop their skills and  
53 perceive the changes taking place as challenges to be overcome. Essential to such adaption is  
54 people's belief in own capabilities [1]. Self-efficacy relates to people believing in their  
55 capability to successfully realize behaviors necessary to generate specific outcomes and is a  
56 core aspect of Bandura's Social Cognitive Theory [2]. Self-efficacy is developed in four  
57 ways: mastery of experiences (overcoming obstacles through perseverance), social modelling  
58 (peers' successful performances), social persuasion (encouragement of belief in one's self),  
59 and good physical and mental health. Since people's belief in own capabilities varies from  
60 situation to situation and across activity domains, Bandura recommended the measurement of  
61 domain-specific self-efficacy versus general self-efficacy [2]. The domain-specific  
62 occupational self-efficacy (OSE) pertains to workers' belief in their capability to successfully  
63 perform in an occupational domain in respect to occupational adjustment and the management  
64 of obstacles [3]. Previous research has shown positive relationships between OSE and general  
65 health [4], and work-related factors, for example work efficiency [5], job performance [5, 6],  
66 work motivation and job satisfaction [4, 5].

67  
68 Because of the decreasing number of workers in Europe, retaining ageing workers in work life  
69 is important [7]. Personal resources refer to intrinsic factors generally linked to individuals'  
70 beliefs about whether they can successfully influence their environment [8, 9], and are found  
71 essential for work related wellbeing throughout the work life [10]. Universally, self-efficacy  
72 has been considered an important personal resource [9], and the domain-specific OSE an  
73 important personal resource for workers [3]. Research on workers' general self-efficacy has  
74 shown age-related decline [11]. However, regarding work domain-specific self-efficacy

75 among older workers there is less knowledge [5, 12]. Some evidence is found on higher OSE  
76 among older workers compared to younger ones [12, 13]. Negative attitudes, organizational  
77 [12] and workers' own [5], towards ageing have been seen to decrease the older workers'  
78 OSE. Among older workers, higher OSE has been related to better work motivation, job  
79 satisfaction and life satisfaction, but not to predicted future job performance and retirement  
80 age [5].

81

82 Research shows a positive relationship between OSE and work engagement [4, 14], especially  
83 when workers are facing work demands [15]. Workers with high self-efficacy tend to feel  
84 good at work and are motivated and engaged [16]. Similarly, people with high work  
85 engagement are both able and motivated to do a good job [17] and are primarily driven by  
86 intrinsic motivation [18]. Work engagement relates to a more persistent and pervasive  
87 affective-cognitive state of how workers experience their work as, "... a positive, fulfilling,  
88 work-related state of mind that is characterized by vigor, dedication, and absorption" [19].  
89 Vigor is characterized by high levels of energy and mental resilience and the willingness to  
90 devote time and effort at work. Dedication relates to having work as a significant and  
91 meaningful interest, while absorption is being fully concentrated and deeply absorbed in one's  
92 work [19]. Work engagement is an important indicator of occupational well-being and is  
93 positively associated with, for example, health [14, 20], life satisfaction [17], low sickness  
94 absence, job resources [14], and job performance [21]. Yet even high-engaged workers may  
95 experience failure at work when self-efficacy is low [22].

96

97 In one multidimensional model, work ability is described as a balance between individual  
98 resources and work demands [23]. Individual resources include health and functional  
99 capacities, competence, values, attitudes and motivation. Work demands are related to

100 working life, work community and leadership. Workers' everyday work ability is influenced  
101 by individual resources, work demands, family and close community, which interact.  
102 Workers' values, attitudes and motivation are strongly influenced by previous work life  
103 experiences and have the greatest influence on work. In previous studies, researchers have  
104 found that work ability tends to decrease with age, even though high individual variability  
105 exists [10, 24]. Chronic disease is typically seen to increase alongside age, and as the  
106 European workforce ages the proportion of workers with health-related limitations will  
107 increase [23, 25, 26]. Having a chronic disease is often related to an imbalance between  
108 individual resources and one's ability to meet work demands [25]. Still, because ageing is an  
109 individual process, a deterioration in one's health does not necessary impact one's job  
110 performance [27]. Nevertheless, the need to achieve a best-possible balance between  
111 individual resources and work demands throughout one's working life exists [23]. The more  
112 positive values, attitudes and motivation to work a worker has, the more likely he/she will  
113 have a good work life, longer career, better work ability and better quality of life after  
114 retirement. In the shadow of a focus on decreasing work demands and increasing job  
115 resources [28], personal resources can help managing adverse work demands [8, 9].  
116 Additionally, personal resources may, together with job resources, reduce the negative effects  
117 of age on work ability [10]. Thus, improving workers' self-efficacy may help workers meet  
118 emotional demands at work [15] and facilitate work engagement [15, 22] and motivation [5,  
119 22].

120

121 The female-dominated health care sector and the male-dominated engineering sector are  
122 different both in terms of the nature of work and educational levels; however, each faces  
123 increasing job demands [29]. Finnish home care workers already perceive their workload to  
124 be too high, including a burdensome physical workload and an increased psychological one

125 [30]. Many changes in home care work have taken place during the last few years. The  
126 greatest change has been an increased number of administrative tasks. Additionally, there are  
127 more clients overall, and with more complex care needs. These home care workers have  
128 expressed concern that the lack of home care staff constitutes a risk for the clients' safety as  
129 well as for their own health. About 40% of them have considered quitting their work.  
130 Although the Finnish home care staff has been rejuvenated, approximately 60% are 45 years  
131 and older [30]. Previous research on self-efficacy among home care workers in different ages  
132 has revealed that self-efficacy promotes work ability [31]. For middle-aged nursing staff in  
133 Germany, researchers have found positive correlations between OSE and task performance  
134 and feeling recovered during leisure time, but no correlation between work reflection and  
135 contextual performance [32].

136

137 Engineers' work content has also shifted due to changes in the world in the last 20 years [33].  
138 The world has become more complex, interconnected and interdependent. The engineers'  
139 work is characterized by offering solutions, and today's demands require different skills and  
140 broader competence compared to before. Engineers' central role in high-tech companies still  
141 requires strong and unique technical skills. Additionally, it necessitates global understanding  
142 and competence, as well as entrepreneurship, creativity, teamwork and social skills [33]. In a  
143 report from the Finnish association for engineering academics, 25 % of their workers 50 years  
144 and above have experienced discrimination because of their age [34]. Higher self-efficacy  
145 belief has been found to buffer the negative effects of job demands on psychological strain  
146 among engineers [35].

147

148 To conclude, despite the importance of OSE on work engagement [4, 14, 15, 16] and work  
149 related well-being [3, 4, 36], only few studies have investigated the relationship between OSE

150 and work ability [10] among the ageing workforce [5, 12]. Moreover, regarding gender  
151 differences in OSE, contrary findings have been reported. Some studies have found higher  
152 OSE for men than for women [12], while others revealed no gender differences [3, 4].  
153 Regarding educational status, higher OSE has been found among workers with college level  
154 education compared to primary education [3]. A Finnish sample showed higher work  
155 engagement for women than for men, and for white collar compared to blue collar workers  
156 [37]. Additionally, both home care and engineering sectors are considered upcoming  
157 bottleneck vacancies in Europe [38]. It is therefore important to retain workers of both  
158 professions in their respective work sector. In the future, ageing will affect access to labor in  
159 the European countries, resulting in recruitment difficulties [38]. We presume OSE to be an  
160 important personal resource also among ageing workers. In addition to the workers  
161 themselves, work organizations could therefore benefit from strengthening ageing workers'  
162 OSE [36, 39].

163

164 The aim of this study was to explore the relationship between perceived work ability,  
165 occupational self-efficacy and work engagement among a middle-aged workforce. An  
166 additional aim was to examine whether there were any differences, regarding these variables,  
167 between ageing and older workers and between professionals in home care and engineering  
168 settings, despite dissimilarities such as work context, educational level and gender  
169 distribution.

170

## 171 **2. Methods**

### 172 *2.1. Design and study population*



173 The study had an observational and cross-sectional design. Forty-five years old and older  
 174 home care workers and engineers were recruited from a region in Western Finland to answer  
 175 an anonymous questionnaire (Figure 1). In this study, workers aged 45 to 54 years were  
 176 considered “ageing workers”. The term encompasses a period where major changes in  
 177 function that can affect work ability and personal resources usually occur but where there are  
 178 still nonetheless possibilities to improve functional abilities [40]. However, loss in work  
 179 ability may accelerate if no preventive actions are taken. Workers aged 55 years or older were  
 180 considered “older workers”. This threshold often used for older workers corresponds to their  
 181 decline in the participation rate in the labor market [41], even though the rate for 55 years and  
 182 older workers has slightly increased in the OECD area [42].

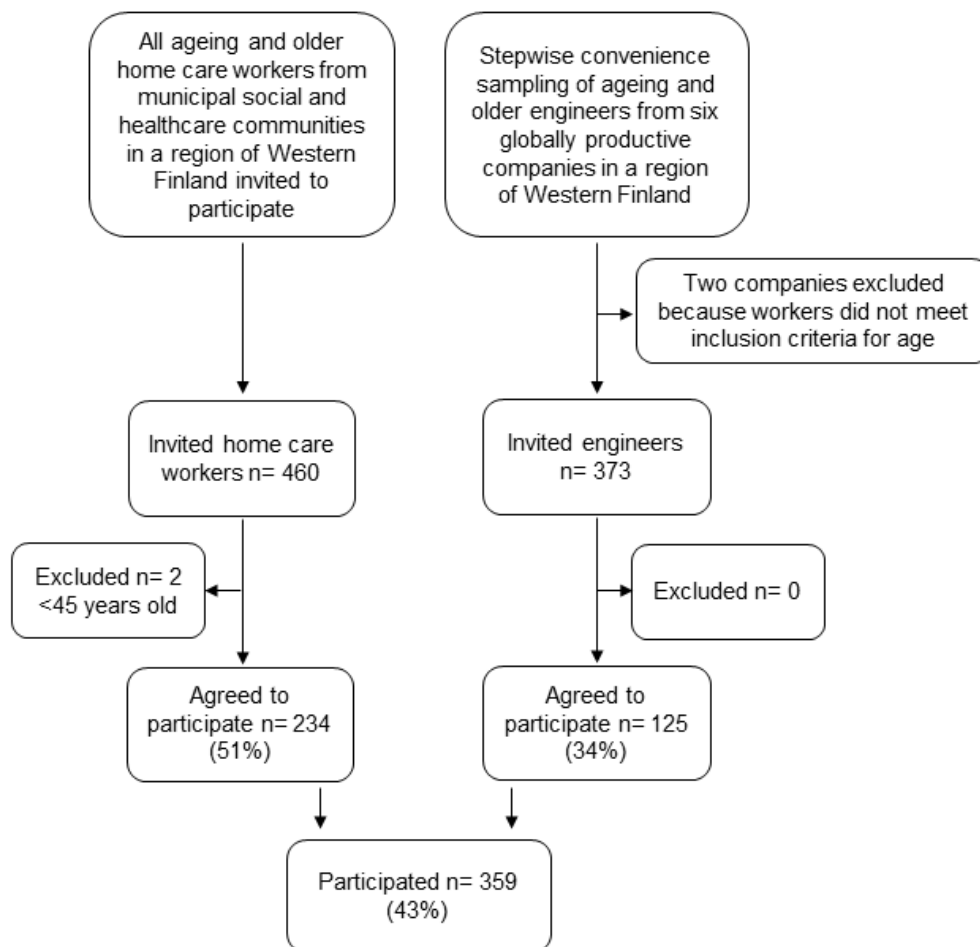


Fig. 1 Flowchart of sample selection and study population

184

185 The main inclusion criteria were being 45 years old or above and having a valid employment  
186 contract. All home care workers meeting these criteria and working in municipal social and  
187 healthcare communities, regardless of educational level, were invited to participate. Their  
188 closest supervisors shared information about the study and access to the study questionnaire,  
189 in either paper-based or web-based form. Seventy-one percent of the participating home care  
190 workers completed a paper-based questionnaire. Data material from two home care workers  
191 was excluded because they were younger than 45 years old. Engineers meeting the inclusion  
192 criteria were invited by convenience sampling. One company at a time was selected following  
193 a discussion about the inclusion criteria with each company's head of human resource  
194 management. While six companies were invited to participate, workers from two of these  
195 companies did not meet the inclusion criteria, because no 45 year-olds or older engineers were  
196 working there. These companies were excluded before the survey was sent out to their  
197 engineers. Thus, four globally productive companies were ultimately included. Each  
198 company's local human resource department provided those participating with information  
199 about the study and access to web-based questionnaires. The period to collect data material  
200 was set for May to June 2018, and was extended to September 2018 to enable a larger  
201 participation. The collection ended at the end of September, despite some difficulties in  
202 recruiting engineers to the survey. The study questionnaire was made available in both the  
203 Swedish and Finnish languages.

204

## 205 *2.2. Measurements*

### 206 *2.2.1. Work ability*

207 Perceived work ability was assessed using the Work Ability Index (WAI) [43]. The WAI  
208 measures seven aspects: current work ability compared with lifetime best, work ability in

209 relation to physical and mental job demands, number of current diseases diagnosed by a  
210 physician, estimated work impairment due to diseases, sick leave during the past year, own  
211 prognosis of work ability two years from now, and mental resources. The WAI summative  
212 index ranges from 7 to 49 points and is classified into poor (7-27), moderate (28-36), good  
213 (37-43) and excellent (44-49) work ability. The WAI has been shown to have satisfactory  
214 internal reliability and construct validity, and is a highly predictive instrument for mental and  
215 physical wellbeing [44].

216

### 217 *2.2.2. Occupational self-efficacy*

218 Confidence in mastering various occupational tasks was measured using the Occupational  
219 Self-Efficacy Scale – Short Form [3] (OSS-SF). Statements in the OSS-SF (e.g., “I feel  
220 prepared for most of the demands in my job”) are scored using a seven-point Likert scale  
221 ranging from 1 (strongly disagree) to 7 (strongly agree). Higher mean scores indicate more  
222 positive OSE. The OSS-SF has been found to have satisfactory internal consistence and  
223 evidence of construct validity. The OSS-SF provides a domain-specific measurement.  
224 Defined by Rigotti et al [3], OSS-SF refers to “the competence that a person feels concerning  
225 the ability to successfully fulfill the tasks involved in his or her job”. An advantage of this  
226 domain-specific measurement is that it enables a comparison of workers from different  
227 organizations, professions and/or jobs [3].

228

### 229 *2.2.3. Work engagement*

230 Work engagement was assessed with the short version of the Utrecht Work Engagement Scale  
231 (UWES-9) [45]. The UWES-9 consists of nine items (e.g., “At my work, I feel that I am  
232 bursting with energy”) and assesses the level of vigor, dedication and absorption at work,  
233 scored on a seven-point Likert scale ranging from 0 (never) to 6 (always). Higher mean scores

234 indicate better work engagement. The UWES-9 has been found to have good internal  
235 consistency and test-retest reliability [40] and construct validity [46].

236

### 237 *2.3. Covariates*

238 Variables thought to affect the association between the WAI, OSS-SF and UWES-9 were  
239 selected based on a review of the literature and in relation to the feasibility of collecting data  
240 in the field. Included covariates were gender, age, marital status, educational level (low: no  
241 vocational training/professional school/traineeship contracts, high: vocational institute/higher  
242 vocational education/lower university degree/university degree), employment status (full-  
243 time/part-time employment, permanent/temporary employment), profession (home care  
244 worker/engineer) and work experience in years (continuous).

245

### 246 *2.4. Statistical analyses*

247 Descriptive analyses of baseline characteristics are presented as mean, standard deviation and  
248 percentage rates (Table 1-2). Differences between groups were evaluated using the  
249 independent sample t-test and Mann-Whitney U test. Pearson's chi-square test and Fisher's  
250 exact test were used for categorical variables. Effect size was calculated using Rosenthal's  
251 formula [47]. Missing value analysis was performed to address concerns caused by  
252 incomplete data. The missing data varied between 0 and 4.7% in the variables studied. Little's  
253 Missing Completely at Random (MCAR) test confirmed that missing data were completely at  
254 random ( $p = .084$ ), which allowed data transformation through maximum likelihood  
255 estimation.

256

257 To examine the relationship between the WAI, OSS-SF and UWES-9, binary logistic  
258 regression analyses were performed to generate odds ratios and 95% confidence intervals

259 (95% CI). Work ability was considered the dependent variable. Workers with poor or  
260 moderate WAI are at risk of losing their work ability, unless preventive or corrective actions  
261 are initiated [48]. Binary logistic regression enabled the examination of differences between  
262 poor-moderate and good-excellent levels of WAI. Therefore, we dichotomized WAI into  
263 poor-moderate work ability (=1) and good-excellent work ability (=0). The threshold of 55  
264 years of age for older workers is often used because of the correspondence to decline in  
265 participation rate in the labor market [41]. Therefore, the variable age was dichotomized into  
266 45-54 years old (ageing) and 55 and above (older workers), to analyze possible differences  
267 between the age groups. The variables OSS-SF, UWES-9, profession (home care staff =1) and  
268 age (55 years and older =1) were considered covariates. Nagelkerke R Square values are  
269 presented with regression analysis models (Table 4). The OSS-SF and UWES-9 have different  
270 scales, making them difficult to interpret and compare. Therefore, standardized slopes were  
271 used in the statistical analyses to facilitate the interpretation. All statistical tests were  
272 conducted at the two-sided  $p < 0.05$  level of significance. The data were analyzed using SPSS  
273 Statistics 24.0 (IBM Corporation, Armonk, NY, USA).

Table 1  
Characteristics of the study population, stratified by profession

n=359 (%)	Home care workers 234 (65,2)		Engineers 125 (34,8)		p-value
	%	Mean (standard deviation)	%	Mean (standard deviation)	
<b>Age (years)</b>					
45-49 years	19.4		33.3		0.000 <sup>a</sup>
50-54 years	26.6		32.5		
55-59 years	31.1		22.8		
60- years	23.0		11.4		
<b>Gender</b>					
Women	99.1		12.1		0.000 <sup>b</sup>
Men	0.9		87.9		
<b>Marital status</b>					
Single	8.3		7.2		0.316 <sup>c</sup>
Married/marriage-like relationship	80.3		84.8		
Divorced	11.0		8.0		
Widow	0.4		0.0		
<b>Educational level</b>					
Low education	68.1		0.8		0.000 <sup>b</sup>
High education	31.9		99.2		
<b>Employment status</b>					
Permanent employment	88.3		100.0		0.000 <sup>d</sup>
Temporary employment	11.7		0.0		
Full-time employment	73.0		97.6		0.000 <sup>d</sup>
Part-time employment	27.0		2.4		
<b>Job demands</b>					
Psychologically demanding	18.5		96.0		0.000 <sup>d</sup>
Physically demanding	5.6		0.0		
Physically and psychologically demanding	75.9		4.0		
<b>Work experience (years)</b>		18 (12.1)		18 (9.7)	0.645 <sup>b</sup>

<sup>a</sup>= Independent Samples T-Test <sup>b</sup>=Mann-Whitney U Test <sup>c</sup>=Fisher's Exact Test <sup>d</sup>=Pearson Chi-Square Test P-value= Differences between poor-moderate work ability group and good-excellent work ability group and between home care workers and engineers

274

### 275 3. Results

276 Of 833 questionnaires, 359 were completed after three reminders, yielding a response rate of

277 43% (home care workers n=234, 51%; engineers n=125, 34%). Participants were on average

278 54 ±5.3 years old and 69% were women (Table 1). The majority were home care workers. As

279 there were only a few men (n=2) among the home care workers and a few women among the  
280 engineers (n=15), the results are presented in relation to professional groups.

281

282 The average WAI was good in both professional groups (Table 3). More than two-thirds of  
283 the participants had good-excellent work ability. Among the home care staff, there was a  
284 higher proportion of workers with poor-moderate work ability compared to the engineers  
285 (Table 2). In addition to more often being home care workers, those with poor-moderate work  
286 ability were generally older, women, part-time employed, and had both physically and  
287 psychologically demanding work; all factors related to a greater degree to home care workers  
288 in this study. Three-quarters of home care workers perceived their work to be both physically  
289 and psychologically demanding, while nearly all of the engineers perceived their work to  
290 primarily be psychologically demanding. Both professional groups perceived their work  
291 ability to be rather or very good, due to work-related psychological demands. However, in the  
292 poor-moderate work ability group, significantly more engineers (68%) than home care  
293 workers (43%) ( $p=0.030$ ) perceived their work ability in relation to psychological demands as  
294 poor-moderate. The poor-moderate work ability group had more currently diagnosed diseases  
295 ( $p<0.0005$ ). The most common were musculoskeletal (73%) and cardiovascular diseases  
296 (40%), also most common among the good-excellent work ability group (25% and 16% each).

Table 2  
 Characteristics of the study population, stratified by work ability (poor-moderate and good-excellent)

n=359 (%)	Poor-moderate work ability 106 (31)		Good-excellent work ability 236 (69)		p-value
	%	Mean (standard deviation)	%	Mean (standard deviation)	
<b>Professional group</b>					
Home care workers	36.4		63.6		0.004 <sup>b</sup>
Engineers	21.3		78.7		
<b>Age (years)</b>					
45-49 years	29.3		70.7		0.003 <sup>b</sup>
50-54 years	21.6		78.4		
55-59 years	29.5		70.5		
60- years	49.2		50.8		
<b>Gender</b>					
Women	35.6		64.4		0.008 <sup>b</sup>
Men	21.3		78.7		
<b>Marital status*</b>					
Single	30.8		69.2		0.078 <sup>b</sup>
Married/marriage-like relationship	29.7		70.3		
Divorced	48.6		51.4		
<b>Educational level</b>					
Low education	35.2		64.8		0.133 <sup>b</sup>
High education	27.5		72.5		
<b>Employment status</b>					
Permanent employment	30.7		69.3		0.678 <sup>b</sup>
Temporary employment	34.6		65.4		
Full-time employment	28.2		71.8		0.018 <sup>b</sup>
Part-time employment	43.5		56.5		
<b>Job demands</b>					
Psychologically demanding	20.1		79.9		0.000 <sup>b</sup>
Physically demanding	46.2		53.8		
Physically and psychologically demanding	40.4		59.6		
<b>Work experience (years)</b>		19.4 (10.7)		17 (11.3)	0.080 <sup>a</sup>

<sup>a</sup>= Independent Samples T-Test <sup>b</sup>=Pearson Chi-Square Test.

P-value= Differences between poor-moderate work ability group and good-excellent work ability group and between home care workers and engineers.

\*=Widow n=1 in good-moderate group, not included in p-test.

297

298 The poor-moderate work ability group showed lower OSS-SF and UWES-9, meaning that  
 299 their belief in being able to successfully accomplish work-related tasks and work engagement  
 300 were significantly lower compared to the good-excellent work ability group (Table 3). In the  
 301 whole study sample, the reported mean values of OSS-SF were seen to be at the same level  
 302 for both professional groups. However, the engineers showed significantly lower UWES-9  
 303 compared to the home care workers, meaning they had a significantly lower work engagement



304 regardless of their level of WAI. Stratified into age groups, older workers had significantly  
 305 higher OSS-SF and lower WAI compared to ageing workers. No differences were found  
 306 between age groups in UWES-9. Despite frequently significant values, effect sizes were  
 307 mostly at a low level, except for the moderate level difference between WAI groups in  
 308 UWES-9.

Table 3  
 Comparison of WAI, OSS-SF and UWES-9 measurements between groups

	Mean	Median	SD	Z	P-value	Effect size
<b>WAI (n=342)</b>	39.0	40.5	6.6			
Home care workers (n=220)	37.9	39.8	6.8	-2.879	0.004	0.16
Engineers (n=122)	41.0	42.5	5.7			
45-54 years old (n=179)	39.6	41.0	6.4	-2.340	0.019	0.13
≥55 years old (n=154)	38.4	39.0	6.8			
<b>OSS-SF (n=343)</b>	5.9	6.0	0.8			
Home care workers (n=221)	5.9	6.0	0.8	-0.746	NS 0.455	0.04
Engineers (n=122)	5.8	6.0	0.8			
Poor-moderate WAI (n=101)	5.5	5.7	1.0	-4.113	0.000	0.23
Good-excellent WAI (n=230)	6.0	6.0	0.7			
45-54 years old (n=178)	5.8	5.8	0.8	-2.371	0.018	0.13
≥55 years old (n=152)	5.9	6.0	0.9			
<b>UWES-9 (n=343)</b>	4.9	5.2	1.1			
Home care workers (n=219)	5.1	5.3	0.9	-4.488	0.000	0.24
Engineers (n=123)	4.5	5.0	1.3			
Poor-moderate WAI (n=101)	4.5	4.9	1.1	-6.004	0.000	0.33
Good-excellent WAI (n=228)	5.1	5.3	1.0			
45-54 years old (n=177)	4.9	5.1	1.1	-1.722	NS 0.085	0.09
55- years old (n=153)	5.0	5.2	0.9			

P-value for differences between home care workers and engineers, and between poor-moderate WAI and good-excellent WAI. P-values were analyzed using Mann-Whitney U Test. Effect size were analyzed using Rosenthal's formula. SD=Standard deviation. OSS-SF=Occupational Self-efficacy - Short Form. UWES-9= short version of the Utrecht Work Engagement Scale. WAI=Work Ability Index.

309  
 310 Before testing the regression model, a correlation analysis between the study variables was  
 311 conducted. Spearman's rho showed significant correlations in the whole sample between the  
 312 dichotomous set WAI (poor-moderate =1, good-excellent =0) and OSS-SF ( $r = -.236$ ,  $p =$   
 313  $.000$ ), UWES-9 ( $r = -.334$ ,  $p = .000$ ), profession ( $r = -.145$ ,  $p = .006$ ), gender ( $r = -.138$ ,  $p =$   
 314  $.010$ ), educational level ( $r = -.128$ ,  $p = .016$ ), and dichotomous set age ( $r = -.119$ ,  $p = .025$ ).  
 315 For the home care workers, Spearman's rho showed significant correlations between WAI and  
 316 OSS-SF ( $r = -.210$ ,  $p = .001$ ) and between WAI and UWES-9 ( $r = -.360$ ,  $p = .000$ ). Similar

317 correlations were seen for the engineers: OSS-SF ( $r = -.332, p = .000$ ) and UWES-9 ( $r = -$   
 318  $.502, p = .000$ ). Nevertheless, based on Fisher's r-to-z transformation, the correlation between  
 319 WAI and OSS-SF was not significantly different between the professional groups ( $z = -1.17,$   
 320  $p = .242$ ), nor the correlation between the WAI and UWES-9 ( $z = -1.53, p = .126$ ). Subgroup  
 321 binary logistic regression analyses were computed, and no differences in explanatory  
 322 variables between the home care workers and engineers were found. For this reason, the  
 323 results from the regression analyses were presented for the whole study sample.

**Table 4**  
 Relationship between WAI, occupational self-efficacy,  
 and work engagement by binary logistic regression

	<b>Model 1</b> Unadjusted	<b>Model 2</b> Adjusted
<b>Constant</b> (Poor-moderate WAI =1)	0.426***	0.140***
<b>Occupational self- efficacy</b>	0.664** (0.516-0.856)	0.655** (0.499-0.859)
<b>Work engagement</b>	0.608*** (0.474-0.780)	0.486*** (0.365-0.646)
<b>Profession</b> (Home care workers =1)		3.248*** (1.755-6.012)
<b>Age</b> (≥55 years =1)		1.833* (1.108-3.034)
<b>Nagelkerke R Square</b>	0.152	0.236
<b>N</b>	360	360

\*\*\*= $p < 0.001$  \*\*= $p < 0.01$  \*= $p < 0.05$ .  
 Odds ratio with 95% confidence interval (95% CI).  
 Reference group: poor-moderate WAI.  
 Standardized slopes for occupational self-efficacy and for  
 work engagement were used in regression analysis.  
 WAI=Work Ability Index.

324  
 325 The results of the binary logistic regression analyses showed a significant relationship  
 326 between the WAI, OSS-SF and UWES-9, even after adjustment for additional covariates ( $p <$   
 327  $0.05$ ). The unadjusted model included the OSS-SF and UWES-9 as explanatory variables. In  
 328 the adjusted model, socio-demographic factors with  $p$ -value  $< 0.05$  in Spearman's rho test  
 329 were also included. A model including solely socio-demographic factors such as profession,

330 work experience, level of education and age showed non-significant results and are therefore  
331 not presented in Table 4 (Nagelkerke R Square 0.048). Interactions between work ability and  
332 possible confounders for OSE were also tested, with non-significant results. The results  
333 revealed that higher OSS-SF and UWES-9 more often related to good-excellent WAI as well.  
334 Being a home care worker entails four times greater odds and being 55 years or older entails  
335 twice greater odds of having poor-moderate work ability, when compared to the reference  
336 group in each dichotomous variable.

337

#### 338 **4. Discussion**

339 In this study we examined the relationship between 45 year-olds' and older workers'  
340 perceived work ability, OSE and work engagement. Additionally, we investigated possible  
341 differences between ageing and older workers in the home care and engineering professions.  
342 The main finding was that higher OSE was related to higher work ability among both ageing  
343 and older home care workers and engineers, despite the differences in their work content and  
344 work context.

345

346 Regarding the home care workers, these results are consistent with findings by Larsson et al.  
347 [31]. Given that previous research on ageing engineers' OSE and WAI was not found, the  
348 findings here contribute new knowledge on male-dominated technical professions. Similar to  
349 earlier findings [12], older workers in our study perceived higher OSE in comparison to  
350 ageing workers. Such results support the assertion that OSE is an important personal resource  
351 also for the ageing and older work force, which corresponds to previous research [5].

352

353

354 As seen in previous research, during the past few years both home care workers [30] and  
355 engineers [29] have reported experiencing an increasing level of work-related psychological  
356 demands. In the holistic Work Ability House-model, work ability is defined as the balance  
357 between individual resources and work demands [23]. In the Job Demands-Resource (JD-R)  
358 model, the workers' performance and well-being are similarly explained in terms of work  
359 demands and job resources (for an overview; Bakker, Demerouti 2014 [49]; Bakker, 2017  
360 [9]). In the development of the JD-R model, personal resources were included [49]. Workers  
361 with high personal resources can successfully control and influence their environment [8, 9].  
362 Personal resources can help workers resist adverse work demands. Additionally, personal  
363 resources may, together with job resources, decrease the negative effects of age on work  
364 ability [10]. Self-efficacy is stated as an important personal resource enabling work-related  
365 well-being [5, 9, 16], and previous research has revealed that enhancing workers' self-efficacy  
366 can help them meet emotional demands at work [15]. Therefore, based on our results, we  
367 claim that OSE might be helpful also for ageing and older workers to cope with work-related  
368 demands.

369

370 However, activities supporting work ability among the ageing workforce mainly focus on  
371 harmonizing work demands against job resources [26]. Supporting activities less frequently  
372 focus on improving personal resources. According to the results in our study, enhancing OSE  
373 might strengthen work ability among ageing and older workers. Previous research has also  
374 indicated that it is worthwhile to enhance OSE in occupational interventions [13]. Self-  
375 efficacy can be stimulated through mastery experiences of overcoming challenging obstacles  
376 [2]. In the changing home care and engineering sectors, including the high number of work  
377 demands [30, 33], strengthening OSE by mastery experiences could be valuable. Mastery  
378 experience is the most significant indicator for workers' abilities [50]. While exceeding

379 demands will undermine self-efficacy beliefs, meeting challenges that are possible to  
380 overcome will instead increase them. Nevertheless, leaders and organizations have a great  
381 mandate since they have the power to improve the work environment [51, 52], consequently  
382 influencing work demands.

383

384 Even though OSE was related to work ability among both home care workers and engineers,  
385 their work context highly differs. In general, all workplaces and work situations as well as all  
386 workers are different [51]. Therefore, the actions improving workers' opportunities to remain  
387 longer in working life need individual, organizational and company adaptations. As regards  
388 the role of social modeling of similar others in corresponding situations [2], interventions  
389 planned to enhance OSE should consider individuality also in group-based interventions.

390

391 In our study both ageing and older workers had higher work engagement when compared to a  
392 previous Finnish sample [37]. Also the home care workers had considerably higher work  
393 engagement when compared to the engineers. For the engineers, work engagement was at  
394 about the same level as in a sample including Finnish supervisor engineers [37]. The home  
395 care workers had higher scores when compared to other studies for healthcare workers [37]  
396 and home care aids [31]. When emotional demands are high, high self-efficacy facilitates  
397 work engagement [15]. Both professional groups in our study perceived their work ability as  
398 good in relation to work-related psychological demands and both professional groups  
399 demonstrated high OSE, which nonetheless still does not illuminate the difference seen  
400 between the groups in relation to work engagement. One can suppose that the difference may  
401 be related to home care workers' and engineers' dissimilar work content and work contexts.  
402 Home care workers perceive their work to be meaningful and have a high sense of  
403 responsibility for their clients, even when it negatively affects their own health [30]. The

404 meaningfulness of the home care work itself acts as an inner motivation [53]. Even though  
405 work engagement differs from motivation, high work pleasure and involvement refer to  
406 dedication and reflect the motivational aspect of the concept [54]. Work engagement refers to  
407 the content of work rather than to the workplace itself. Job resources are physical,  
408 psychological, social and organizational, functional in achieving work goals and stimulating  
409 personal growth, learning and development. Job resources act as motivational factors and are  
410 most predictive for work engagement. Consequently, to support the engineers' work  
411 engagement, coaching supervisors giving feedback, a positive team atmosphere and learning  
412 opportunities throughout their working career might be helpful, and will contribute to higher  
413 self-efficacy as well [54].

414

#### 415 *4.1. Methodological considerations*

416 A strength was that the study sample encompassed both the nursing and technical sectors and  
417 national and international work contexts. Despite the different natures of the professions  
418 included, no differences in explanatory factors regarding work ability were seen. One  
419 limitation was the response rate of 43%. This could imply a possible selection bias, whereby  
420 the results should be interpreted with some caution. A disadvantage of using a questionnaire is  
421 the risk of a high number of dropouts. Here the engineers demonstrated a lower response rate  
422 (34%) in comparison to the home care workers (51%). This difference can possibly be  
423 attributed to the different methods whereby the questionnaire was administered. For the  
424 engineers, their company's human resource department distributed the questionnaire while for  
425 the home care workers their closest supervisor distributed the questionnaire. A questionnaire  
426 distributed by a close supervisor may have motivated workers to a greater degree to complete  
427 the questionnaire. The home care workers were also able to choose between a paper-based or  
428 web-based questionnaire, as opposed to the engineers who were only provided with a web-

429 based questionnaire. Still, because the average WAI here did not differ from a previous  
430 Finnish sample [55], the sample here can be considered representative. Another limitation was  
431 the cross-sectional design of the study, which did not allow for testing causal inferences. Also,  
432 because the measures were self-reporting, some self-report bias might have influenced the  
433 results. Furthermore, some researchers question the use of chronological age as a determinant  
434 of work ability, because of the high individual variability in age related declines [27].  
435 Nevertheless, the use of a start age of 45 years [40], chosen in relation to age-related  
436 functional decline that affects work ability, still allowed for the use of the terms ageing and  
437 older workers.

438

## 439 **5. Conclusions**

440 Higher OSE was positively associated with higher work ability among middle-aged workers  
441 in home care and engineering settings. OSE was on the same level in both professions, despite  
442 dissimilarities such as work context, educational level and gender distribution. Based on these  
443 results, improving occupational self-efficacy could be worthwhile in supporting work ability  
444 among ageing workforce.

445

## 446 **Ethical approval and consent to participate**

447 The study was performed in compliance with the ethical principles delineated by the Finnish  
448 National Board on Research Integrity and was approved by the Board for Research Ethics at  
449 Åbo Akademi University, Turku, Finland (dated April 12, 2018). All individual participants  
450 in the study received written information that completing the survey meant consent to  
451 participation in the study.

452

## 453 **Funding**

454 Funding for this study was provided by Åbo Akademi University, Finland.

455

#### 456 **Conflict of interests**

457 None to report.

458

#### 459 **References**

460 1. del Libano M, Llorens S, Salanova M, Schaufeli WB. About the dark and bright sides of self-  
461 efficacy: Workaholism and work engagement. *Span Journal Psychol.* 2012; 15(2): 688-701.

462 2. Bandura, A. On the functional properties of perceived self-efficacy revisited. *J Manag.*  
463 2012; 38(1): 9-44.

464 3. Rigotti, T, Schyns, B, Mohr, G. A short version of the occupational self-efficacy scale.  
465 Structural and construct validity across five countries. *J Career Assess.* 2008; 16: 238-55.

466 4. Guarnaccia C, Scrima F, Civilleri A, Salerno L. The role of occupational self-efficacy in  
467 mediating the effect of job insecurity on work engagement, satisfaction and general health.  
468 *Curr Psychol.* 2018; 37: 488-97.

469 5. Paggi ME, Jopp DS. Outcomes of occupational self-efficacy in older workers. *Int J Aging*  
470 *Hum Dev.* 2015; 80(4): 357-78.

471 6. Cetin F, Askun D The effect of occupational self-efficacy on work performance through  
472 intrinsic work motivation. *MRR.* 2018; 41(2): 186-201.

473 7. Crawford JO, Davis A, Cowie H, Dixon K, Graveling R, Belin A, Dupont C, editors. The ageing  
474 workforce: implications for occupational safety and health. A research review: Publications  
475 Office of the European Union. Luxembourg: European Agency for Safety and Health at Work;  
476 2016.

477 8. Hobfoll SE Johnson RJ, Ennis N, Jackson AP. Resource loss, resource gain, and emotional  
478 outcomes among inner city women. *J Pers Soc Psychol.* 2003; 84(3): 632-43.

479 9. Bakker AB, Demerouti E Job Demands–Resources Theory: Taking stock and looking  
480 forward. *J. Occup Health Psychol.* 2017; 22(3): 273-85.



- 481 10. Converso D, Sottimano I, Guidetti G, Loera B, Cortini M, Viotti S. Aging and work ability:  
482 The moderating role of job and personal resources. *Front Psychol.* 2018; (8): 2262.
- 483 11. Dingemans E, Henkens K. How do retirement dynamics influence mental well-being in  
484 later life? A 10-year panel study. *Scand J Work Environ Health.* 2015; 41(1):16-23.
- 485 12. Chiesa R, Toderi S, Dordoni P, Henkens K, Fiabane EM, Setti I. Older workers: stereotypes  
486 and occupational self-efficacy. *J Manage Psychol.* 2016; 31(7): 1152-66.
- 487 13. Fullemann D, Gregor JJ, Brauchli R, Bauer GF. The key role of shared participation in  
488 changing occupational self-efficacy through stress management courses. *J Occup Organ*  
489 *Psych.* 2015; 88: 490-510.
- 490 14. Bakker A, Albrecht S, Leiter M. Key questions regarding work engagement. *Eur J Work*  
491 *Organ Psychol.* 2011; 20(1): 4-28.
- 492 15. Xanthopoulou D, Bakker AB, Fischbach A. Work engagement among employees facing  
493 emotional demands: The role of personal resources. *J Pers Psychol.* 2013; 12(2): 74-84.
- 494 16. Salanova M, Llorens S, Schaufeli WB. Yes, I can, I feel good, and I just do it! On gain cycles  
495 and spirals of efficacy beliefs, affect, and engagement. *Appl Psychol.* 2011; 60(2): 255-85.
- 496 17. Reijseger G, Peeters M, Taris T, Schaufeli W. From motivation to activation: why engaged  
497 workers are better performers. *J Bus Psychol.* 2017; 32: 117-30.
- 498 18. van Beek I, Hu Q, Schaufeli WB, Taris TW, Schreurs BHJ. For fun, love, or money: What  
499 drives workaholic, engaged, and burned-out employees at work? *Appl Psychol.* 2012; 61(1):  
500 30-55.
- 501 19. Schaufeli W, Salanova M, González-Romá V, Bakker V. The measurement of engagement  
502 and burnout: a two sample confirmatory factor analytic approach. *J Happiness Stud.* 2002; 3:  
503 71-92.
- 504 20. Hakanen JJ, Schaufeli WB. Do burnout and work engagement predict depressive  
505 symptoms and life satisfaction? A tree-wave seven-year prospective study. *J Affect Disord.*  
506 2012; 141: 415-24.

- 507 21. Xanthopoulou D, Baker AB, Heuven E, Demerouti E, Schaufeli WB. Working in the sky: A  
508 diary study on work engagement among flight attendants. *J Occup Health Psychol.* 2008;  
509 13(4): 345-56.
- 510 22. Alessandri G, Borgogni L, Schaufeli WB, Caprara GV, Consiglio C. From positive  
511 orientation to job performance: The role of work engagement and self-efficacy beliefs. *J*  
512 *Happiness Stud.* 2015; 16: 767-88.
- 513 23. Ilmarinen, J. Promoting active ageing in the workplace. European Agency for Safety and  
514 Health at Work; 2012.
- 515 24. van den Berg TIJ, Elders LAM, de Zwart BCH, Burdorf A. The effects of work-related and  
516 individual factors on the Work Ability Index: a systematic review. *Occup Environ Med.* 2009;  
517 66; 211-20.
- 518 25. Sundstrup E, Jakobsen M, Mortensen O, Andersen L. Joint association of multimorbidity  
519 and work ability with risk of long-term sickness absence: a prospective cohort study with  
520 register follow-up. *Scand J Work Environ Health.* 2017; 43(2): 146-54.
- 521 26. Kadijk EA, van den Heuvel S, Ybema JF, Leijten FRM. The influence of multi-morbidity on  
522 the work ability of ageing employees and the role of coping style. *J Occup Rehabil.* 2019;  
523 29(3): 503-13.
- 524 27. Yeomans L. An update of the literature on age and employment. Health and Safety  
525 Executive. Research report, RR832. Derbyshire: Health and Safety Laboratory; 2011.
- 526 28. Cloostermans L Bekkers MA, Uiters E, Proper KI. The effectiveness of interventions for  
527 ageing workers on (early) retirement, work ability and productivity: a systematic review. *Int*  
528 *Arch Occup Environ Health.* 2015; 88: 521-32.
- 529 29. European Foundation for the Improvement of Living and Working Conditions (Eurofond).  
530 Sixth European Working Conditions Survey - Overview report. Luxembourg: Publications  
531 Office of the European Union. International Publications; 2016.
- 532 30. Kröger T, van Aerschot L, Puthenparambil JM. Hoivatyö muutoksessa - Suomalainen  
533 vanhustyö pohjoismaisessa vertailussa (In Finnish) (Changes in care of others Finnish elderly  
534 care in Nordic comparison). Jyväskylä: Jyväskylä University, 2018. YFI Publications 6.

- 535 31. Larsson A, Karlqvist L, Westerberg M, Gard G. Identifying work ability promoting factors  
536 for home care aides and assistant nurses. *Musculoskelet Disord.* 2012; 13: 1-11.
- 537 32. Binnewies C, Sonnentag S, Mojza EJ. Feeling recovered and thinking about the good sides  
538 of one's work. *J Occup Health Psychol.* 2009; 14(3): 243-56.
- 539 33. Rajala SA. Beyond 2020: Preparing engineers for the future. *Proceedings of the IEEE.*  
540 2012; 100 (Special centennial issue): 1376-83.
- 541 34. Salomaa S 5 vastausta, miten kitketään ikäsyRJintää (5 answers on how to eradicate age  
542 discrimination): *Tekniikan akateemiset TEK* [updated 2020 Nov 25, cited 2020 Dec 3].  
543 Available from: <http://lehti.tek.fi/tyoelama/5-vastausta-miten-kitketaan-ikasyrjintaa>
- 544 35. Panatik SA, O'Driscoll MPO, Anderson M. Job demands and work-related psychological  
545 responses among Malaysian technical workers: The moderating effects of self-efficacy. *Work*  
546 *Stress.* 2011; 25(4): 355-70.
- 547 36. König CJ, Debus ME, Häusler S, Lendenmann N, Kleinmann M. Examining occupational  
548 self-efficacy, work locus of control and communication as moderators of the job insecurity-  
549 job performance relationship. *Econ Ind Democr.* 2010; 31(2): 231-47.
- 550 37. Hakanen J. Työn imu arviointimenetelmä - Utrecht Work Engagement Scale (In Finnish)  
551 (Work engagement evaluation method- Utrecht Work Engagement Scale). Helsinki:  
552 Työterveyslaitos; 2009. ISBN 978-951-802-934-5.
- 553 38. Attström K, Niedlich S, Sandvliet K, Kuhn H-M, Beavor E. Mapping and analysing  
554 bottleneck vacancies in EU labour market: Overview report. Final report: European  
555 commission; 2014.
- 556 39. Chaudhary R. Occupational self-efficacy expectations among Indian executives:  
557 Examining thr psychometric properties of Occupational Self-Efficacy scale (OSES). *Glob Bus*  
558 *Rev.* 2014; 15(1): 47-58.
- 559 40. Ilmarinen J. Towards longer worklife. Ageing and the quality of worklife in the European  
560 Union. Helsinki: Finnish Institute of Occupational Health, Ministry of Social Affairs and  
561 Health; 2006.

- 562 41. Kooij D, De Lange A, Jansen P, Dijkers J. Older workers' motivation to continue to work:  
563 five meanings of age. A conceptual review. *J Manag Psychol*. 2008; 23(4): 364–94.
- 564 42. Working better with age. OECD. 2019. [www.oecd-ilibrary.org/employment/working-](http://www.oecd-ilibrary.org/employment/working-better-with-age_c4d4f66a-en)  
565 [better-with-age\\_c4d4f66a-en](http://www.oecd-ilibrary.org/employment/working-better-with-age_c4d4f66a-en)
- 566 43. Tuomi K, Ilmarinen J, Jahkola A, Katajarinne L, Tulkki A. Work Ability Index. 2nd revised  
567 edition. Helsinki: Finnish Institute of Occupational Health; 1998.
- 568 44. Radkiewicz P, Widerszal-Bazyl M. Psychometric properties of work ability index in the  
569 light of comparative survey study. *International Congress Series*. 2005; 1280: 304-09.
- 570 45. Schaufeli WB, Bakker AB, Salanova M. The measurement of work engagement with a  
571 short questionnaire. A cross-national study. *Educ Psychol Meas*. 2006; 66(4): 701-16.
- 572 46. Seppälä P, Mauno S, Feldt T, Hakanen J, Kinnunen U, Tolvanen A, et al. The construct  
573 validity of the Utrecht Work Engagement Scale: Multisample and longitudinal evidence. *J*  
574 *Happiness Stud*. 2009; 10: 459-81.
- 575 47. Rosenthal R. Parametric measures of effect size. In: Cooper H, Hedges LV (editors). *The*  
576 *handbook of research synthesis*. New York: Russell Sage Foundation; 1994.
- 577 48. Ilmarinen J, Ilmarinen V. Work ability and aging. In: Finkelstein LMD, Truxillo DM,  
578 Fraccaroli F, Kanfer R, editors. *Facing the challenges of a multi-age workforce: A use-inspired*  
579 *approach*. SIOP organizational frontiers series. Routledge/Taylor & Francis Group; 2015.
- 580 49. Bakker AB, Demerouti E. Job Demands-Resources Theory. In: Cooper PY, Chen CL,  
581 editors. *Wellbeing: A complete reference guide*. Volume III. Chichester: Wiley-Blackwell;  
582 2014.
- 583 50. Bandura A. *Self-efficacy: the exercise of control*. New York: W.H. Freeman & Company;  
584 1997. ISBN 10-0-7167-2626-2.
- 585 51. Nilsson K. A sustainable working life for all ages. The swAge-model. *Appl Ergon*. 2020; 86:  
586 103082.
- 587 52. Warburton J, Moore ML, Clune SJ, Hodgkin SP. Extrinsic and intrinsic factors impacting on  
588 the retention of older rural healthcare workers in the north Victorian public sector: a  
589 qualitative study. *Rural Remote Health*. 2014; 14: 2721.

590 53. Tourangeau A Patterson E, Rowe A, Saari M, Thomson H, Macdonald G, Cranley L,  
591 Squires M. Factors influencing home care nurse intention to remain employed. *K Nurs*  
592 *Manag.* 2014; 22: 1015-26.

593 54. Bakker AB. An evidence-based model of work engagement. *Curr Dir Psychol Sci.* 2011;  
594 20: 265-9.

595 55. Gould R, Ilmarinen J, Järvisalo J, Koskinen S, editors. Dimensions of work ability. Results  
596 of the health 2000 Survey. Helsinki: Finnish Center of Pensions (ETK), The Social Insurance  
597 Institution (KELA), national Public Health Institute (KTL), Finnish Institute of Occupational  
598 Health (FIOH); 2008. ISBN 978-951-691-097-3.

599

600

601

602

603

604

605

606

607

608

609

610