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SHORT PAPER

Relationships between WAI, BriefCOPE and COPSOQII scales on health care professionals: a multivariate analysis

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ABSTRACT

Background/Objective: Individual health and organizational performance are strongly influenced by how people manage stress, or how they cope. Analysis and understanding of bidirectional association of BriefCOPE and COPSOQII and a unidirectional association of these two with "Índice de Capacidade para o Trabalho (ICT)", a Portuguese version of Work Ability Index (WAI) in a health care professionals (e.g. Physicians, Nurses…) database (incomplete cases: n=909, complete cases: n=652).

Methods: The Brief-COPE is a 28 item self-report questionnaire designed to measure effective and ineffective ways to cope with a stressful life event. The psychosocial factors of work were evaluated using the COPSOQII. This questionnaire comprises 76 items divided into 29 scales. The WAI assesses the work ability, considering their health status, physical and mental demands, and work-related resources. To explore the association between Sociodemographic variables, BrieCOPE and COPSOQII with WAI, the chi-squared test (for categorical variables) and the Kruskal-Wallis test (for quantitative variables) were applied. Exploratory Factorial Analysis (EFA) and Confirmatory Factorial Analysis (CFA) methods to determine the model structure and fitness were also used.

Results: The WAI classification for the health care professionals was: poor/moderate (n=123; 18.9%), good (n=349, 53.5%), excellent (n=180, 27.6%). The sociodemographic variables showed no significant association with WAI categories. For the BriefCOPE scale, significant results were found with WAI categories in 8 of 14 dimensions (e.g active coping, denial, and substance use). For the COPSOQII scale, significant results were found with WAI categories in 28 of 29 dimensions (e.g work pace, burnout, and bullying). By EFA, the best model of BriefCOPE (oblimin rotation) with 4 dimensions was obtained, explaining in total 55% of the data variance. The best resulting model for COPSOQII, composed of 7 dimensions (varimax rotation), explains 63% of the total variance. These best models were used to be compared to the respective CFA. The results for the CFAs were not satisfactory given that the CFI and TLI indices were not good.

Conclusions: The main conclusion is that the fitting of the models does not have good results, even considering the models proposed by EFA. This might be explained due to the aggregation of all heath care professionals since different types of healthcare professionals have different work environments and demands.

Introduction

Health professionals' work lives are filled with stress and the coping mechanism makes it possible to deal with stressors in the workplace.[1] The Coping Orientation to Problems Experienced Inventory (BriefCOPE), a self-report questionnaire with 28 items, grouped in 14 scales, and the Copenhagen Psychosocial Questionnaire II (COPSOQ II), composed of 76 items divided into 29 scales, assesses coping and psychosocial factors, respectively.[1-3] Whereas Work Ability Index (WAI) measures work ability. [1,4]

In current literature, these assessment instruments are mainly applied in studies for specific categories of health professionals, such as medical doctors and nurses. The approaches mostly found in the literature are the individual use of each assessment instrument or the simultaneous use of two instruments, e.g. COPSOQII and WAI or BriefCOPE and COPSOQII.[5-10] Only the work of (Ramos, 2014) describes a bidirectional association of BriefCOPE and COPSOQ II and a unidirectional association of these two with "Índice de Capacidade para o Trabalho (ICT)", a portuguese version of WAI.

Therefore, this study aimed to identify significant relationships between the WAI and BriefCOPE, and COPSOQII scales. Also, it will be performed an exploratory factor analysis (EFA) and a confirmatory

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factor analysis (CFA) to identify the internal structure of the BriefCOPE and COPSOQII scales based on a sample of health professionals.

Methods

Design and Sample

The present study is an observational cross-sectional descriptive study. Participants were contacted by email and asked to circulate the survey among their health professional colleagues. The questionnaire was informally tested with team members only (September 27 to November 28, 2011) and was made available online between January 10 and July 18, 2012. Before taking part in the study, all subjects gave their informed consent. The convenience random sample has a size of 2960 individuals, however, in this study only Healthcare Professionals are considered, and thus the sample becomes n = 909. The inclusion factor was to be registered as a health professional in their professional associations (e.g. Ordem dos Enfermeiros, Portuguese Association of Physiotherapists, etc.). Further details on the construction of the questionnaire, informed consent and inclusion/exclusion criteria can be found in Marcos Ramos thesis [1]. This Health-care Professionals are distributed as: Physician (n=55), Nurse (n=111), Physiotherapist (n=208), Dietitian/ Nutritionist (n=301), Speech Therapist (n=8), Optometrist (n=33), Cardio pneumology Technician (n=95), Radiology Technician (n=4) Nuclear Medicine Technician (n=16), Radiotherapy Technician (n=1), Dentist and Orthodontist (n=7), Pharmacist and Pharmacy Technician (n=13), and Other Health Professionals (n=57). The social demographic variables used in this study are presented in Table 1.

Assessment Instruments

For the evaluation of coping we used the Portuguese version of the BriefCOPE scale [11], originally created by Carver in 1997 [12]. The psychosocial factors of work were assessed by the COPSOQ-II, in which the Portuguese version was used [13,14].

The Work Ability Index (WAI) measures, as the name implies, the capacity to work, divided into four categories: poor, moderate, good, and excellent. This scale was created by Ilmarinen and co-authors in 1997, however, in this paper the Portuguese version is used [15,16]. The categories of work ability are assigned according to the final scores obtained from 60 questions, some questions, some forced choice and others Likert scales. Seven factors are part of the WAI: [1] current ability to work compared to your best; [2] work ability in relation to the demands of the occupation; [3] present illnesses; [4] estimate the degree of incapacity to work due to illnesses; [5] absenteeism in the past 12 months; [6] prognosis of work capacity for two years; and [7] psychological resources.

Statistical Analysis

In the sociodemographic characterization performed, the Chi-Squared test was applied to the categorical variables and the Kruskal-Wallis test to the numerical variables, as shown in Table 1.

In the Exploratory Factor Analysis, multivariate outliers were removed if their Mahalanobis distance is higher than the cut-off calculated by Chi-Square 0.99 quantile. The AFE assumptions were validated and it was possible to extract the number of factors, based on an eigenvalue > 1 (Kaiser's criterion). Regarding the BriefCOPE scale, the best model was obtained through the principal component analysis and oblimin rotation, while the forced model was obtained through the principal component analysis and varimax rotation. For the COPSOQII scale, both the best model and the forced model were obtained by the principal component analysis and varimax rotation. Note that in the best model, although the extraction criterion was eigenvalues greater than 1, the seventh factor was also considered because it had an eigenvalue of 0.97.

Regarding the Confirmatory Factor Analysis, outliers were eliminated by the Mahalanobis distance at 99%. All the assumptions necessary to perform this analysis were validated. The model was obtained with Maximum Likelihood (ML) and Weighted Least Squares (WLS) estimators, and a conceptual diagram was obtained.

This work was performed using R (R version 4.2.1) and R studio (2022.07.1 Build 554), using the following packages: foreign, corrplot, rela, psych, gtsummary, lavaan, MVN, corrplot, and ggcorrplot. Significant results were considered if $p<0.05$.

Results

Sociodemographic Characterization

The sample consists of 652 individuals (representing the complete cases) belonging to the Health Professional class. A sociodemographic characterization of the data was carried out, with the construction of Table 1, where there is a separation of categorical variables (Sex, marital status, years of work) and numeric variables (Age and years of work). The female gender (78.4%) presents a much higher number of individuals than males (21.6%). About 59.0% of the individuals have less than 11 years of work, 46.8% are single and 37.9% are married. The average age of the individuals is 34.7 years (SD=10.0).

Table 2 presents the distribution between BriefCOPE and COPSOQII scores, along with the distributions among WAI scores and respective Kruskal-Wallis test results.

Exploratory Factorial Analysi

Table 3 and 4 summarise the results obtained, with a cutoff of 0.4, for the EFA for BriefCOPE and COPSOQII scales, respectively. For the forced models of both scales, the varimax rotation was used. Regarding the best model of BriefCOPE (Table 3), 4 dimensions were obtained and oblimin rotation was applied, explaining in total 55% of the data variance. The best resulting model for COPSOQII is composed of 7 dimensions (varimax rotation) and explains 63% of the total variance (Table 4).

Table 1 - Sociodemographic characterization and distribution among WAI scores.

Categorical variables	Total	WAI Categories			Statistical Result
		Poor/Mod (n=123) N (%)	Good (n=349) N (%)	Excellent (n=180) N (%)	Chi-Squared
Sex					
Feminine	511 (78.4%)	97 (14.9%)	284 (43.6%)	130 (19.9%)	$X^2(2) = 5.89$
Masculine	141 (21.6%)	26 (4.0%)	65 (10.0%)	50 (7.7%)	p = 0.053
Marital Status					
Single	305 (446,8%)	60 (9.2%)	166 (25.5%)	79 (12.1%)	
Married	247 (37.9%)	47 (7.2%)	125 (19.2%)	75 (11.5%)	$X^2(6) = 2.69$
Consensual Union	63 (9.7%)	11 (1.7%)	36 (5.5%)	16 (2.5%)	p = 0.85
Widowed/Separated/Divorced	37 (4.9%)	5 (0.8%)	22 (3.4%)	10 (1.5%)	
Years of work					
Less than 11	385 (59.0%)	73 (11.2%)	207 (31.7%)	105 (16.1%)	
Between 11 and 20	133 (20.3%)	28 (4.3%)	68 (10.4%)	37 (5.7%)	$X^2(6) = 2.86$
Between 21 and 30	102 (15.6%)	18 (2.8%)	53 (8.1%)	31 (4.8%)	p = 0.83
More than 30	32 (4,9%)	4 (0.6%)	21 (3.2%)	7 (1.1%)	
Quantitative variables	M ± SD	M ± SD	M ± SD	M ± SD	Kruskal-Wallis
Age	34.7 ± 10.0	34.6 ± 9.8	34.6 ± 10.1	35.0 ± 10.2	$X^2(2) = 0.51$ p = 0.77
Years of work	11.7 ± 9.7	11.9 ± 9.4	11.6 ± 9.8	11.7 ± 9.8	$X^2(2) = 0.56$ p = 0.76

Table 2 - BriefCOPE and COPSOQII distribution among WAI scores.

BriefCope					
	Mean ± SD	Work Ability Index			Kruskal-Wallis
		Poor/Mod (n=123)	Good (n=349)	Excellent (n=180)	
Active coping [1]	2.16 ± 0.59	1.97 ± 0.55	2.14 ± 0.56	2.32 ± 0.63	X^2 (2) = 28.87 p < 0.001
Positive reinterpretation [3]	1.84 ± 0.70	1.68 ± 0.69	1.79 ± 0.69	2.03 ± 0.69	X^2 (2) = 20.39 p < 0.001
Use of emotional support [7]	1.66 ± 0.78	1.83 ± 0.80	1.61 ± 0.76	1.64 ± 0.79	X^2 (2) = 6.50 p = 0.0389
Self-distraction [9]	1.34 ± 0.68	1.63 ± 0.71	1.30 ± 0.66	1.20 ± 0.64	X^2 (2) = 33.94 p < 0.001
Denial [10]	0.48 ± 0.59	0.65 ± 0.69	0.48 ± 0.57	0.36 ± 0.52	X^2 (2) = 15.41 p < 0.001
Substance use [12]	0.06 ± 0.24	0.15 ± 0.38	0.05 ± 0.20	0.03 ± 0.16	X^2 (2) = 15.21 p < 0.001
Behavioral disinvestment [13]	0.32 ± 0.47	0.52 ± 0.57	0.31 ± 0.45	0.19 ± 0.37	X^2 (2) = 35.92 p < 0.001
Self-blaming [14]	1.23 ± 0.61	1.35 ± 0.65	1.25 ± 0.59	1.10 ± 0.60	X^2 (2) = 13.86 p < 0.001
COPSOQII					
	Mean ± SD	Work Ability Index			Kruskal-Wallis
		Poor/Mod (n=123)	Good (n=349)	Excellent(n=180)	
Quantitative demands [1, 2, 3]	3.39 ± 0.91	3.15 ± 0.95	3.36 ± 0.90	3.62 ± 0.84	X^2 (2) = 19.66 p < 0.001
Work pace [4]	2.78 ± 1.04	2.53 ± 1.07	2.74 ± 0.98	3.03 ± 1.08	X^2 (2) = 15.24 p < 0.001
Cognitive demands[5, 6, 7]	2.01 ± 0.64	1.97 ± 0.59	2.09 ± 0.66	1.88 ± 0.59	X^2 (2) = 12.028 p = 0.00244
Emotional demands [8]	1.81 ± 0.85	1.54 ± 0.66	1.86 ± 0.88	1.89 ± 0.88	X^2 (2) = 15.22 p < 0.001
Influence [9, 10, 11, 12]	2.88 ± 0.88	3.13 ± 0.90	2.95 ± 0.84	2.57 ± 0.86	X^2 (2) = 34.78 p < 0.001
Possibilities for development [13, 14, 15]	1.88 ± 0.70	2.02 ± 0.78	1.94 ± 0.71	1.67 ± 0.59	X^2 (2) = 22.6 p < 0.001
Meaning of work [51, 52, 53]	1.72 ± 0.65	2.02 ± 0.68	1.74 ± 0.64	1.46 ± 0.53	X^2 (2) = 59.72 p < 0.001
Commitment to the workplace [54, 55]	2.33 ± 0.81	2.60 ± 0.84	2.33 ± 0.79	2.14 ± 0.76	X^2 (2) = 23.47 p < 0.001
Predictability [16, 17]	2.80 ± 0.89	3.20 ± 0.97	2.82 ± 0.83	2.48 ± 0.81	X^2 (2) = 44.19 p < 0.001
Rewards (recognition) [21, 22, 23]	2.38 ± 0.92	2.76 ± 1.00	2.44 ± 0.89	2.00 ± 0.79	$X2^2$ (2) = 54.40 p < 0.001
Role clarity [18, 19, 20]	1.91 ± 0.78	2.09 ± 0.89	1.99 ± 0.73	1.63 ± 0.71	X^2 (2) = 38.82 p < 0.001
Role conflicts [24, 25, 26]	2.91 ± 0.71	2.65 ± 0.71	2.93 ± 0.65	3.04 ± 0.78	X^2 (2) = 17.96 p < 0.001
Quality of leadership [36, 37, 38, 39]	2.90 ± 1.02	3.21 ± 1.07	2.94 ± 0.96	2.61 ± 1.01	X^2 (2) = 26.307 p < 0.001
Social support from supervisor [30, 31, 32]	3.19 ± 1.01	3.46 ± 1.03	3.22 ± 0.96	2.95 ± 0.104	X^2 (2) = 16.60 p < 0.001
Social support from colleagues [27, 28, 29]	2.49 ± 0.76	2.67 ± 0.86	2.52 ± 0.73	2.31 ± 0.72	X^2 (2) = 16.37 p < 0.001
Job satisfaction [56, 57, 58, 59]	2.68 ± 0.77	3.07 ± 0.82	2.73 ± 0.70	2.33 ± 0.72	X^2 (2) = 72.43 p < 0.001
Work-family conflict [62, 63, 64]	3.05 ± 1.04	2.71 ± 0.99	3.02 ± 1.02	3.34 ± 1.04	X^2 (2) = 27.51 p < 0.001
Trust regarding management [43, 44, 45]	2.41 ± 0.70	2.74 ± 0.72	2.42 ± 0.65	2.19 ± 0.69	X^2 (2) = 48.91 p < 0.001
Mutual trust between employees [40, 41, 42]	3.43 ± 0.79	3.13 ± 0.87	3.41 ± 0.75	3.66 ± 0.74	X^2 (2) = 30.87 p < 0.001
Justice and respect [46, 47, 48]	2.78 ± 0.80	3.14 ± 0.87	2.78 ± 0.74	2.54 ± 0.77	X^2 (2) = 39.22 p < 0.001
Social inclusiveness [33, 34, 35]	2.08 ± 0.82	2.34 ± 0.94	2.09 ± 0.77	1.87 ± 0.76	X^2 (2) = 22.87 p < 0.001
Self-efficacy [49, 50]	2.26 ± 0.62	2.53 ± 0.75	2.30 ± 0.56	2.00 ± 0.55	X^2 (2) = 50.80 p < 0.001
Self rated health [61]	2.38 ± 0.81	2.97 ± 0.84	2.46 ± 0.70	1.84 ± 0.63	X^2 (2) = 147.89 p < 0.001
Stress [69, 70]	3.17 ± 0.96	2.54 ± 0.80	3.15 ± 0.92	3.64 ± 0.89	X^2 (2) =96.65 p < 0.001
Burnout [67, 68]	2.99 ± 0.95	2.37 ± 0.82	2.94 ± 0.90	3.49 ± 0.88	X^2 (2) = 107.54 p < 0.001
Sleeping troubles [65, 66]	3.75 ± 1.08	3.26 ± 1.14	3.72 ± 1.07	4.13 ± 0.91	X^2 (2) = 45.96 p < 0.001
Depressive symptoms [71, 72]	3.59 ± 1.02	2.86 ± 1.00	3.55 ± 0.96	4.18 ± 0.77	X^2 (2) = 121.14 p < 0.001
Bullying [73, 74, 75, 76]	4.83 ± 0.36	4.74 ± 0.50	4.82 ± 0.32	4.89 ± 0.30	X^2 (2) = 19.69 p < 0.001

Table 3 - Comparison of the EFA of the Theoretical Model with the Forced Model and Best Model for the BriefCOPE scale, with a cutoff of 0.40

BC (Alpha)	Proposed Theorical Model			Forced Model (Varimax rotation)					Best Model (Oblimin rotation)					
	D1	D2	D3	D1	D2	D3	h2	u2	F1	F2	F3	F4	h2	u2
BC1 (0.66)	X				0.62		0.62	0.38			-0.64		0.64	0.36
BC2 (0.64)	X				0.65		0.62	0.38			0.56		0.65	0.35
BC3 (0.65)		X			0.82		0.68	0.32		0.76			0.69	0.31
BC4 (0.64)		X			0.66		0.47	0.53		0.57			0.48	0.52
BC5 (0.66)		X			0.65		0.52	0.48		0.80			0.60	0.40
BC6 (0.66)		X		-	-	-	0.20	0.80		0.41			0.25	0.75
BC7 (0.64)		X		0.80			0.68	0.32	0.87				0.74	0.26
BC8 (0.63)	X			0.80			0.68	0.32	0.83				0.72	0.28
BC9 (0.67)			X			0.59	0.36	0.64			0.59		0.44	0.56
BC10 (0.67)			X			0.60	0.37	0.63			0.47		0.40	0.60
BC11 (0.66)			X	0.65			0.42	0.58	0.65				0.43	0.57
BC12 (0.68)			X	-	-	-	0.11	0.89				0.74	0.50	0.50
BC13 (0.68)			X			0.69	0.52	0.48			0.65		0.52	0.48
BC14 (0.65)			X	0.42			0.31	0.60				0.68	0.56	0.44
SS loadings				2.18	2.53	1.86			2.18	2.12	1.90	1.40		
% of Explained Variance				16	18	13			16	15	14	10		
Cronbach's alpha				0.68	0.74	0.46			0.72	0.58	0.21	0.16		

BC1: Active coping; BC2: Planning; BC3: Positive reinterpretation; BC4: Acceptance; BC5: Humor; BC6: Religion; BC7: Use of emotional support; BC8: Use of instrumental support; BC9: Self-distraction; BC10: Denial; BC11: Expression of feelings; BC12: Substance use; BC13: Behavioral disinvestment; BC14: Self-blaming.

Table 4 - Comparison of the EFA of the Theoretical Model with the Forced Model and Best Model for the COPSOQII scale, with a cutoff of 0.40

CS (Alpha)	Proposed Theorical Model								Forced Model (Varimax rotation)										Best Model (Varimax rotation)								
	D1	D2	D3	D4	D5	D6	D7	D8	D1	D2	D3	D4	D?	D?	D7	D8	h2	u2	F1	F2	F3	F4	F5	F6	F7	h2	u2
CS1 (0.69)	X								0.74								0.67	0.33				0.74				0.64	0.36
CS2 (0.69)	X								0.73								0.58	0.42				0.73				0.58	0.42
CS3 (0.66)	X												0.77				0.67	0.33			0.77					0.66	0.34
CS4 (0.68)	X												0.59				0.44	0.56			0.60					0.44	0.56
CS5 (0.67)		X											0.46				0.54	0.46			0.42					0.55	0.45
CS6 (0.65)		X									0.42		0.63				0.64	0.36	0.40		0.69					0.65	0.35
CS7 (0.66)		X								0.67							0.74	0.26			0.55					0.59	0.41
CS8 (0.66)		X								0.69							0.66	0.34	E	E	E	E	E	E	E	E	E
CS9 (0.65)			X								0.73						0.68	0.32	0.72							0.68	0.32
CS10 (0.66)			X								0.77						0.70	0.30	0.74							0.66	0.34
CS11 (0.66)			X								0.48						0.49	0.51	0.41							0.47	0.53
CS12 (0.70)			X						-	-	-	-	-	-	-	-	0.54	0.46					-0.40			0.47	0.53
CS13 (0.66)			X								0.83						0.73	0.27	0.83							0.73	0.27
CS14 (0.66)			X								0.69			0.41			0.73	0.27	0.71					0.42		0.72	0.28
CS15 (0.67)			X											0.88			0.85	0.15						0.88		0.85	0.15
CS16 (0.70)				X								0.83					0.76	0.24							0.85	0.77	0.23
CS17 (0.66)				X							0.61						0.63	0.37	0.61							0.61	0.39
CS18 (0.68)				X					0.67								0.63	0.37				0.67				0.61	0.39
CS19 (0.67)					X						0.70						0.69	0.31	0.66				0.48			0.69	0.31
CS20 (0.71)					X					-0.45						-0.45	0.67	0.33					-0.72			0.67	0.33
CS21 (0.66)					X						0.74						0.73	0.27	0.72							0.73	0.27
CS22 (0.67)					X									0.63			0.74	0.26					0.50	0.61		0.76	0.24
CS23 (0.67)						X					0.50						0.45	0.55	0.48							0.46	0.54
CS24 (0.70)							X								-0.65		0.56	0.44		-0.65						0.50	0.50
CS25 (0.70)							X								0.74		0.72	0.28		0.75						0.71	0.29
CS26 (0.69)							X								0.70		0.73	0.27		0.70						0.71	0.29
CS27 (0.70)							X								0.73		0.60	0.40		0.73						0.58	0.42
CS28 (0.71)							X								0.72		0.73	0.27		0.72						0.70	0.30
CS29 (0.71)								X								-0.67	0.56	0.44					-0.47			0.32	0.68
SS loadings									2.29	1.86	5.26	1.19	2.23	1.60	3.06	1.33			4.97	3.08	2.43	2.25	2.12	1.49	1.20		
% of Explained Variance									8	6	18	4	8	6	11	5			18	11	9	8	8	5	4		
Cronbach's alpha									0.67	0.7	0.9	1	0.62	0.74	0.82	1			0.9	0.82	0.41	0.67	0.5	0.74	1		

CS1: Quantitative demands; CS2: Work pace; CS3: Cognitive demands; CS4: Emotional demands; CS5: Influence; CS6: Possibilities for development; CS7: Meaning of work; CS8: Commitment to the workplace; CS9: Predictability; CS10: Rewards (recognition); CS11: Role clarity; CS12: Role conflicts; CS13: Quality of leadership; CS14: Social support from supervisor; CS15: Social support from colleagues; CS16: Job insecurity; CS17: Job satisfaction; CS18: Work-Family conflict; CS19: Trust regarding management; CS20: Mutual trust between employees; CS21: Justice and respect; CS22: Social inclusiveness; CS23: Self-efficacy; CS24: Self rated health; CS25: Stress; CS26: Burnout; CS27: Sleeping troubles; CS28: Depressive symptoms; CS29: Bullying; E: Excluded.

Confirmatory Factorial Analysis:

Confirmatory Factor Analysis (CFA) was performed on the models. The structure of this analysis is concerned with the evaluation of the COPSOQII and BriefCOPE data sets. These are divided in two models: The theoretical models and the best-fit models proposed by the EFA. Two different Estimators were used and compared in each of the CFAs.

Considering the CFAs for the theoretical models, the BriefCOPE results are: WLS: CFI=0.477, TLI=0.357, RMSEA=0.09; and for ML: CFI=0.575, TLI=0.478, RMSEA=0.123. For the COPSOQ-II, the results are: WLS: CFI=0.568, TLI= 0.496, RMSEA=0.088; and for ML: CFI=0.803; TLI=0.770 RMSEA=0.084.

Considering the CFAs for the best model approach, the BriefCOPE results are: WLS: CFI = 0.690, TLI= 0.603, RMSEA= 0.070; and for ML: CFI = 0.778, TLI = 0.715, RMSEA = 0.091. For the COPSOQ-II, the results are: WLS: CFI = 0.609, TLI = 0.548, RMSEA = 0.082; and for ML: CFI = 0.851; TLI=0.828, RMSEA = 0.073.

Figure 1 shows the conceptual diagrams for both approaches.

Discussion:

According to Table 2, who has an excellent WAI in BriefCope is characterized by a significative: active coping, positive reinterpretation, use of emotional support, self-distraction, denial, substance use, behavioral disinvestment, and self-blaming. In the case of COPSOQII, who has an excellent WAI is associated with significative: Quantitative demands, Work pace, Cognitive demands, Emotional demands, Influence, Possibilities for development, Meaning of work, Commitment to the workplace, Predictability, Rewards (recognition), Role clarity, Role conflicts, Quality of leadership, Social support from supervisor, Social support from colleagues, Job satisfaction, Work-family conflict,, Trust regarding management, Mutual trust between employees, Justice and respect, Social inclusiveness, Self-efficacy, Self rated health, Stress, Burnout, Sleeping troubles, Depressive symptoms, and Bullying.

In the literature, a 3-dimensional model is proposed for BriefCOPE and an 8-dimensional model for COPSOQ-II, whereas in the present study, better models with 4 and 7 dimensions were identified, respectively. It should be noted that, after several approaches, the item "Commitment with work" (Dim8), Table 4, had to be excluded to obtain the best model presented for COPSOQ. In addition, the models with the dimensions proposed in the literature were forced for both scales. Thus, in the forced model of BriefCOPE, 2 items did not reach saturation in any dimension (Dim6: Religion; and Dim12: Substance use), Table 3. With regard to the COPSOQ-II forced model (Table 4), one item does not reach saturation (Dim12: Role conflicts) and another item saturates in two dimensions (Dim20: Mutual trust between employees). In general, the results obtained for the best BriefCOPE and COPSOQ-II models are not consistent with the theoretical models proposed in the literature (Table 3 and 4, respectively). One explanation for these results could be that the sample under analysis is a vaguer group, health professionals.

Regarding the confirmatory factorial analysis, in order to evaluate the quality of the CFAs, it is taken in consideration the thresholds provided by Hair et al. (2010).[17].

For all the CFAs, the thresholds provided are CFI or TLI > 0.94, RMSEA < 0.07. Comparing the CFAs obtained with WLS and ML, most of the time the results are similar. However, the ML estimator tends to have a better fit on some occasions, especially when the normal multivariate requirement is fulfilled.

It is clear that the CFA models are better when considering the best model approach rather than the theoretical model. The theoretical model for COPSOQII has several problems. There are several dimensions that are not linked to the proposed latent variables. In order to have a result for this CFA model, there was a need to erase dimensions 8 and 16 from the COPSOQII data set. This does not solve all the problems of this model but is enough to have a result.

One of the limitations that might explain the lack of quality in the CFA models is related to the fact of considering all the health care professionals together, without distinguishing them by their specific occupation. This is relevant because different types of health care professionals have different work demands and ways of coping with those demands.

Ethics committee and informed consent:

The ethical compliance of the study was independently validated and confirmed by two different Ethics Committees, one from the Centro Hospitalar de São João (Porto) and the other from the Escola Superior de Saúde de Viseu.

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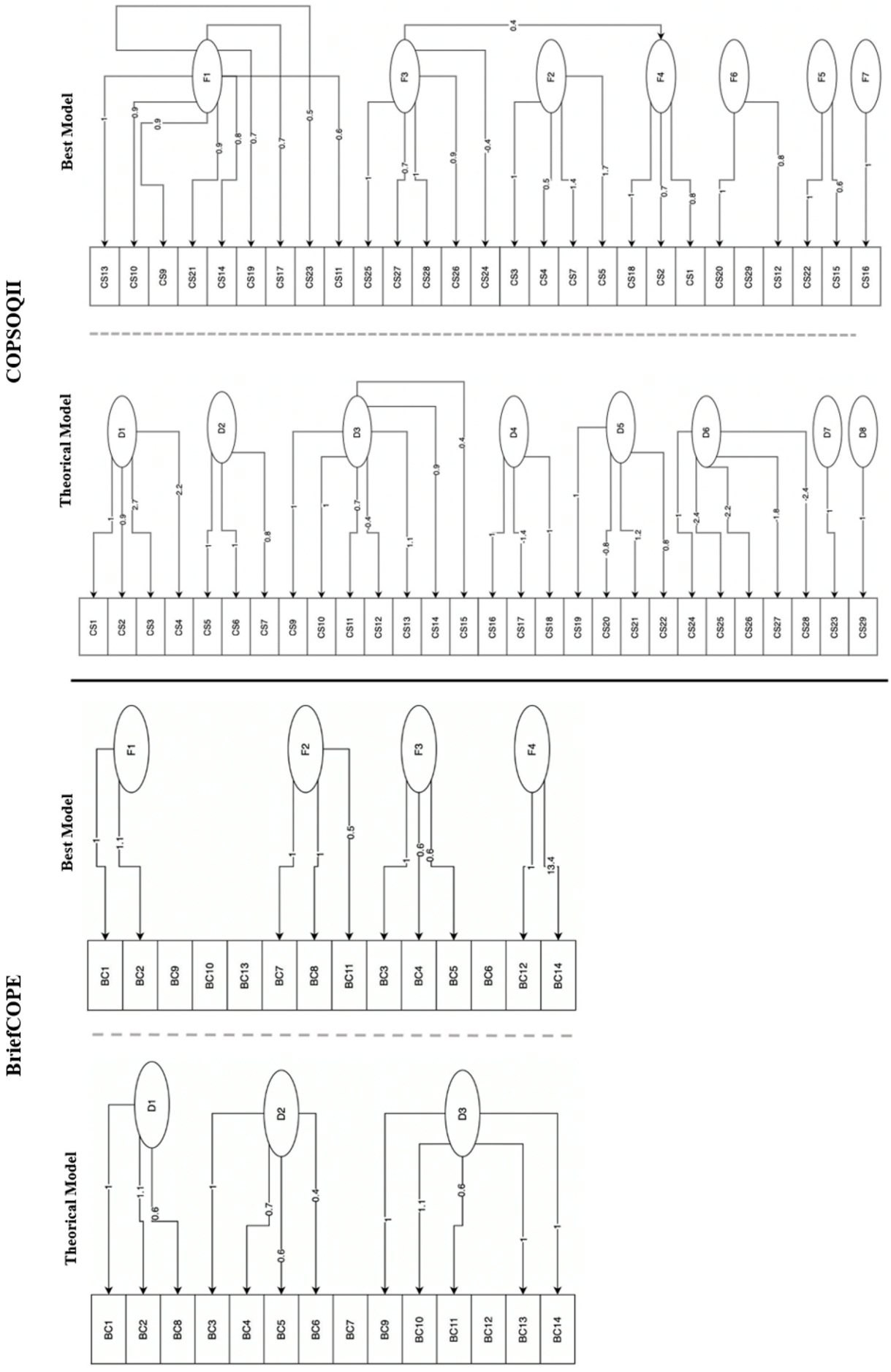

Figure 1- Comparison of the conceptual diagrams of the theoretical model and the best model. The diagram on the left is for BriefCOPE and the diagram on the right is for COPSOQII.

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