

# Workaholism, work engagement, and burnout among academics in Montenegro: A psychometric network approach

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## Abstract.

**BACKGROUND:** The academic environment is known for its high demands in research, teaching, and administration, that along with increasing publish or perish culture can lead to reduced psychological well-being and mental health issues.

**OBJECTIVE:** This study aimed to investigate the associations between workaholism, work engagement, and burnout among academics in Montenegro.

**METHODS:** A cross-sectional design was used to develop anonymous online survey. Data was collected from 131 participants employed as teaching and research staff at public and private universities. To measure the variables of interest we used: ultra-short Utrecht Work Engagement Scale (UWES-3), the work-related burnout subscale from the Copenhagen Burnout Inventory (CBI-7) and the Dutch Work Addiction Scale (DUWAS-10). Psychometric network analysis was employed to examine the relationships among variables.

**RESULTS:** The findings revealed two distinct clusters: the first containing the dimensions of work engagement and the second containing burnout and the dimensions of workaholism. The two clusters were connected with the dimensions of dedication - burnout having the strongest edge ( $-0.25$  and  $-0.40$ ). In the cross-sample network the strongest connection was burnout – working excessively (.35). No significant differences in network density (0.80 (12/15 edges)) and global strength ( $p = 0.159$ ) in the networks of public and private universities were found.

**CONCLUSION:** Results of the network centrality and the edge strength analyses suggest that the interventions focused at increasing dedication while not fostering a work environment that encourages working excessively might be the key to preventing and reducing burnout in academia across contexts of public and private universities.

Keywords: Workaholism, work engagement, burnout, academia, psychometric network analysis, Montenegro

## 1. Introduction

Academia is a high-pressure environment characterised by elevated research, teaching, and administrative demands, increasing bureaucracy, long working hours, and job insecurity. Unfortunately, such circumstances frequently take a toll on

the mental well-being of academics, resulting in heightened levels of psychological distress, anxiety, depression, and burnout when compared to the general population [1]. Recent reports on mental health in the UK have shed light on the extent of these challenges. Among various professions, academics exhibit the highest prevalence of common mental disorders, with rates hovering around 37% [2]. Also, a systematic review conducted by Urbina-Garcia [3] underscores the vulnerability of young academic

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44 staff, particularly those in private universities, to  
45 poorer well-being, marked by heightened stress and  
46 burnout. Furthermore, in the last 20 years the aca-  
47 demic landscape has been significantly influenced  
48 by neoliberalism as western universities followed the  
49 model of ‘competition-based logics’ [4]. This ideol-  
50 ogy emphasises performance management and the  
51 use of performance indicators [5]. Within such a  
52 context, securing research funding and publishing in  
53 high-impact journals have become crucial for both  
54 universities’ competitiveness and researchers’ career  
55 progression, fostering a culture of competition and  
56 often leading to a “publish or perish” mindset [1].  
57 As Ryan-Flood and Gill [6] point out, neoliberal-  
58 ism’s impact on academics’ mental health is palpable,  
59 given their inherent drive to “work hard” and “excel”  
60 [6]. Consequently, the academic environment may  
61 also inadvertently expose researchers to the risk of  
62 workaholism.

63 More specifically, workaholism refers to a strong  
64 inner drive to work excessively hard and to allocate an  
65 exceptional amount of time to work [7]. It is charac-  
66 terised by the tendency to compulsively, persistently,  
67 and frequently think about work or be obsessed with  
68 work, even when not working [8]. Empirical evi-  
69 dence shows that academic workers often engage in  
70 working practices indicative of workaholism, such  
71 as working on weekends, bringing work home, and  
72 working in the evenings [9, 10]. Workaholism preva-  
73 lence among academic staff is between 50% and 66%  
74 [9, 11]. Moreover, academic work is open-ended and  
75 absorbing [9], with each academic largely responsi-  
76 ble for deciding the scope of their workload. Finally,  
77 the university context is claimed to have ‘overtime  
78 culture’ [12] which is one of the main contributors to  
79 the onset of workaholism [13] and presenteeism [14].  
80 But, some authors argued that, although especially  
81 in contexts like academia, workaholism manifests  
82 itself through the same dysfunctional characteristics  
83 as other addictive behaviours, it comes with a lit-  
84 tle social stigma attached to it, or might even be  
85 actively encouraged by the reward system that stimu-  
86 late quantity over quality of output [15]. Because the  
87 nature and intensity of job demands as well as the cli-  
88 mate in academia may be both challenging for mental  
89 health and conducive to workaholism, it is impor-  
90 tant to assess relationships between workaholism and  
91 other indicators of wellbeing. Therefore, in the cur-  
92 rent study, we build on the circumplex model of work  
93 wellbeing [16] to analyse the relationships between  
94 workaholism, work engagement, and burnout as the  
95 emotional states central to the work domain.

96 The circumplex model [16] represents a broad  
97 theoretical framework that is useful to represent  
98 wellbeing at work because it distinguishes and  
99 encompasses both, positive and negative types of  
100 work wellbeing. It further proposes that there are two  
101 primary dimensions of wellbeing in the workplace,  
102 namely, activation (the level of energy and arousal  
103 that an individual experiences at work) and pleasure  
104 (the level of positive emotions and satisfaction an  
105 individual experiences). On one hand, work engage-  
106 ment refers to a positive, fulfilling, work-related state  
107 of mind that is characterised by vigor, dedication, and  
108 absorption [17] and is reflective of high levels of plea-  
109 sure and activation related to one’s work. Based on  
110 the circumplex model, workaholism and engagement  
111 share the dimension of activation because they are  
112 both characterised by high energy and arousal related  
113 to work but are different in pleasure that work entails  
114 in that engaged workers feel fulfilled by their jobs,  
115 whereas those who are work-addicted feel frustrated  
116 and continually dissatisfied. Empirical studies pro-  
117 vide some support for this theorising as they showed  
118 that the two might be both negatively [19] and pos-  
119 itively [20] related. Additionally, work engagement  
120 and workaholism might both be reflected in identic-  
121 al behaviours and, in the short-term, lead to similar  
122 positive work outcomes such as higher productivity,  
123 organisational commitment, and long working hours  
124 [21]. On the other hand, in contrast to work engage-  
125 ment, burnout reflects a negative emotional state that  
126 is most dominantly characterised by general feel-  
127 ing and experience of extreme chronic exhaustion or  
128 draining of physical and psychological resources due  
129 to continuous exposure to demanding working con-  
130 ditions, which is reflective of low levels of pleasure  
131 and activation related to one’s work [18]. Within the  
132 circumplex model, workaholism and burnout share  
133 the dimension of pleasure because they are both  
134 characterised by low satisfaction and negative affect  
135 related to one’s work but are different in the level  
136 of activation at work. In sum, despite the evidenced  
137 distinctions between work engagement, burnout, and  
138 workaholism [7, 17], the relationships among the  
139 three might be more complex than expected and some  
140 conceptual similarities persist. Hence, the current  
141 study employs the psychometric network approach to  
142 provide deeper insight into the relationships between  
143 work engagement, workaholism, and burnout among  
144 academic employees in Montenegro.

145 The network approach [23] has become popular  
146 in the psychological sciences for studying men-  
147 tal disorders [24–26] and, recently, it has been

148 used in occupational behaviours for investigating the  
149 complex interplay of different occupational health  
150 dimensions such as job satisfaction, job crafting, and  
151 meaningfulness at work [28]. In brief, a network  
152 refers to a graph that consists of nodes, the observed  
153 variables, and edges that represent the relationships  
154 among the nodes [29]. In the network perspective,  
155 constructs are theorised as a network system of pair-  
156 wise associations among variables where a change in  
157 one variable is associated to a change in the remain-  
158 ing variables or in the whole network [30, 31]. In  
159 this sense, work engagement, burnout, and work  
160 addiction are the nodes that are connected by edges  
161 [29]. Absent edges indicate zero partial correlations,  
162 whereas non-absent edges indicate the association  
163 between each two variables after controlling for all  
164 other variables [29, 32]. The network methodology  
165 may offer a more comprehensive representation of  
166 how work engagement, burnout, and work addiction  
167 are organised.

### 168 1.1. *Montenegrin academic context*

169 Since 2003, Montenegro's higher education sys-  
170 tem has been transformed in accordance with  
171 European documents, policies, and legal agreements,  
172 common structural reforms, and shared tools as a  
173 member of the Bologna Process/European Higher  
174 Education Area (EHEA) and European Research  
175 Area (ERA) [33]. All of these transformations, in  
176 combination with other factors such as overall social  
177 and economic development, the pandemic, change in  
178 all spheres of life, digitalization, modernization of  
179 higher education, awareness of the need for qual-  
180 ity improvement in teaching, introduction of state  
181 accreditation and quality control, and a stronger  
182 requirement of higher education to be more respon-  
183 sive to the needs of employers and employability  
184 of students, created a working context with multiple  
185 demands and sources of pressure for academic staff  
186 at the universities in Montenegro [33]. In addition,  
187 social pressure for universities to place highly on the  
188 international ranking lists is strikingly evident.

189 As a part of the current Law on Higher Educa-  
190 tion, the Council for Higher Education of Montenegro  
191 issued the Criteria on the Conditions and Require-  
192 ments for Promotion of Teaching Staff Working at  
193 Higher Education Institutions (Official Gazette of  
194 Montenegro, No. 44/14 and 47/15). These criteria are  
195 related to selection, promotion to a higher position or  
196 re-election to the same position i.e. academic title.

197 Privatization of higher education is one of the  
198 most significant trends in education over the past  
199 few decades around the world [34]. As a mixture of  
200 national and international systems, the environment  
201 in which public and private higher education institu-  
202 tions operate and want to establish themselves clearly  
203 affects them in different ways [35]. Although accred-  
204 ited public and private universities operate under the  
205 same law and perform the same core teaching and  
206 research functions, they differ in how they go about  
207 doing them. Given the fact that there seem to be no dif-  
208 ferences in terms of core job functions and work being  
209 done by academic staff at public and private universi-  
210 ties, we wanted to explore whether there are structural  
211 differences in experiencing burnout at work, worka-  
212 holism, and work engagement.

213 The main objective of our study was to investigate  
214 relationships between work addiction and burnout  
215 with work engagement among academic workers in  
216 Montenegro. From a practical perspective, the preva-  
217 lence of workaholism among academic workers is a  
218 growing concern, given the negative consequences  
219 of this condition for individuals and organizations.  
220 Academic institutions should recognize the signs of  
221 workaholism and provide support and resources to  
222 prevent and manage this condition.

## 223 2. Method

### 224 2.1. *Participants and procedure*

225 The population of the current study consisted  
226 of academic staff at public and private universities  
227 in Montenegro. According to the Statistical Office  
228 of Montenegro [36] the total number of academic  
229 employees in higher education institutions for the  
230 academic year 2021/2022 was 1,289, with men mak-  
231 ing up 678 and women 611. There is no official data  
232 on the precise number of teaching staff members  
233 working in public and private institutions. The cur-  
234 rent study is based on a convenience sample of 131  
235 academic researchers from two universities in Mon-  
236 tenegro (55% were from the public university, and  
237 45% were from one private university, Table 1). In  
238 calculating sample size for cross-sectional network  
239 model, we used the Powerly package in R developed  
240 by Constantin and colleagues [37]. Specifically, for a  
241 network model of 6 nodes with a sensitivity of 0.6, a  
242 probability of 0.8, and a density of 0.3, a sample size  
243 of 153 was recommended.

Table 1  
Sample characteristics for public and private universities

Sample Characteristics		University		
		Public	Private	Total
Gender %	Men	27.5	36.2	31.5
	Women	72.5	63.8	68.5
Relationship %	Yes	80.3	71.2	76.3
	No	36.8	57.9	46.4
Children %	One or more	63.2	42.1	53.6
	Undergrad	1.4	13.6	6.9
Education %	Postgrad	33.3	40.6	36.6
	PhD	65.3	45.8	56.5
Position %	Associate*	40.6	48.1	43.9
	Assistant professor	20.3	18.5	19.5
	Associate professor	18.8	13	16.3
	Full professor	17.4	13	15.4
	Researcher (all ranks)	2.8	7.4	4.9
Tenure (in years) M (SD)	Academia	15.03 (7.53)	8.95 (8.03)	12.23 (8.31)
	University	14.08 (8.22)	5.05 (3.75)	9.86 (7.91)
	Current position**	6.78 (7.15)	4.20 (3.39)	5.58 (5.84)

Note.  $n = 131$  Associates together – associate with master, associate on PhD studies, associate with PhD.

\*\*Length of experience on the present position – calculated without full professors.

Participants took part in an anonymous online survey in June 2022. There were 66.40% women, 30.50% men, and 3.10% did not declare their gender. The majority had a PhD degree (56.50%). The majority were in the position of teaching associate (41.50%), whereas the smallest number held positions in research (6.20%). Three quarters of participants were in a relationship, and slightly over half of the sample had one child or more.

All measures were translated into Montenegrin using a translation–back translation procedure [38]. To ensure the quality of the questionnaire and the translation, the research team went through several iterations of survey adjustment and fine-tuning. Through discussions, the team reached consensus regarding the final layout and wording of the survey.

## 2.2. Measures

### 2.2.1. Work engagement

We used the ultra-short version of the Utrecht Work Engagement Scale (UWES-3) [39], asking participants to rate their vigor, dedication, and absorption with one item each. The responses are provided on a 5-point scale ranging from 1 (never) to 5 (everyday). An example item is: “At my work, I feel bursting with energy” ( $\alpha = .84$ ).

### 2.2.2. Burnout

The work-related burnout subscale (7 items) from the Copenhagen Burnout Inventory (CBI) has been used [18]. It measures the degree of physical and

psychological fatigue related to work (an example item: “Do you feel worn out at the end of the working day?”). The responses are provided on a 5-point scale, ranging from 1 (very low degree/never) to 5 (very high degree/always) ( $\alpha = .90$ ).

### 2.2.3. Workaholism

We used the 10-item Dutch Work Addiction Scale (DUWAS-10) [40]. The scale comprised two 5-item subscales measuring working excessively (e.g., “I seem to be in a hurry and racing against the clock”;  $\alpha = .84$ ) and working compulsively (e.g., “I feel obliged to work hard, even when it’s not enjoyable”;  $\alpha = .84$ ). The responses are provided on a 5-point scale ranging from 1 (almost never) to 5 (almost always).

### 2.2.4. Analytical strategy

We performed a confirmatory factor analysis (CFA) to test the psychometric properties of the measures using R package lavaan 0.6.14 [41] with the weighted least square mean and variance (WLSMV) adjusted estimator. We considered the following model fit indices and reference values: root mean square error of approximation (RMSEA)  $< 0.06$ , Comparative Fit Index (CFI)  $> 0.95$  and Tucker-Lewis Index (TLI)  $> 0.95$  [42].

Network analyses were performed with R version 4.2.2 [43] and qgraph 1.9.3 package [44]. We followed steps described by Fried and colleagues [29] in estimating networks from multiple samples: (a) network estimation, (b) network stability, (c) network

303 inference, and (d) network comparison. Furthermore,  
304 in reporting results in cross-sectional dataset, we fol-  
305 lowed guidelines developed by Burger and colleagues  
306 [45].

### 307 2.2.5. Network estimation

308 The fused graphic lasso (FGL) method and the  
309 EstimateGroupNetwork 0.3.1 package were used for  
310 jointly estimating the two networks (private and pub-  
311 lic universities) [46]. We averaged the layouts for the  
312 two individually estimated networks for the visualiza-  
313 tion of both networks. Finally, we used a spin-glass  
314 algorithm implemented in the igraph 1.3.5 package  
315 [47] for searching for clusters of nodes within the two  
316 networks.

### 317 2.2.6. Network stability

318 Stability of each network was investigated using  
319 the bootnet 1.5.0 package [29], with nonparamet-  
320 ric bootstrapping and case bootstrapping based on  
321 1000 bootstrap samples. Network stability was mea-  
322 sured considering the correlation stability coefficient.  
323 Specifically, a correlation stability coefficient  $> 0.50$   
324 is suggests good stability, and a correlation stability  
325 coefficient  $> 0.25$  suggests acceptable stability [29].

### 326 2.2.7. Network inference

327 The bridge strength developed by Bereznowski  
328 and colleagues [27] was performed for assessing  
329 node centrality. In comparing node centrality of  
330 networks, we calculated Spearman correlation coeffi-  
331 cients between both versions of the node strength for  
332 the networks. In estimating nodes' predictability, we  
333 used the mgm 1.2.13 package [48]. In our study, node  
334 predictability represents the percentage of variance  
335 explained by all its neighbors ( $R^2$ ) [48].

### 336 2.2.8. Network comparison

337 In comparing networks, we calculated Spearman  
338 correlation coefficients of edge weights using the  
339 NetworkComparisonTest 2.2.1 package [49] with  
340 seed set to 1. In investigating whether all edges  
341 of the two networks were equal, the omnibus test  
342 was performed. If networks were significantly differ-  
343 ent, the post hoc test with Holm-Bonferroni method  
344 was performed for inspecting which edge weights  
345 were different between the two networks. Then, the  
346 networks' global strength were estimated for both  
347 networks and tested whether differed. Finally, we  
348 estimated a cross-sample network (combining both  
349 samples into one general sample) to investigating the  
350 similarities between the networks. Furthermore, to

351 investigate the differences between both networks,  
352 we assessed a cross-sample variability network where  
353 each network's edge correspond to the standard devi-  
354 ation of this edge between the networks [29].

## 355 3. Results

### 356 3.1. Preliminary analyses

357 In the first step, we fit and compared a series of fac-  
358 tor models. Specifically, we tested five different factor  
359 structures (1) a one factor CFA (all items form one  
360 general factor), (2) a three-factor CFA (burnout, items  
361 from working excessively and working compulsively  
362 dimensions were combined to form a single factor of  
363 workaholism, and work engagement), and (3) a four-  
364 factor CFA (burnout, working compulsively, working  
365 excessively, and work engagement). As shown in  
366 Table 2, results showed that the theoretical four-factor  
367 CFA showed the better fit to the data (CFI = .966,  
368 TLI = .962, RMSEA = .132, 95% CI = .120 – .144).

### 369 3.2. Network estimation

370 The jointly estimated networks for the two samples  
371 are presented in Fig. 1.

372 The network density was 0.80 (12/15 edges) for  
373 both networks. The mean absolute edge weights was  
374 0.15, and 0.16 for network 1 (Private University), and  
375 network 2 (Public University), respectively. The spin-  
376 glass algorithm found the same two clusters in both  
377 networks. Specifically, the first cluster included the  
378 three dimensions of work engagement (vigor, absorp-  
379 tion, and dedication), the second cluster included  
380 burnout, and both dimensions of workaholism (work-  
381 ing excessively and working compulsively). Mainly,  
382 the cluster of work engagement was linked to the clus-  
383 ter of burnout and work addiction by a significant  
384 edge (see Fig. 1). The strongest edge was dedication  
385 — burnout.

### 386 3.3. Network stability

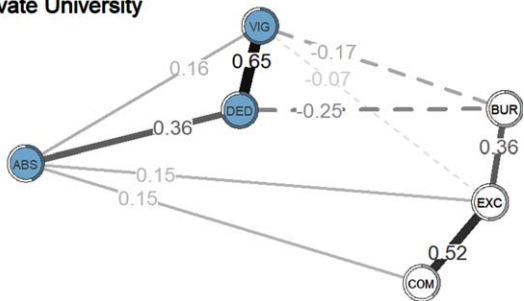
387 Stability analyses suggested that both networks  
388 were accurately estimated, with small to moderate  
389 confidence intervals around the edge weights. The  
390 correlation stability coefficients suggested acceptable  
391 stability [29] for network 1 = .51, and .44 for net-  
392 work 2.

Table 2  
Goodness of fit statistics of the measurement model

Model	$\chi^2$	Df	CFI (>0.95)	TLI (>0.95)	RMSEA (90% CI)
One-factor CFA	1561.86	171	.882	.869	.244 (.233 –.255)
3-factor CFA	666.26	170	.958	.953	.146 (.134 –.158)
4-factor CFA	567.88	168	.966	.962	.132 (.120 –.144)

Note:  $n = 131$ ; one-factor CFA = all items load in one general factor; 3-factor CFA = (1) burnout, (2) items from working excessively and working compulsively dimensions were combined to form a single factor of workaholism, and (3) work engagement; 4-factor CFA = (1) burnout, (2) working compulsively, (3) working excessively, and (4) work engagement).  $\chi^2$  = chi-square, CFA = Confirmatory Factor Analysis; df = Degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation; 90% CI = 90% confidence interval for RMSEA.

Private University



Public University

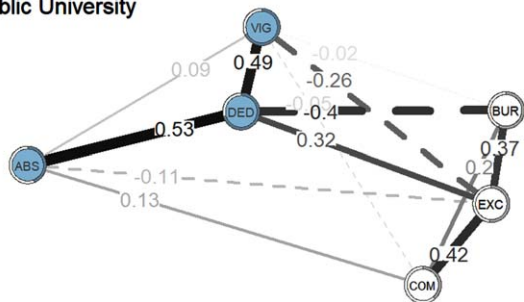


Fig. 1. The two regularized partial correlation networks estimated jointly for the two samples. Note. Line thickness indicates the strength of a relationship. The lighter gray area in the ring around a node represents predictability based on the proportion of explained variance (R2) by all of its neighbors, and the darker gray area in the ring around a node represents predictability based on the marginal distribution of a node. ABS = Absorption; BUR = Burnout, COM = Working Compulsively; DED = Dedication; EXC = Working Excessively; VIG = Vigor.

3.4. Network inference

Concerning network 1, dedication was the most central node (unstandardized value = 1.25) and work compulsively was the least central node (unstandardized value = 0.67). Concerning network 2, dedication was the most central node (unstandardized value = 1.73) and work compulsively was the least central node (unstandardized value = 0.80). Spearman correlation coefficients of the standard ver-

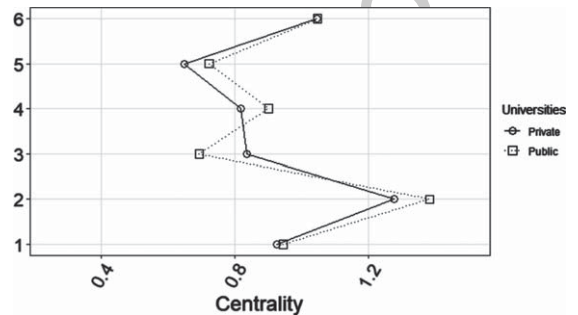


Fig. 2. The unstandardized values of the standard version of the node strength (centrality) in the private and public networks. Notes: 1 = Vigor; 2 = Dedication; 3 = Absorption; 4 = Burnout; 5 = Working Compulsively; 6 = Working Excessively.

sion of the node strength were 0.83. For more details, see on Fig. 2.

Predictability analysis showed that dedication was the most predictable variable (average predictability equaled 68.1%) and working excessively was the least predictable node (average predictability equaled 38.3%; see Fig. 1). Average predictability equaled 55.1% in network 1, and 51.3% in network 2.

3.5. Network comparison

In the omnibus test of the comparison, networks did not differ significantly ( $p = 0.169$ ). We inspected edge differences, finding these two edges (13.3%) differed significantly: dedication-working excessively ( $p = 0.017$ ), and absorption-working excessively ( $p = 0.017$ ). Global strength did not differ significantly ( $p = 0.159$ ), and its values were 2.48 and 3.35.

Figure 3a shows the cross-sample network with averaged edge weights, Fig. 3b the cross-sample variability network, the unstandardized values of the standard version of the node strength in the cross-sample network are presented in Fig. 3c, and the unstandardized values of the bridge strength in the cross-sample network are in Fig. 3d.

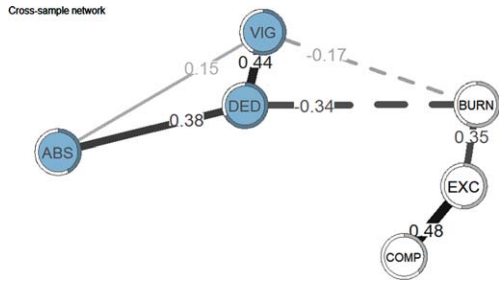


Fig. 3a. The cross-sample network. Note. The cross-sample network was obtained by pooling all observations into one sample. Solid lines represent positive edges, and dashed lines represent negative edges. Line thickness and darkness indicate the strength of a relationship. Note: ABS = Absorption; BUR = Burnout, COM = Working Compulsively; DED = Dedication; EXC = Working Excessively; VIG = Vigor.

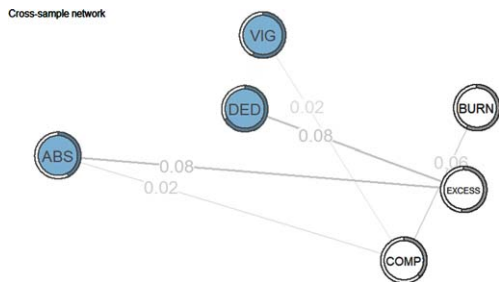


Fig. 3b. The cross-sample variability network. Note. Edge weights represent the standard deviation of edge weights between the jointly estimated networks. Note: ABS = Absorption; BUR = Burnout, COM = Working Compulsively; DED = Dedication; EXC = Working Excessively; VIG = Vigor.

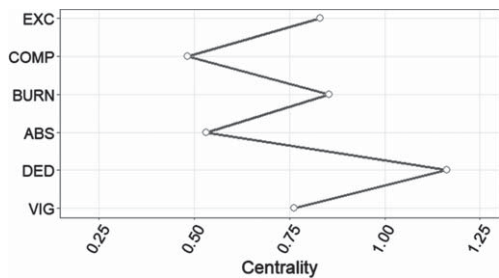


Fig. 3c. The unstandardized values of the standard version of the node strength in the cross-sample network. Note: ABS = Absorption; BUR = Burnout, COM = Working Compulsively; DED = Dedication; EXC = Working Excessively; VIG = Vigor.

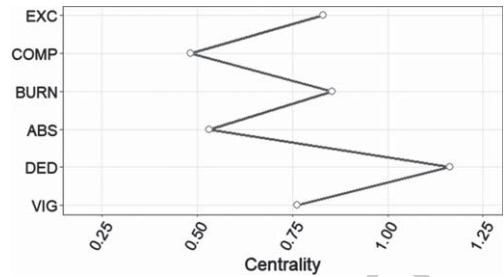


Fig. 3d. The unstandardized values of the bridge strength in the cross-sample network. Note: ABS = Absorption; BUR = Burnout, COM = Working Compulsively; DED = Dedication; EXC = Working Excessively; VIG = Vigor.

The correlation stability coefficient of the cross-sample network was 0.67 and beyond the recommended threshold ( $=0.50$ ) for stable estimation of centrality indices [29]. Node strength showed that dedication was the most central node (unstandardized value = 1.16), working compulsively was the least central node (unstandardized value = 0.48).

#### 4. Discussion

Our study aimed to explore the relationships between workaholism, burnout, and work engagement among academics. Specifically, adopting a psychometric network perspective, we jointly estimated two networks and combined two samples of academics (private and public universities) into one to estimate the cross-sample network. Concerning private and public universities, both networks did not significantly differ, and there were only two differences in edge weights between the networks (edges between work engagement dimensions and working excessively). In this sense, the relationship between workaholism, burnout, and work engagement was not significantly different among public and private universities. Mainly, our results suggest that the relationship between workaholism, burnout and work engagement is context independent and is common in Academia. Furthermore, those results might confirm that, in Montenegro, as public and private universities are similar in core teaching and research functions [33], they did not differ in terms of academic staff's mental health. Those results are in line with previous research [50, 51] who suggested that Academic culture ('overtime culture' [52]) and deep changes in the academic working environment may have facilitated conditions prone to the development of workaholic behaviours and poor mental health.

The strongest edges connecting the variables were working compulsively—working excessively ( $edge_w = .48$ ), vigor -dedication ( $edge_w = .38$ ), and burnout-working excessively ( $edge_w = .35$ ).

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463 Considering the jointly estimated networks, we  
 464 observed two distinct clusters of nodes, (1) work  
 465 engagement and (2) workaholism-burnout clusters.  
 466 In the first cluster, only vigor and dedication showed  
 467 a strong connection, whereas absorption was weakly  
 468 linked to the other two dimensions of workaholism. In  
 469 the second cluster, working excessively was strongly  
 470 connected to burnout and working compulsively.  
 471 No direct connection between working compulsively  
 472 and burnout was found. Despite the bivariate cor-  
 473 relation between workaholism and burnout is well  
 474 known [7, 40], very little research has investigated  
 475 this relationship adopting different measure, such  
 476 as global burnout instead of measuring exhaustion,  
 477 cynicism, and personal accomplishment. Moreover,  
 478 it is possible that the relationship between work-  
 479 ing compulsively and job burnout would exhibit a  
 480 delayed effect that manifests itself after some time  
 481 has elapsed, then requesting for a longitudinal per-  
 482 spective.

483 Furthermore, work engagement cluster was con-  
 484 nected to the other cluster through the negative edges  
 485 between dedication and vigor with job burnout and  
 486 working excessively, and the positive (weak) rela-  
 487 tionship between absorption and both dimensions  
 488 of workaholism. Concerning the private university  
 489 network, vigor and dedication nodes are not con-  
 490 nected to any of the workaholism nodes, whereas  
 491 absorption is positively linked to both dimensions  
 492 of workaholism. It might indicate that “being fully  
 493 concentrated and deeply engrossed in one’s work,  
 494 whereby time passes quickly and one has difficulties  
 495 with detaching oneself from work” (p.74) [17] share  
 496 overlapping mechanisms of workaholism, especially  
 497 for working excessively component [21]. Further-  
 498 more, vigor and dedication nodes are connected to  
 499 job burnout, suggesting that having “high levels of  
 500 energy and mental resilience while working, the will-  
 501 ingness to invest effort in one’s work, and persistence  
 502 even in the face of difficulties” and “experiencing a  
 503 sense of significance, enthusiasm, inspiration, pride,  
 504 and challenge“ (p.74) [17] are directly connected  
 505 to job burnout. Concerning the public university  
 506 network, vigor and dedication are directly nega-  
 507 tively and positively linked to working excessively,  
 508 respectively. Those results are in line with previous  
 509 research [27, 53], suggesting that work engagement  
 510 had direct relationship with workaholism, especially  
 511 for working excessively component. Furthermore,  
 512 absorption was (weakly) negatively linked to working  
 513 excessively and positively linked to working com-  
 514 pulsively. Those results are in contrast with previous

515 research [21, 27, 53], suggesting that the relation-  
 516 ship between absorption and workaholism need more  
 517 investigation.

518 When we considered the cross-sample network,  
 519 we observed the same two distinct clusters of nodes,  
 520 where work engagement dimensions clustered in the  
 521 first one, and workaholism components and burnout  
 522 clustered in the second one. Both clusters were con-  
 523 nected by the negative edges between dedication and  
 524 vigor with job burnout. Interestingly, considering  
 525 workaholism, working excessively was connected  
 526 to burnout, and no significant edges were identified  
 527 with work engagement dimensions. In general, those  
 528 results are partially in line with previous research  
 529 that showed how work engagement and workaholism  
 530 are (weakly) correlated. In fact, in their systematic  
 531 review and meta-analysis, Di Stefano and Gaudiino  
 532 [21] showed that absorption has a medium-size asso-  
 533 ciation with working excessively ( $g = .34$ , 95% CI  
 534 [.25, .43]), whereas only dedication showed a sig-  
 535 nificant ( $g = .14$  [.08, .21]) weak association with  
 536 working excessively. In this sense, our results con-  
 537 firmed Di Stefano and Gaudiino [21] results about  
 538 the not-overlapping concepts hypothesis, showing  
 539 that workaholism and work engagement are dis-  
 540 tinct constructs. That is in line with Taris, Schaufeli,  
 541 and Shimazu [49], who suggested that workaholism  
 542 and work engagement are intrinsically different, and  
 543 “engaged workers lack the typical compulsive drive  
 544 that is characteristic of any addiction, including an  
 545 addiction to work” (p. 51). Concerning studies that  
 546 adopted a network perspective, our results were par-  
 547 tially in line with Bereznowski and colleagues [27,  
 548 53], who found that work addiction and work engage-  
 549 ment form separate clusters, and job burnout form  
 550 another distinct cluster. In fact, we found that job  
 551 burnout and workaholism form a cluster, suggesting  
 552 that both variables share some unique variance. Fur-  
 553 thermore, our results are in line with Bereznowski and  
 554 colleagues [27, 53], who found a dense network char-  
 555 acterized by weak edges between work engagement  
 556 and workaholism ( $edge_w = .10$  [.10, .10]).

557 Additionally, our results confirm the positive asso-  
 558 ciation of workaholism with occupational health  
 559 risks, such as job burnout [54–56]. In particular,  
 560 people with workaholism patterns are characterized  
 561 by a personal tendency to invest more energies into  
 562 their jobs, taking on heavy workloads and spending  
 563 more time at work, which can drain their personal  
 564 resources such as physical and psychological ener-  
 565 gies, and personal/social life, and exposing workers  
 566 to higher burnout risk [40, 57, 58].



567 The correlation stability coefficients indicated that  
568 node strength was stable for both jointly estimated  
569 networks. There are two strong bridge nodes in our  
570 study: dedication and working excessively. In this  
571 sense, we found that dedication and working exces-  
572 sively had the strongest connections with burnout.  
573 This suggests that promoting interventions aimed at  
574 increasing dedication might reduce job burnout, as  
575 dedication “refers to being strongly involved in one’s  
576 work, and experiencing a sense of significance, enthu-  
577 siasm, inspiration, pride, and challenge” (p. 3) [17].  
578 However, dedication shares with working excessively  
579 the characteristics of time and energy investment (for  
580 example, in terms of significance and enthusiasm)  
581 into the work, it might represent a potential addi-  
582 tional risk for developing burnout. Moreover, both  
583 networks showed the same predictability. Mainly,  
584 dedication and working excessively were the most  
585 predictable nodes, whereas working compulsively  
586 was the least predictable node. This suggests that  
587 work engagement, workaholism, and burnout are a  
588 complex network of interrelated nodes where both  
589 types of employees who work excessively and are  
590 dedicated to their work are at risk of developing  
591 burnout [7].

592 Based on the main results of our study, potential  
593 interventions aimed at reducing workaholism can be  
594 proposed. Firstly, interventions aimed at promoting  
595 work engagement should focus on enhance sense  
596 of significance, enthusiasm, inspiration, pride, and  
597 challenge might directly reduce job burnout. At the  
598 same time, fostering a work environment that does  
599 not encourage work excessively, condemning a cul-  
600 ture that emphasizes high investment in work, may  
601 directly reduce job burnout. It is important to remark  
602 that work excessively refers to the “behavioural com-  
603 ponent of hard working, which is spending too much  
604 time on work-related activities” [21]. In this sense, it  
605 is linked to the workaholic person rather than to orga-  
606 nizational demands [21]. Then, interventions aimed  
607 at reducing job demands would not impact worka-  
608 holics.

#### 609 *4.1. Limitations and future study directions*

610 Although the current study provides valuable  
611 insights into the relationships between workaholism,  
612 work engagement, and burnout among academic  
613 workers in Montenegro, some limitations are to be  
614 considered when interpreting the findings. First, it is  
615 important to acknowledge that the data were collected  
616 in a single country context, and as such, the gener-

617 alizability of the results to other academic settings  
618 and cultural contexts may be limited. Although being  
619 more inclusive of the samples from middle and lower-  
620 income countries is good because these samples are  
621 generally underrepresented in wellbeing research.  
622 That may represent an important limitation in our  
623 analysis, as we did not control for these differences.  
624 Future research should aim to replicate the findings  
625 using data from multiple universities in different cul-  
626 tural contexts to offer a broader understanding of the  
627 relationships between workaholism, work engage-  
628 ment, and burnout among academic workers.

629 Second, despite the fact that the study was endorsed  
630 by all the public and private universities in Montene-  
631 gro we obtained responses from the public university  
632 and one larger private university, but no participants  
633 were obtained from any other private university. In  
634 addition, the estimated response rate (18%) in the  
635 current study was relatively low, resulting in a small  
636 sample. In fact, our sample was smaller than the rec-  
637 ommended sample size for cross-sectional network  
638 models. According to Constantin and colleagues  
639 [37], “for psychological networks, the necessity for  
640 making informed decisions about the sample size  
641 is further emphasized by the fact that the number  
642 of parameters that needs to be estimated increases  
643 rapidly with the number of variables included in the  
644 network” (p. 2). In this sense, future studies will  
645 have to consider a larger sample when replicating  
646 our results. Relatedly, due to limited sample size,  
647 we were not able to perform further comparisons  
648 among other sub-groups possibly existing within the  
649 broader population of academics in Montenegro. For  
650 example, in addition to comparison between the aca-  
651 demics from public and private universities, it would  
652 have been interesting to assess the networks of the  
653 study variables across academic majors and disci-  
654 plines. Future research, on larger populations and  
655 samples, should perform more fine-grained compar-  
656 isons among different majors, disciplines, and other  
657 relevant groupings.

658 Third, the collected data is cross-sectional which  
659 does not enable us to test causal relationships between  
660 workaholism, work engagement, and burnout. Lon-  
661 gitudinal data would be beneficial in assessing the  
662 temporal relationships among these constructs and  
663 determining whether workaholism and burnout pre-  
664 dict changes in work engagement or vice versa.  
665 Moreover, in the context of the network approach,  
666 longitudinal data would have been used to assess  
667 the dynamic interplay between workaholism, work  
668 engagement, and burnout, allowing for a more

669 comprehensive understanding of the relationships  
670 among these constructs over time.

## 671 5. Conclusion

672 In the present study, we investigated the network  
673 structure of workaholism, work engagement, and  
674 burnout within a sample of academics in Montene-  
675 gro. Mainly, our results suggest that interventions  
676 should consider workaholism as an important burnout  
677 risk factor and dedication as a protective factor for  
678 academics. Furthermore, our contribution highlights  
679 that work engagement and workaholism are distinct  
680 and not directly connected, suggesting that interven-  
681 tions should be developed considering this empirical  
682 distinction.

## 683 Author contributions

684 All authors contributed to the study conception  
685 and design. Data collection: Sabina Osmanovic;  
686 Analysis: Igor Portoghese; Writing – original draft  
687 preparation: Igor Portoghese; All authors revised the  
688 draft critically and contributed to the writing of the  
689 manuscript. The final version of the manuscript was  
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697 port in disseminating the survey.

## 698 Declaration of interests' statement

699 The authors declare no conflict of interest.

## 700 Ethical approval

701 The study was approved by the Ethics Com-  
702 mittee of the University of Amsterdam number  
703 20220523100547.

## Informed consent

Informed consent was obtained from all partici-  
pants for being included in the study.

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Uncorrected Author Proof