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Maslach Burnout Inventory – Student Survey: Portugal-Brazil cross-cultural adaptation

ABSTRACT

OBJECTIVE: To perform a cross-cultural adaptation of the Portuguese version of the Maslach Burnout Inventory for students (MBI-SS), and investigate its reliability, validity and cross-cultural invariance.

METHODS: The face validity involved the participation of a multidisciplinary team. Content validity was performed. The Portuguese version was completed in 2009, on the internet, by 958 Brazilian and 556 Portuguese university students from the urban area. Confirmatory factor analysis was carried out using as fit indices: the χ^2/df, the Comparative Fit Index (CFI), the Goodness of Fit Index (GFI) and the Root Mean Square Error of Approximation (RMSEA). To verify the stability of the factor solution according to the original English version, cross-validation was performed in 2/3 of the total sample and replicated in the remaining 1/3. Convergent validity was estimated by the average variance extracted and composite reliability. The discriminant validity was assessed, and the internal consistency was estimated by the Cronbach's alpha coefficient. Concurrent validity was estimated by the correlational analysis of the mean scores of the Portuguese version and the Copenhagen Burnout Inventory, and the divergent validity was compared to the Beck Depression Inventory. The invariance of the model between the Brazilian and the Portuguese samples was assessed.

RESULTS: The three-factor model of Exhaustion, Disengagement and Efficacy showed good fit (χ^2/df = 8.498, CFI = 0.916, GFI = 0.902, RMSEA = 0.086). The factor structure was stable (λ: χ^2_{dif} = 11.383, p = 0.50; Cov: χ^2_{dif} = 6.479, p = 0.372; Residues: χ^2_{dif} = 21.514, p = 0.121). Adequate convergent validity (VEM = 0.45;0.64, CC = 0.82;0.88), discriminant (ρ^2 = 0.06;0.33) and internal consistency (α = 0.83;0.88) were observed. The concurrent validity of the Portuguese version with the Copenhagen Inventory was adequate (r = 0.21, 0.74). The assessment of the divergent validity was impaired by the approach of the theoretical concept of the dimensions Exhaustion and Disengagement of the Portuguese version with the Beck Depression Inventory. Invariance of the instrument between the Brazilian and Portuguese samples was not observed (λ:χ^2_{dif} = 84.768, p<0.001; Cov: χ^2_{dif} = 129.206, p < 0.001; Residues: χ^2_{dif} = 518.760, p < 0.001).

CONCLUSIONS: The Portuguese version of the Maslach Burnout Inventory for students showed adequate reliability and validity, but its factor structure was not invariant between the countries, indicating the absence of cross-cultural stability.

DESCRIPTORS: Burnout; Students. Young Adult. Psychometrics. Reproducibility of Results. Validation Studies.

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INTRODUCTION

In psychology, the term "burnout" is referred to as a multifactorial syndrome consisting of emotional exhaustion, depersonalization and reduced sense of personal accomplishment related to work.[20] Currently, the burnout syndrome is considered a public health issue because of the impact on the patients' physical and mental health, besides the socioeconomic implications arising from this condition.[27,28]

Early studies on burnout referred exclusively to professions with high human contact. Currently, the research extends to all occupational groups, including students.[16,21,24] According to Schaufeli & Taris[25] (2005) and Hu & Schaufeli[10] (2009), although students are not formally considered workers, the core of their activities, under a psychological perspective, can be regarded as work, because they are involved in an organizational structure with mandatory activities.

To evaluate the burnout syndrome, the most widely used measurement tool is the three-dimensional Maslach Burnout Inventory (MBI).[20] It can be found in four different versions, according to occupational group: MBI – Human Services Survey; MBI – Educators Survey; MBI – General Survey; and MBI – Student Survey.

Although some authors[5, 14] question the metric characteristics of the MBI, its psychometric properties have been extensively tested and approved in various occupational contexts. The MBI – Student Survey (MBI-SS) showed adequate reliability and validity in the Netherlands, Spain, Portugal[19,24] and China,[10] but its factorial validity has not been adequately established in Brazilian students.

The need to use a cross-culturally adequate version of the MBI-SS, the orthographic agreement between the Portuguese speaking countries[a] and the lack of studies that evaluate the validity of a cross-cultural MBI-SS in Brazilian and Portuguese samples justify the validation study of this tool. Thus, the objective of this study was to conduct the cross-cultural adaptation to the Portuguese language of the MBI-SS, as well as to investigate its reliability, validity and invariance between Brazil and Portugal.

METHODS

Higher education students, enrolled in Brazilian and Portuguese universities in 2009, volunteered to participate in this work. The invitation was made to the institutions by the researchers in person or via e-mail. Contact information for the institutions was acquired through the Brazilian Ministry of Education and Culture and the Portuguese Ministry of Education and Science websites.

The calculation of sample size was carried out with standard formulas for sizing samples in structural model analysis.[12] Degree of freedom of the model, $\alpha = 5\%$ and power of at least 80% were considered, obtaining an estimate of the sample size of 177 individuals. However, since the objective was to study the psychometric properties of the MBI-SS for the student population of Portugal and Brazil, the sample must be large enough to adequately capture population variability. For this reason, a representative sample of the population much larger than the usually recommended for performing statistical tests was used.

The inclusion criteria were: higher education student, 18 years or older, agreeing to participate and to complete all items of the MBI-SS.

Sociodemographic information, such as gender, age, field of study, type of institution, class shift, housing, funding of studies, use of medication linked to the studies and thoughts about quitting the course was gathered to characterize the sample.

The MBI-SS was proposed by Schaufeli et al[24] (2002) in the English language, and the validity of its three-factor structure was verified in samples of students from three European countries.

The Portuguese version used in this study was developed by Carlotto et al[4] (2006), to which a small adjustment was made to keep it consistent with the latest Portuguese Language Orthographic Agreement.

The idiomatic, semantic, cultural and conceptual equivalences of the instrument were verified by a multidisciplinary team of eight professionals from the psychology and Portuguese language fields. After consensus, this MBI-SS version was pretested on a group of 20 students to estimate the rate of incomprehension of each item.

To verify the essentiality of each item, 13 psychology professionals (judges) carried out an analysis to classified them as "essential", "useful but non-essential" and "not necessary". Subsequently, the Content Validity Ratio (CVR) was calculated. The significance of each item was based on Laewshe[15] (1975), with 5% level of significance.

The Copenhagen Burnout Inventory for Students (CBI-S)[3] was used to estimate the concurrent validity, and the Beck Depression Inventory (BDI), for the divergent validity.

A website was created to house the sociodemographic questionnaire and the Portuguese version of the MBI-SS. The questionnaires were available online for

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7 months (May to November). Each webpage hosted an instrument, allowing the respondents to view all items simultaneously. Non-response was allowed to the items. This survey method (online) was assessed by a previous study.[3]

Initially, the psychometric sensitivity was evaluated through measures of central tendency and shape. Items with skew (Sk) above 3 and kurtosis (ku) above 7, in absolute values, were linked to sensitivity problems.[13]

A confirmatory factor analysis was carried out to verify the adequacy of the data obtained from the Portuguese version of the MBI-SS to the three-factor structure proposed by Schaufeli et al[24] (2002). The following fit indices were used: χ^2/df (chi-square and degree of freedom ratio), CFI (comparative fit index), GFI (goodness of fit index) and RMSEA (root mean square error of approximation).

The model fit was considered suitable for χ^2/df values below 5, CFI and GFI above 0.9 and RMSEA below 0.10.[2,17] The AMOS® 18.0 program (IBM, SPSS Inc., Chicago, IL) was used to perform the confirmatory factor analysis.

To verify the stability of the factor solution obtained, a model cross-validation was carried out to compare the indices observed in the sample with another independent sample from the same population.[9] Thus, the total sample was divided into three equal parts, two of them being the "test sample" and the other one the "validation sample". The invariance test was conducted by imposing equality restrictions to the factor weights of both groups. The statistic was the difference between the χ^2 of the model with fixed factor weights and the model with equal weights. When the hypothesis of factorial invariance was accepted, the analysis of the invariance of specific factors (covariances, residuals) was carried out.[11] This procedure was also performed to verify the cross-cultural stability of the factor solution obtained, by comparing the indices observed in the Brazilian sample with the Portuguese sample.

Convergent validity was estimated by the average variance extracted (AVE) and composite reliability (CR).[7,17] According to Hair et al[9] (2005), $AVE_j \geq 0.5$ and $CR_j \geq 0.7$ indicate convergent validity and construct reliability.

The discriminant validity was calculated according to Fornell & Larcker[7] (1981) and Maroco[17] (2010), as follows: for two factors *i* and *j*, if AVE_i and $AVE_j \geq \rho_{ij}^2$ (ρ_{ij}^2: square of the correlation between factors *i* and *j*) there is evidence of discriminant validity.

The criterion-related validity was assessed through the concurrent and divergent validity, using the Pearson's correlation coefficient. For the concurrent validity, the mean scores from each MBI-SS dimension was correlated with that obtained from each CBI-S dimension, and for the divergent validity, with the mean scores obtained with the BDI.

Internal consistency was assessed using the Cronbach's alpha coefficient (α) standardized for each dimension of the MBI-SS.

This study is part of a larger research approved by the Ethics Committee on Human Research of the Universidade Luterana do Brasil, Canoas/RS, Brazil (protocol: 2010-188H).

RESULTS

The pretest showed that no item had an incomprehension index ≥ 0.20. The estimated CVR can be seen in Table 1.

In the opinion of the judges, only eight items of the MBI-SS are essential for investigating the burnout syndrome in students.

In total, the instruments were completed by 1,052 Brazilian and 612 Portuguese students. However, only 958 Brazilian (response rate: RR = 91.1%) and 556 Portuguese (RR = 90.9%) students fully completed the MBI and were included in the study. Sample losses were random and, therefore, did not affect the characteristics of the sample studied. The average age of the Brazilians was 23.1 years (sd = 5.1) and the Portuguese, 23.8 years (sd = 7.6) (Table 2).

All items had skew and kurtosis values close to the normal distribution (Sk = 0, Ku = 0) in both the

Table 1. Content Validity Ratio of the Portuguese version of the Malasch Burnout Inventory for students, Portugal-Brazil, 2009.

MBI-SS	Not necessary	Useful, but non-essential	Essential	RVC*
it1	-	1	11	0.83
it2	-	3	9	0.50[a]
it3	-	1	12	0.85
it4	-	3	9	0.50[a]
it5	3	4	5	-0.17[a]
it6	3	6	4	-0.38[a]
it7	-	1	12	0.85
it8	-	3	10	0.54
it9	-	2	11	0.69
it10	1	1	11	0.69
it11	4	2	6	0.00[a]
it12	1	2	9	0.50[a]
it13	-	3	10	0.54
it14	4	3	6	-0.08[a]
it15	1	1	11	0.69

* CVR = Content Validity Ratio. $CVR_{12;0.05} = 0.56$; $CVR_{13;0.05} = 0.54$
[a] Values below the minimum significant
MBI-SS: Malasch Burnout Inventory for students

Table 2. Sociodemographic characteristics of participant students. Portugal-Brazil, 2009.

Variable	Brazil		Portugal		Brazil and Portugal	
	n	%	n	%	n	%
Gender						
Female	510	53.3	448	80.9	958	63.4
Male	446	46.7	106	19.1	552	36.6
Field of study						
Biological Sciences	55	5.8	53	9.5	108	7.2
Exact Sciences	308	32.7	-		308	20.6
Social and Human Sciences	109	11.6	503	90.5	612	40.8
Health Sciences	471	49.9	-		471	31.4
Type of institution						
Private	438	46.9	503	90.5	941	63.2
Public	496	53.1	53	9.5	549	36.8
Class shift						
Morning/Full time	409	44.2	225	45.3	634	44.5
Afternoon	27	2.9	100	20.1	127	9.0
Evening	490	52.9	172	34.6	662	46.5
Course year						
1	211	22.0	25	4.6	236	15.7
2	237	24.7	367	67.3	604	40.2
3	272	28.4	73	13.4	345	23.0
4	204	21.3	37	6.8	241	16.0
5	34	3.6	43	7.9	77	5.1
Housing						
Friends	294	30.7	75	13.7	369	24.5
Family	539	56.4	410	74.7	949	63.1
Alone	123	12.9	64	11.7	187	12.4
Funding of studies						
Bursary	83	9.1	16	3.0	99	6.8
Family	566	61.7	371	69.5	937	64.6
Self- funded	268	29.2	147	27.5	415	28.6
Use of medication linked to the studies						
Never/Rarely	605	63.6	427	77.7	1,030	68.7
Some times	292	30.7	112	20.5	404	27.0
Frequently	56	5.8	10	1.8	65	4.3
Thoughts about quitting the course						
Never	553	58.0	396	71.7	949	63.0
Some times	340	35.6	132	23.9	472	31.3
Frequently	61	6.4	24	4.4	85	5.6

Brazilian and Portuguese samples. Only the item no. 6 was slightly leptokurtic in the Portuguese sample, but without compromising the psychometric sensitivity.

The confirmatory factor analysis pointed to an adequate fit (χ^2/df = 8.498, CFI = 0.916, GFI = 0.902, RMSEA = 0.086) of the MBI-SS and all items showed factorial weights greater than 0.50. There was also a moderate to strong correlation between the scales (r = 0.31 to 0.64).

The simultaneous evaluation in both samples (test and validation) revealed good fit indices (χ^2/df = 5.325; CFI = 0.923; GFI = 0.904; RMSEA = 0.053). The factor model adjustment, the covariance between factors and

the residuals of the validation and test samples revealed no significant differences between them (λ: $\chi^2(12)_{dif}$= 11.383, p = 0.496; Cov: $\chi^2(6)_{dif}$ = 6.479, p = 0.372; residues: $\chi^2(15)_{dif}$=21.514, p=0.121). These observations point to the model invariance in both independent samples, confirming the stability of the factor structure.

The adequate convergent validity (Emotional Exhaustion: AVE = 0.606, CR = 0.823; Disengagement: AVE = 0.644, CR = 0.876; Professional Efficacy: AVE = 0.450, CR = 0.828) and discriminant (Exhaustion: ρ^2 = 0.06 to 0.33; Disengagement: ρ^2 = 0.15 to 0.33; Professional Efficacy: ρ^2 = 0.06 to 0.15) of the MBI-SS is attested. The convergent validity was impaired only for Professional Efficacy.

Internal consistency was excellent for all CBI-S dimensions (α_{Ex}= 0.884; α_{Dis}= 0.868; $\alpha_{Prof\ Ef.}$= 0.827).

It was noted a strong correlation between the dimensions 'personal burnout PB'and 'study related burnout – SRB' of CBI-S and the dimension Emotional Exhaustion of the MBI-SS, and a moderate correlation between PB, SRB and 'teacher related burnout – TRB' and the dimension Disengagement of MBI-SS, indicating an adequate concurrent validity of the MBI-SS. On the other hand, the moderate correlation found between the MBI-SS dimensions Exhaustion and Disengagement and the BDI denotes that the theoretical constructs of the instruments are close, which impairs the assessment regarding the divergent validity of the scale (Table 3).

The fit indices in the simultaneous evaluation of the Brazilian and Portuguese samples were adequate (χ^2/df = 7.820; CFI: = 0.881, GFI = 0.882, RMSEA = 0.067). However, model invariance was not observed (λ: $\chi^2(12)_{dif}$ = 84.768, p < 0.001; Cov: $\chi^2(18)_{dif}$ = 129.206, p < 0.001; residues:, $\chi^2(33)_{dif}$ = 518.760, p < 0.001).

The values shown in the Figure are the standardized estimates of the covariance between factors, factor weights and explained variance of each item, respectively. There is no cross-cultural equivalence between the countries. However, the value proximity of the factor weights of the items and the correlations between the MBI-SS scales in the different samples is evident. The significant difference between the factor weights in both countries occurred only in three items (it2, it9 and it14).

DISCUSSION

The present study examined the psychometric properties of the Portuguese version of the MBI-SS, confirmed the stability of the three-dimensional structure of the instrument in independent samples and certified the importance of the three dimensions in defining the construct burnout. This process of analysis is important for data collection with adequate reliability and validity, and should be performed prior to performing any study.

The convergent and discriminant validity of the MBI-SS was adequate, except for the AVE, which was compromised for the dimension Professional Efficacy. This may be due to the correlation between item 14 and the dimensions Exhaustion and Disengagement, indicated by the modification indices. Therefore, Maroco et al[19] (2008) and Maroco & Tecedeiro[18] (2009) opted for removing this item from their studies. However, despite this correlation, we chose to keep the item on the MBI-SS, because it showed adequate factor weight in the Portuguese sample and good factor weight in the Brazilian. The model fit was adequate in both samples.

The excellent internal consistency observed in the MBI dimensions appears to be a consensus in the literature, except for Poghosyan et al[22] (2009). These authors found α = 0.36 for the dimension professional achievement in a sample of nurses (n = 388) in Armenia.

The moderate correlation found between the MBI-SS dimensions Exhaustion and Disengagement and the

Table 3. Correlation matrix between the Maslach Burnout Inventory, the Copenhagen Inventory for students and the Beck Depression Inventory. Portugal-Brazil, 2009.

Variável		CBI-S				MBI-SS			BDI
		PB	SRB	CRB	TRB	Ex.	Dis.	Prof. Ef.	
CBI-S	PB	1.00	-	-	-	-	-	-	-
	SRB	0.78	1.00	-	-	-	-	-	-
	CRB	0.32	0.30	1.00	-	-	-	-	-
	TRB	0.37	0.50	0.41	1.00	-	-	-	-
MBI-SS	Ex.	0.67	0.74	0.25	0.41	1.00	-	-	-
	Dis.	0.46	0.59	0.21	0.46	0.58	1.00	-	-
	Prof. Ef	-0.24	-0.35	-0.06	-0.21	-0.25	-0.38	1.00	-
BDI		0.45	0.49	0.39	0.60	0.44	0.44	-0.08	1.00

MBI-SS: Maslach Burnout Inventory; CBI-S: Copenhagen Inventory for students; BDI: the Beck Depression Inventory; PB: personal burnout, SRB: study related burnout, CRB: colleagues related burnout , TRB: teacher related burnout; MBI-SS: Malasch Burnout Inventory for students; Ex.: Exhaustion, Dis.: Disengagement, Prof. Ef.: professional efficacy.

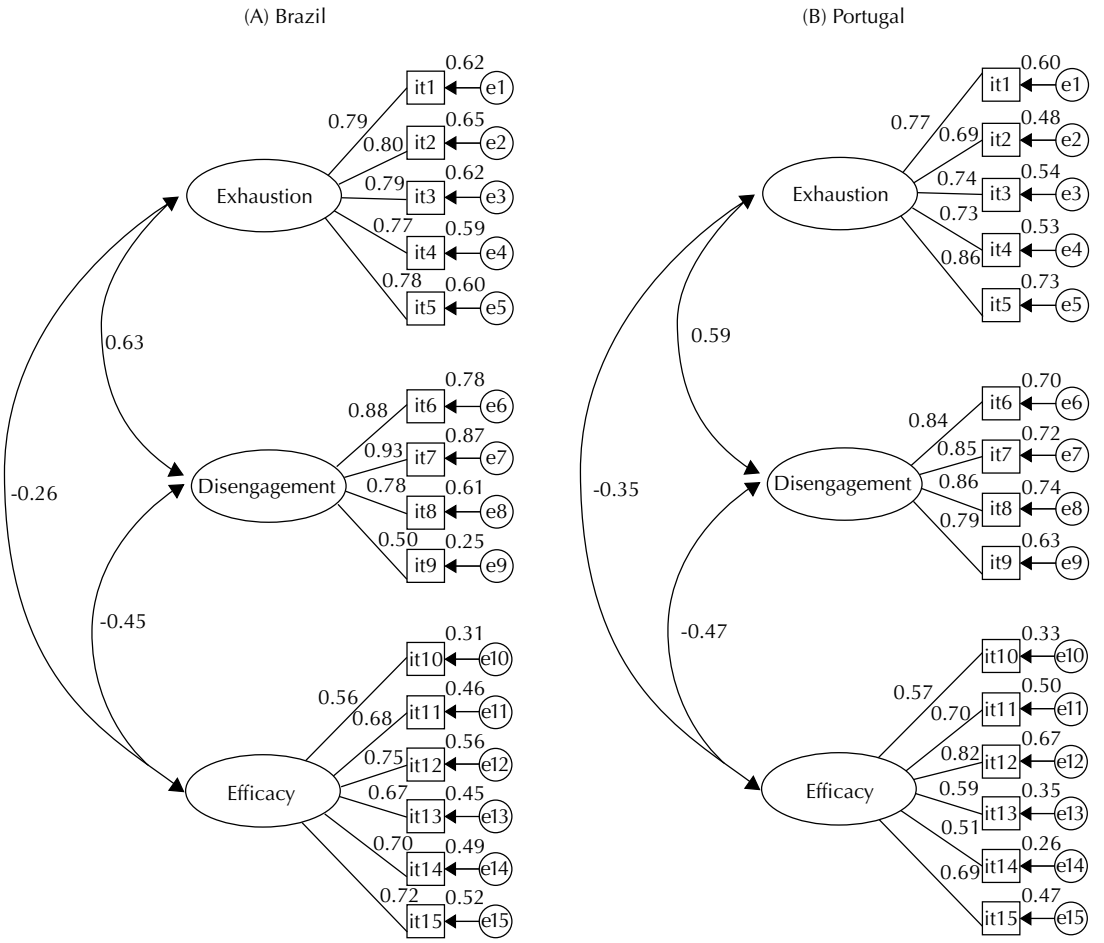

Figure. Confirmatory factor analysis of the Portuguese version of the Malasch Burnout Inventory for students. Portugal-Brazil, 2009.
(A): Brazilian sample: χ^2/df=6.872; CFI = 0.932; GFI = 0.919; RMSEA = 0.078;
(B): Portuguese sample: χ^2/df = 5.769; CFI = 0.903; GFI = 0.884; RMSEA = 0.093

BDI (Table 3) may denote approximation of these scales with depression. However, burnout and depression are distinct concepts. The meta-analysis conducted by Glass & McKnight[8] (1996) warns that, although the two constructs present a shared variance of about 20%, this does not mean isomorphism between concepts. Stronger and more significant correlations were found between the dimensions Exhaustion and Disengagement than with Professional Efficacy (Figure), which is typically reported in studies using the MBI in its different versions.[6,22,23,26] This may be assigned to the original configuration of the instrument, which has inverse answers in such dimension, in relation to the others. To test this hypothesis, Bresó et al[1] (2007) inverted the items in the original instrument, thus the dimension was termed professional inefficacy and presented items in the same direction of other dimensions. Compared to the original scale, the inefficacy was positively and more strongly correlated with the other dimensions of the instrument. This type of behavior can be attributed to the creation of a response pattern in which participants may have marked the answers without realizing that the scale was reversed for that item.

The rejection of the factorial invariance of the MBI-SS between Portugal and Brazil can be attributed to differences between the sociodemographic characteristics of the samples (Table 2). On the other hand, the only study in the literature on the cross-cultural invariance of the MBI-SS was by Schaufeli et al[24] (2002), who attributed the lack of invariance to the rigor of the statistical method used (multigroup analysis: chi-square difference test). Although the factor weights differ between countries, the three-dimensional adjustment of the MBI-SS was appropriate for all. This pattern seems to be constantly verified also in cross-cultural studies that used other MBI versions.[1,6,22,23,26] It is noteworthy that the difference between the factor weights obtained for Brazil and Portugal was significant only for three items.

According to Poghosyan et al[22] (2009), this is a normal situation, because it would not be realistic to expect that the factor weights were identical in both groups. It should also be noted that two of these items were identified by the experts as non-essential to measure burnout in students (Table 1). It is possible that these differences can be attributed to cultural differences between countries.

The results presented here should be analyzed considering the study limitations, such as: 1) the cross-sectional and correlational design, which impairs the establishment of cause and effect relations; 2) the fact that the sample is composed of volunteers; and 3) the sample did not have similar sociodemographic characteristics in both countries. However, these limitations are found in most transnational studies available in the literature.[6,22,23,26] Despite these limitations, the results confirm the reliability and validity of the Portuguese version of the MBI-SS, thus providing an instrument for tracking the burnout syndrome in students. Despite the factor structure was not invariant between the Brazilian and Portuguese samples, the three-factor model showed a good fit for both samples.

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REFERENCES

1. Breso E, Salanova M, Schaufeli W. In search of the "Third Dimension" of burnout: Efficacy or Inefficacy? *Appl Psychol.* 2007;56(3):460-78. DOI:10.1111/j.1464-0597.2007.00290.x
2. Byrne BM. Structural equation modeling with Amos: basic concepts, applications and programming. New Jersey: Lawrence Erlbaum Associates; 2001.
3. Campos JADB, Zucoloto ML, Bonafé FSS, Jordani PC, Maroco J. Reliability and validity of self reported burnout in college students: A cross randomized comparison of pencil-and-paper vs. online administration. *Comput Human Behav.* 2011;27(5):1875-83. DOI:10.1016/j.chb.2011.04.011
4. Carlotto MS, Câmara SG. Características psicométricas do Malasch Burnout Inventory – Student Survey (MBI-SS) em estudantes universitários brasileiros. *Psico-USF.* 2006;11(2):167-73. DOI:10.1590/S1413-82712006000200005
5. Demerouti E, Bakker AB, Nachreiner F, Schaufeli WB. The job demands-resources model of burnout. *J Appl Psychol.* 2001;86(3):499-512. DOI:10.1037/0021-9010.86.3.499
6. Enzmann D, Schaufeli W, Girault Nl, Bennett L, Miller D, Ross M. The validity of the Maslach Burnout Inventory in three national samples. Health workers and AIDS: Research, intervention and current issues in burnout and response. Amsterdam: Harwood Academic Publishers; 1995. p.131-50.
7. Fornell C, Larcker DF. Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *J Marketing Res.* 1981;18(1):39-50. DOI:10.2307/3151312
8. Glass DC, McKnight JD. Perceived control, depressive symptomatology, and professional burnout: A review of the evidence. *Psychol Health.* 1996;11(1):23-48. DOI:10.1080/08870449608401975
9. Hair JF, Black WC, Babin B, Anderson RE, Tatham RL. Multivariate data analysis. 6.ed. New Jersey: Prentice Hall; 2005.
10. Hu Q, Schaufeli WB. The factorial validity of the Maslach Burnout Inventory - student survey in China. *Psychol Rep.* 2009;105:394-408. DOI:10.2466/pr0.105.2.394-408
11. Kaplan D. Structural equation modeling: foundations and extensions. Thousand Oaks: Sage Publications; 2000.
12. Kim KH. The relation among fit indexes, power and sample size in structural equation modeling. *Struct Equ Modeling.* 2005;12(3):368-90. DOI:10.1207/s15328007sem1203_2
13. Kline RB. Principles and practice of structural equation modeling. New York: The Guilford Press; 1998.
14. Kristensen TS, Borritz M, Villadsen E, Christensen KB. The Copenhagen Burnout Inventory: A new tool for the assessment of burnout. *Work Stress.* 2005;19(3):192-207. DOI:10.1080/02678370500297720
15. Laewshe CH. A quantitative approach to content validity. *Pers Psychol.* 1975;28(4):563-75. DOI:10.1111/j.1744-6570.1975.tb01393.x
16. Leiter MP, Schaufeli WB. Consistency of the burnout construct across occupations. *Anxiety Stress Coping.* 1996;9(3):229-43. DOI:10.1080/10615809608249404
17. Maroco J. Análise de equações estruturais: Fundamentos teóricos, software e aplicações. Lisboa: Report Number; 2010.
18. Maroco J, Tecedeiro M. Inventário de Burnout de Maslach para estudantes portugueses. *Psicol Saude Doenças.* 2009;10(2):227-35.
19. Maroco J, Tecedeiro M, Martins P, Meireles A. Estrutura fatorial de segunda ordem da Escala de Burnout de Malasch para estudantes numa amostra portuguesa. *Anal Psicol.* 2008;4(26):639-49.
20. Maslach C, Jackson SE. The Measurement of Experienced Burnout. *J Occup Behav.* 1981;2(2):99-113. DOI:10.1002/job.4030020205
21. Maslach C, Schaufeli WB, Leiter MP. Job burnout. *Annu Rev Psychol.* 2001;52:397-422. DOI:10.1146/annurev.psych.52.1.397
22. Poghosyan L, Aiken LH, Sloane DM. Factor structure of the Maslach Burnout Inventory: an analysis of data from large scale cross-sectional surveys of nurses from eight countries. *Int J Nurs Stud.* 2009;46(7):894-902. DOI:10.1016/j.ijnurstu.2009.03.004
23. Schaufeli WB, Janczur B. Burnout among nurses: a Polish-Dutch comparison. *J Cross Cult Psychol.* 1994;25(1):95-113. DOI:10.1177/0022022194251006
24. Schaufeli WB, Martinez IM, Pinto AM, Salanova M, Bakker AB. Burnout and engagement in university students: a cross-national study. *J Cross Cult Psychol.* 2002;33(5):464-81. DOI:10.1177/0022022102033005003
25. Schaufeli WB, Taris TW. The conceptualization and measurement of burnout: Common ground and worlds apart. *Work Stress.* 2005;19(3):256-62. DOI:10.1080/02678370500385913
26. Schutte N, Toppinen S, Kalimo R, Schaufeli W. The factorial validity of the Maslach Burnout Inventory: general survey (MBI-GS) across occupational groups and nations. *J Occup Organ Psych.* 2000;73(1):53-66. DOI:10.1348/096317900166877
27. Vieira I. Conceito(s) de burnout: questões atuais da pesquisa e a contribuição da clínica. *Rev Bras Saude Ocup.* 2010;35(122):269-76. DOI:10.1590/S0303-76572010000200009
28. Yeh WY, Cheng Y, Chen CJ, Hu PY, Kristensen TS. Psychometric properties of the Chinese version of Copenhagen burnout inventory among employees in two companies in Taiwan. *Int J Behav Med.* 2007;14(3):126-33. DOI:10.1007/BF03000183

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