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SHORT PAPER

Are coping and workplace psychosocial factors related to work ability in physicians? A PLS-SEM approach

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ABSTRACT

Background/Objective: Over the last few years, new statistical techniques have been developed in the context of multivariate analysis, which are proving to be very useful in the social or health sciences, even marketing. The aim of this work was to study the interplay between 3 scales: BriefCOPE for evaluating coping strategies; COPSOQII for assessing psychosocial factors; and WAI for assessing work ability.

Methods: Considering a subpopulation of physicians (n=35) we applied the Partial Least Squares Structure Equations Modelling (PLS-SEM) technique to study the relation between the 3 scales.

Results: Regarding the analysis of BriefCOPE and WAI, the only BriefCOPE domain significantly related to WAI was *'Strategies focused on emotions'* (β=0.329;*p*=0.038). In COPSOQII and WAI analysis, the COPSOQII domain *'Health and wellness'* was significantly associated with WAI (β= 0.599; *p*<0.001) with a strong effect. In final model regarding the three scales, we could observe that the apparent relationship between WAI and 'Strategies focused on emotions' (BriefCOPE) is mediated by the COPSOQII domain 'Health and wellness' (p = 0.047), which shows that there is small effect between the BriefCOPE and WAI.

Conclusions: This study is the first to test relationships between these three scales simultaneously. Using a PLS-SEM approach to analyse the data, the results of the present study highlight the central role of *'Health and wellness'* in work ability and in the mediation between coping '*Strategies focused on emotions'* and work ability. These data suggest that employers should implement organizational policies that enhance health and well-being in order to achieve better performance from their employees.

Introduction

The ability to work is an indicator of occupational health. It reflects workers' capacity to perform their professional occupation and meet the demands of their position without putting their physical and mental health at risk [1]. Ability to work is associated with a range of psychosocial factors comprising organizational, social, relational, and psychological aspects [2]. It is influenced by various work practices and processes, including time pressure, dealing with difficult clients, poor communication between senior staff, job insecurity, and lack of cooperation between colleagues. The coping strategies that workers use to respond to these job stresses can mitigate negative effects on their ability to work [1].

Ramos (2014)[1] evaluated a diverse group of workers on their coping strategies, psychosocial work environment, and ability to work. Exploratory and confirmatory factor analysis revealed that individuals with better health at work used different coping strategies to deal with work stress than those with poorer health. Coping helps to determine health at work, and psychosocial factors seem to influence coping.

Since 2019, various studies have been conducted to explore associations between ability to work and relevant psychosocial factors [2–5]. In one study, Cotrim(2019) [3] investigated which factors influenced ability to work during a financial crisis in a sample of municipal workers in Portugal. Results indicated that predictors could be grouped into two main categories: individual characteristics, such as age, lower back pain, health and burnout perception, and the physical demands of work; and organizational characteristics, such as training received in the last two years, the meaning of work, and a sense of community at work. Another study, conducted with patients with impaired vision, indicated a positive correlation between ability to work and the following variables: work importance, career prospects, rewards/feedback, role and definition, quality of management, social support, job satisfaction, and health condition [6]. Negative correlations were found between ability to work and the following: quantitative, cognitive and emotional work demands, exhaustion, and stress.

Keywords:
Coping, partial least squares path modelling, physicians, work ability, workplace psychosocial factors

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During the COVID-19 pandemic there was an increase concern about ability to work and wellbeing, particularly with regard to health workers. Andrade(2022) [2] tested a cohort of Brazilian health workers, observing no notable differences in Work Ability Index (WAI) scores before and during the pandemic, but notable increases in stress, burnout, work–family conflict, emotional demands, and work pace. Brady (2021) [4] examined workplace variables in assistant nurses and other non-clinical staff, finding nurses to have less degree of moral injury, worse wellbeing, and different coping styles. Kurashvili(2022) [5] had healthcare workers complete the Copenhagen Psychosocial Questionnaire-II (COPSOQII) and WAI scales, finding WAI scores to be negatively correlated with quantitative demands, work pace, job insecurity, burnout, stress, sleep troubles, offensive behaviours, and depressive symptoms. A few variables were found to be positively linked to WAI scores, however. These included role clarity, recognition, sense of community at work, quality of leadership, organisational justice, self-efficacy, meaning of work, job satisfaction, and possibilities for development.

There is a scarcity of studies that test associations between ability to work, psychosocial factors at work, and coping. Thus, the present study continues the work initiated by Ramos (2014), with the objective of understanding interrelationships between these variables, assessed using the WAI, COPSOQII, and BriefCOPE scales, respectively, for a sample of physicians. Using the PLS-SEM technique, we intend to analyze which factors most influence ability to work, and to test for mediating variables for this health group professional.

Methods

The current study uses an observational cross-sectional design. Analysis relied on a dataset developed by Ramos [1], as the work presented here is a continuation of his study. In Ramos' study, data collection was conducted between January 10 and July 18, 2012. The study tested a non-random convenience sample composed of 2960 workers, 31% (n=909) of whom were health professionals and 69% (n=2051) of whom were professionals from other areas. Participants were asked to complete an online questionnaire. In the current study, analyses were performed only on data from a subgroup of physicians (n=55), and only those that had complete data (n=35).

Variables and Instruments

To assess workers' coping strategies, the Portuguese version of the BriefCOPE scale (Pais Ribeiro & Rodrigues, adapted from Carver's original)[7,8] was used. The original BriefCOPE is a reduced version of the COPE maintaining the theoretical framework while removing redundancies and shortening completion time. The measure shows good psychometric properties and has been found to be an appropriate substitute for the original. For our analysis we divided the scale into three dimensions: 'Strategies focused on problems', 'Strategs focused on emotions', and 'Dysfunctional strategies'. These three dimensions are common theoretical divisions presented in other research works [9,10].

Psychosocial factors were assessed using the COPSOQ II Middle Version scale. This is a validated version of the original questionnaire developed by Kristensen [11] for the Portuguese population by Silva et al [12]. The scale consists of eight domains: '*Work requirements', 'Organization and content of work', 'Social relations and leadership', 'Work-individual interface', 'Values at work', 'Personality', 'Health and wellness', and 'Offensive behavior'*.

Ability to work was assessed using the Work Ability Index [13], validated for the Portuguese population by Silva [14] and the WAI total score was used.

Statistical analysis

We employed partial least squares structural equation modeling (PLS-SEM) to analyze the data. This technique is usually used when we are dealing with complex structural models that include many constructs, indicators and/or relationships. The objective is to understand the complexity of the model as best as possible, ideally exploring theoretical extensions of pre-established theories. Additionally, with this type of multifactor analysis we can have a predictive interest and not just test a theoretical framework [15–17]. There were four reasons for this decision: the relative complexity of the conceptual model, the need to capture not only main effects but also mediating effects, the need to use bootstrap and the data were not strictly bound by the multivariate normal distribution assumption [16–18]. The software SmartPLS4 [19] was used to test the models. Bootstrapping made it possible to establish confidence intervals for loadings and path coefficients. In this case, an alpha value of 5% was used. Only reflective measurement models were considered.

Initially, we analysed dimensions of the COPOSQII and BriefCOPE measures separately in relation to WAI scores. Constructs with significant path coefficients were selected from each of these analyses to create a final model where direct effects of BriefCOPE and COPSOII on WAI were analyzed, as also, the possible mediation effects of COPSOQII domains on the association between BriefCOPE and WAI scores.

To compute loadings p-values, we used a bootstrap strategy (5000 subsamples from the original sample size dataset). Then to include in the measurement models, we choose the loadings above >0.4 and p-values less than 0.05. Cronbach's alpha, reliability coefficient (rhoA) and composite reliability (rhoc) scores were calculated to evaluate the internal consistency of each construct, with values over 0.7 deemed acceptable [20]. The average variance extracted (AVE) was evaluated with values higher than 0.5 considered satisfactory [15]. Finally, discriminant validity was evaluated by the heterotrait-monotrait (HTMT) ratio, with values less than 0.9 deemed acceptable.

To evaluate the structural models, multicollinearity was assessed by analyzing the variance inflation factor (VIF < 3), and the coefficient of determination (R^2) was also calculated (values of 0.75, 0.50, and 0.25 were considered as substantial, moderate, and weak, respectively) [15]. Another criterion examined was the effect size (f^2). Based on Cohen's guidelines, f^2 values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively, while effect sizes smaller than 0.02 indicate no effect [21].

Results

A total of 55 physicians were included in this study. Regarding only those that had complete data (n=35), the median age was 35 (interquartile range (IQR)=20) years, the median of work years was 7 (IQR=21) years, and 24 (68.6%) were female. The median WAI total score was 41.50 (IQR=3.5), and categorizing, only 2 (5.7%) had a classification of poor, 4 (11.7%) as moderate, 17 (48.6%) had a classification of good and 12 (34.3%) physicians scored excellent in WAI scale.

Coping Strategies and Ability to Work (BriefCOPE -> WAI)

We first analyzed the BriefCOPE and WAI scales to assess which BriefCOPE domains were significantly associated with WAI scores. The only domain significantly related to WAI scores was 'Strategies focused on emotions' (β=0.329; p=0.038; Figure 1).

Regarding our validation criteria whereby factors were chosen according to loadings and p-values, it was possible to observe that 'Strategies focused on emotions' had a satisfactory Cronbach's alpha of 0.781, indicating good internal consistency. AVE was >0.5 and HTMT values were <0.9, meeting validation requirements for our measurement model.

Regarding the structural model, no multicollinearity was observed (validation requirement for structural model). The R^2 coefficient of determination was 0.306, considered weak. Regarding effect size, the f^2 of the relationship *'Strategies focused on emotions'* and WAI scores was 0.13.

Psychosocial Factors and Ability to Work (COPSOQII -> WAI)

Regarding analysis of COPSOQII and WAI scores, factors were selected according to our criteria of loadings >0.4 and p-values <0.05. The COPSOQII domain *'Health and wellness'* was significantly associated with WAI (β= 0.599; p<0.001; Figure 2).

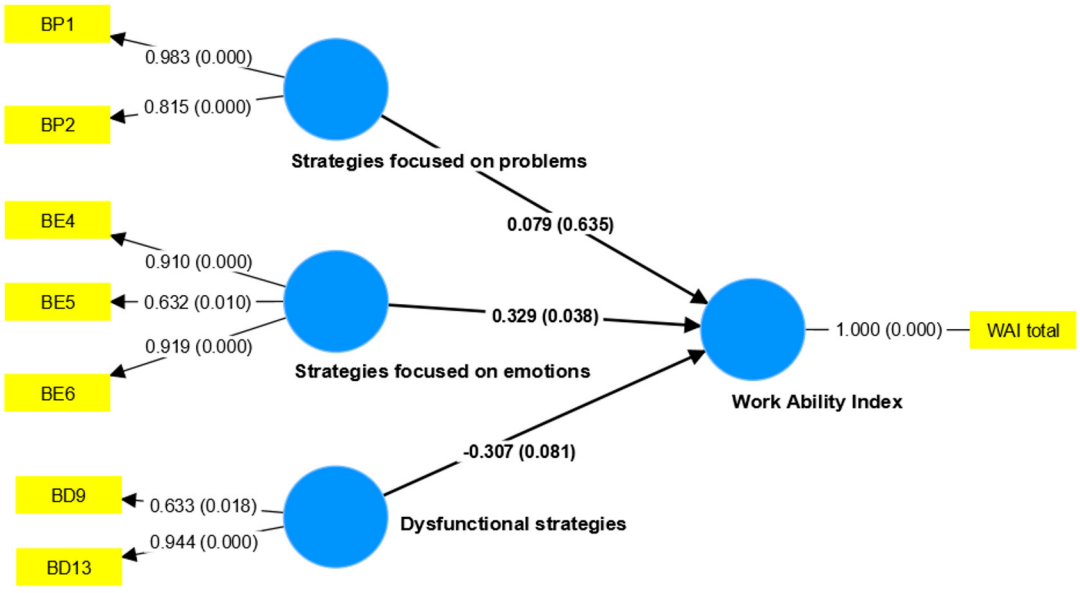

Figure 1 - Path diagram of model BriefCOPE->WAI. Values between brackets represent the correspondent p-values. Legend: BP1: Item scale "active coping"; BP2: Item scale "Planning"; BE4: Item scale "Positive Reinterpretation"; BE5: Item scale "Acceptance"; BE6: Item scale "Humour"; BD9: Item scale "Self-destruction"; BD13: Item scale "Behavioral Divestment".

Regarding validation criteria, the '*Health and wellness'* construct had a Cronbach's alpha of 0.385. This was likely related to the construct having some negative loadings. Other measures of internal consistency were satisfactory. AVE was >0.5 and HTMT was <0.9, thus meeting validation requirements for the measurement model.

Regarding the structural model, it was observed that there was no multicollinearity. The R^2 coefficient of determination was 0.602, considered moderate. Regarding effect size, the f^2 of the relationship between *'Health and wellness'* and WAI scores was 0.575, considered a strong effect.

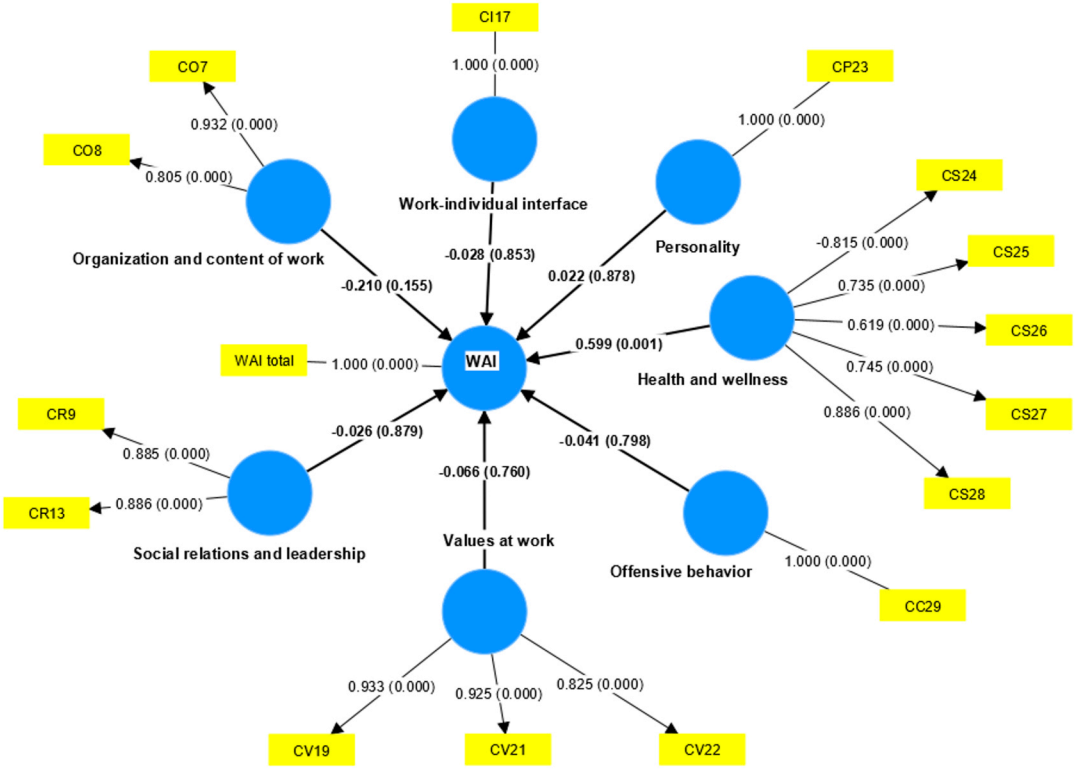

Figure 2 - Path diagram of model COPSOQII->WAI. Values between brackets represent the correspondent p-values. Legend: CO7: Item scale "Work meaning"; CO8: Item scale "Commitment to work"; CR9: Item scale "Predictability"; CR13: Item scale "Leadership Quality"; CV19: Item scale "Trust in Superiors"; CV21: Item scale "Justice"; CV22: Item scale "Social Community at work"; CP23: Item scale "Self-efficacy"; CS24: Item scale "General health"; CS25: Item scale "Stress"; CS26: Item scale "Burnout"; CS27: Item scale "Sleeping problems"; CS28: Item scale "Depressive symptoms"; CC29: Item scale "Bullying".

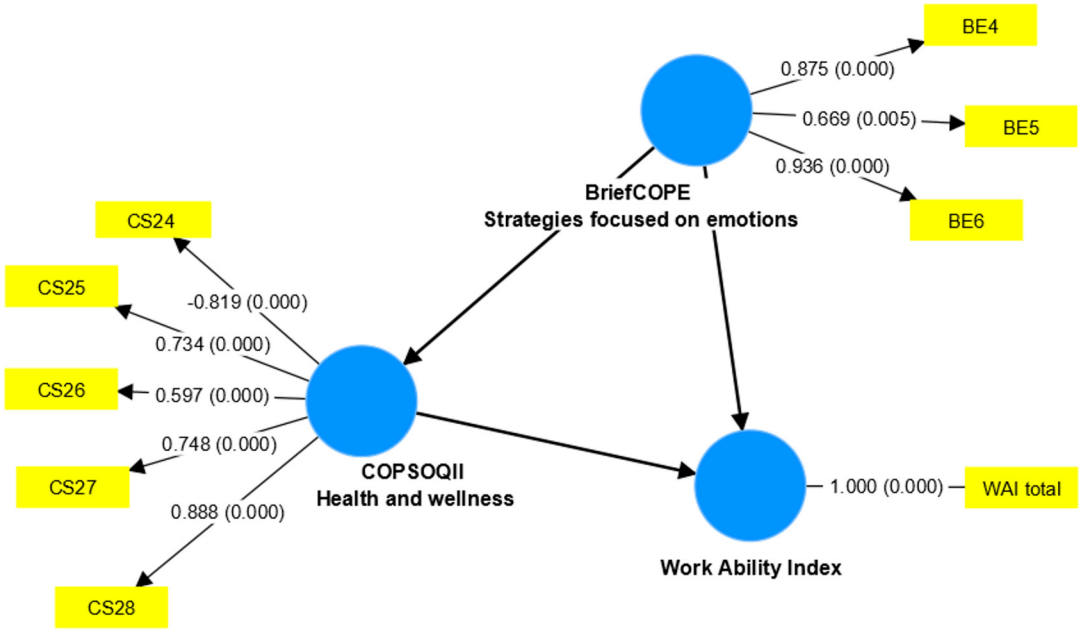

Figure 3 - Path diagram of final model BriefCOPE, COPSOQII and WAI. Values between brackets represent the correspondent p-values. Legend: BE4 Item scale "Positive Reinterpretation"; BE5 Item scale "Acceptance"; BE6 Item scale "Humour"; CS24: Item scale "General health"; CS25: Item scale "Stress"; CS26: Item scale "Burnout"; CS27: Item scale "Sleeping problems"; CS28: Item scale "Depressive symptoms".

Table 1 - Path coefficients of final model BriefCOPE, COPSOQII and WAI

	path coefficient	*T statistics*	*p values*
Direct Effects			
BriefCOPE: Strategies focused on emotions → COPSOQII: Health and wellness	0.356	1.953	0.051
BriefCOPE: Strategies focused on emotions → WAI	0.185	1.472	0.141
COPSOQII: Health and wellness → WAI	0.683	4.653	0.000
Mediating Effect			
BriefCOPE: Strategies focused on emotions → COPSOQII: Health and wellness → WAI	0. 243	1.988	0.047

Final Model - Coping, Psychosocial Factors, and Ability to Work

A final model was developed that included the selected significant constructs of BriefCOPE and COPSOQII on WAI. Figure 3 shows the final path model. COPSOQII 'Health and wellness' domain was positively associated with WAI scores (β=0.683; p<0.001). A mediating effect of COPSOQII was also found on the association between BriefCOPE and WAI scores (β=0.243; p=0.047; Table 1).

Discussion/Conclusion

Previous studies used the PLS-SEM technique to analyze data gathered using the BriefCOPE [9,22], COPSOQII [23], and WAI [24] scales. However, this study is the first to test relationships between these three scales simultaneously, using a PLS-SEM approach.

Our results seem to demonstrate that physicians who have better wellbeing and can deal with their emotions, feel or are healthier at work.

Interestingly, like in Ramos (2014) work, our results revealed that some theoretical dimensions of coping partially determine the capacity for work, but with an important influence of the psychosocial factor "Health and wellness". In the final model that includes elements from all three scales, we could observe that the apparent relationship between WAI and 'Strategies focused on emotions' (BriefCOPE) is mediated by the COPSOQII domain 'Health and wellness' which shows that there is small effect between the BriefCOPE and WAI.

These data suggest that physicians training should incorporate good cooping emotion-focused strategies and ongoing professional development of physicians should do the same, as well as the health organizations should provide their physicians with facilities and opportunities for health and wellbeing promotion. Although this is an expected result, the PLS-SEM technique seems to reinforce this conceptual idea.

It should be noted, however, that a small sample size comprising only a subpopulation of physicians was used in the study. Future work should aim to repeat the same analysis in a larger sample to confirm the results obtained here. Another suggestion is to evaluate other subpopulations of healthcare workers and with different sociodemographic features to study moderation effects.

Ethics committee and informed consent

This study is in compliance with ethical standards.

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