Factorial invariance of the Maslach Burnout Inventory-student survey (MBI-SS) in Chilean and Spanish university students

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Abstract

Introduction: The Maslach Burnout Inventory-Student Survey (MBI SS) is one of the most recognized instruments worldwide to assess burnout in the student population. **Objective:** To estimate the psychometric properties of the Maslach Burnout Inventory Student Survey (MBI-SS) in Chilean and Spanish university students. **Method:** An instrumental study was carried out in a non-probabilistic sample by quotas in 103 Chilean university students and 104 Spanish students. A confirmatory factorial analysis was performed, the reliability of the instrument and its factorial invariance for the Spanish and Chilean samples were analyzed. **Results:** The results confirm its three-factor factor structure and show that the instrument has adequate reliability and factor invariance in its proposed 12-item version. **Discussion:** It is concluded that this instrument and its psychometric properties allow the evaluation of academic burnout in Chilean and Spanish students.

Keywords: burnout; MBI SS; Maslach Burnout Inventory Student Survey; university students.

Invarianza factorial del Maslach Burnout Inventory Student Survey (mbi-ss) en estudiantes universitarios chilenos y españoles

Resumen

Introducción: el Maslach Burnout Inventory-Student Survey (MBI SS) es uno de los instrumentos más reconocidos en todo el mundo para evaluar el burnout en población estudiantil. **Objetivo.** estimar las propiedades psicométricas del Maslach Burnout Inventory Student Survey (MBI-SS) en estudiantes universitarios chilenos y españoles. **Método:** se efectuó un estudio instrumental en una muestra no probabilística por cuotas en 103 estudiantes universitarios chilenos y 104 estudiantes españoles. Se realizó un análisis factorial confirmatorio, se analizó la confiabilidad del instrumento y su invarianza factorial para la muestra española y chilena. **Los resultados** confirman su estructura factorial de tres factores y muestran que el instrumento presenta una adecuada confiabilidad y una invarianza factorial en su versión propuesta de 12 ítems. **Discusión:** se concluye que este instrumento y sus propiedades psicométricas permiten evaluar el burnout académico en estudiantes chilenos y españoles.

Palabras clave: burnout; MBI SS; Maslach Burnout Inventory Student Survey; estudiantes universitarios.

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Introduction

Stress is considered the first step in a gradual process known as burnout, which begins when personal demands exceed the material and human resources individuals possess (Álvarez & Fernández, 1991). Freudenberger (1980) described it as a state of fatigue or frustration due to devotion to a cause, way of life or relationship that does not produce the desired reward. Pines, Aaronson & Kafry (1981) likened it to a state of physical, emotional, and mental exhaustion caused by being involved for long periods of time in situations that affect the person emotionally.

Maslach and Jackson (1981) soon after defined it as a response to chronic work stress that involves the experience of being emotionally exhausted, the development of activities and negative feelings towards the people with whom one works (depersonalization activities), and the appearance of processes of devaluation of one's own professional role. They understand that burnout is configured as a three-dimensional syndrome characterized by a) emotional exhaustion, b) depersonalization, and c) reduced personal fulfillment.

One of the stages of burnout research is characterized by the expansion of the population affected by the syndrome to include students in their academic processes. It is here where it is possible to speak properly of academic burnout syndrome. It is worth distinguishing two aspects in this regard: the first one, which corresponds to the study of the syndrome in university students of medicine and nursing careers, and the second one, which corresponds to students of different careers (Caballero, et al., 2010). The second aspect mentioned is the generalization of the syndrome to the entire academic field and arises from the assumption that university students, as well as any other professional, are faced with the pressures and overloads inherent to academic work (Garcés de los Fayos, 1995).

Bresó (2008) points out that students, and any employee, maintain a relationship of direct and indirect compensation with the university institution, evidenced in economic support, scholarships, recognition, or awards. This assumption makes it possible to investigate the individuals' responses to stress and its implications for their sense of well-being in relation to studies (Bresó, 2008; Caballero, et al., 2007).

Regarding the studies conducted on academic burnout, the three-dimensional approach is the most predominant. In this approach, emotional exhaustion refers to the feeling of having exhausted one's emotional resources and is considered the basic individual stress component of burnout. Depersonalization refers to negative, cynical, or excessively disinterested responses to other people at work; this is the interpersonal component of the syndrome. Finally, low personal accomplishment alludes to feelings of diminished self-competence as well as productivity and represents the self-evaluation component of burnout (Moneta, 2011).

The variables associated with the syndrome are very diverse and, in the academic field, the factors that can restrict or facilitate the student's academic performance have been studied. Salanova, et al. (2005) differentiate between the variables considered *obstacles* (factors of the academic context that hinder student performance), and the so-called *facilitators* (factors of the academic context that enable satisfactory performance and help mitigate obstacles). Among the former, difficulties in the reprographic service, doing or getting too much homework, heavy class schedules and many credits per program stand out. Among the facilitators, they note adequate library service, camaraderie, social support from family and friends, as well as receiving scholarships.

The operationalization of academic burnout has been made possible by the standardization of the Maslach Burnout Inventory-General Survey (MBI-GS) in university students, which gave rise to the Burnout Inventory-Student Survey (MBI-SS) questionnaire by Schaufeli et al. (2002).

The Maslach Burnout Inventory (MBI) has become the gold standard for the measurement of burnout, since it is the most widely used instrument for this purpose and has been validated in multiple cultural and work contexts (Dyrbye et al; 2009; Aguayo et al; 2011; Gil-Monte & Olivares, 2011). To understand the impact of this instrument

on burnout research, it should be mentioned that the appearance of the MBI as an assessment technique and instrument probably constitutes the differential fact that marks the transition from an initial period of formulation to a rigorous and systematic one (Hernández et al., 2005).

The MBI has been widely accepted in all Latin American countries, the EU, and the U.S. This is an advantage because it allows comparison of results and the development of strategies for prevention and treatment of the disorder, as well as promoting the development of adaptations of the questionnaire (Shirom, 2003). However, the fact that the MBI is the most frequently used instrument to measure burnout does not necessarily imply that its validity and reliability has been consolidated (Grajales, 2001).

The inventory to be examined is the Maslach Burnout Inventory-Student Survey (MBI-SS), by Schaufeli, et al. (2002), which is a questionnaire for the evaluation of academic burnout syndrome of collective application and individual completion. It evaluates the feeling of not being able to give more of oneself, both physically and psychically (exhaustion), the presence of a negative attitude of devaluation and loss of interest in the study (cynicism) and the existence of doubts about one's own ability to perform academic work (academic self-efficacy) (Bresó, 2008). All items in each of these three subscales are scored on a seven-point frequency scale, ranging from 0 (never) to 6 (always). Five items assess exhaustion, four assess cynicism, and six items assess academic self efficacy, for a total of 15 items.

It is important to note that, although this instrument was originally designed in English, it has already been translated into Spanish on many occasions for application in Latin American and Spanish populations (Aguilar-Bustamante & Riño-Hernández, 2013; Boada et al., 2015; Merino et al., 2013; Moyano & Riaño-Hernández, 2013; as cited in Hederich-Martínez & Caballero-Domínguez, 2016).

In Mexico, Banda et al. (2021) found Cronbach's alphas of .856 for Emotional Exhaustion, .851 for Cynicism, and .717 for Academic Efficacy, also performing an exploratory factor analysis that evidenced its three dimensions. Consistent results with this were obtained by Ornelas et al. (2020) who evidenced a three-factor structure (exhaustion, cynicism, and efficacy) with adequate reliability and validity fit indicators. Their fit indicators showed acceptable results for a subsample 1 (GFI = .904; RMSEA = .082; CFI = .904) and a subsample 2 (GFI = .916; RMSEA = .077; CFI = .916), but improved by eliminating seven items with lower factor loadings, finding adequate fit indicators in the first subsample (GFI = .984; RMSEA = .039; CFI = .987) and also in the second (GFI = .982; RMSEA = .043; CFI = .985). The omega reliability indicators are .814 in exhaustion, .741 in cynicism, and .776 in efficacy in the first subsample and .802 in exhaustion, .711 in cynicism, and .818 in efficacy in the second subsample. In Spain (Pérez-Fuentes et al., 2020), in a sample of 1,209 students from the autonomous community of Andalusia by means of an exploratory and confirmatory factorial, the authors found that a 12 item version of the instrument presented the best levels of fit, according to a three-factor model (X^2/dl = 3.155, CFI = .966, TLI = .953, GFI = .961, RMR= .167, RMSEA= .061). In relation to reliability, their results show for the emotional exhaustion factor = .83, for the cynicism factor X = .82, and for the academic efficacy factor X = .79. A recent study with Spanish university students (Aguayo-Estremera, 2023) concludes that the internal structure of the MBI-SS is well reflected by the three-factor congeneric oblique model, reaching good values of reliability, and convergent and discriminant validity.

While in Chile referring to the student area, Pérez et al. (2012) say that there is not a validated instrument to assess the syndrome in Chilean university students, which is why we evaluated the factorial structure and reliability of a version of the MBI adapted to students.

In this study, by means of Exploratory Factor Analysis, three factors close to those proposed by Maslach were identified, which showed—together with the general scale—adequate reliabilities. These results indicate that the instrument has an appropriate factorial structure and internal consistency, being useful to assess emotional exhaustion, particularly interpersonal, in the university population. The study coincided with

the trifactorial structure of burnout originally proposed by Maslach and Jackson (1981), showing agreement between the empirical behavior of the instrument and the theoretical model that underlies it. However, the authors confirm that the distribution of the items is not exactly the same as originally proposed. Where factors such as items 6 (*Being with other people all day is an effort*) and 16 (*Working directly with people causes me stress*)—both factors of emotional exhaustion—were assigned to the Cynicism or Depersonalization factor as they presented higher factor loadings. On the other hand, the items show adequate discriminative capacities of correlation with the rest of the items of the scale above r = .30, which shows that they present a sufficient relationship with the factor to which they belong.

In this sense, the present modified version of the MBI for university students has shown to have a defined factorial structure and adequate reliabilities that allow its use for these purposes in the Chilean university population (Pérez et al., 2012).

It is important to mention that the MBI as an assessment instrument for burnout has a systemic structure that benefits its application because it constitutes the initial step to form other rigorous and systematic instruments (Hernández et al., 2005).

Most studies agree that burnout is negatively correlated with satisfaction with studies (Caballero, et al., 2007), intention to drop out of studies and happiness in relation to studies (Salanova, et al., 2005) and lower expectations of success in them (Martínez & Marques-Pinto, 2005). These data show that, although the consequences of in the deterioration of several relevant variables related to academic performance and satisfaction with studies, as well as in the prevention of dropout by university students (Caballero et al., 2015).

Faye Dumanget et al. (2017) analyzed this instrument on a sample of university students from various majors. She used a confirmatory factor analysis to test the appropriateness of the model, evidencing that the French version of the MBI-SS model has an acceptable fit. Similarly, Mostert et. al (2007) evaluated the instrument on Afrikaans and Setswana speaking students. This study revealed, through confirmatory factor analysis, a good fit for the two-factor reference models, supporting the thesis that the two-factor structure of the MBI-SS is equivalent for both languages.

The general objective of this paper is to describe the psychometric properties of the MBI-SS instrument in Chilean and Spanish university students. Specifically, the aim is to: a) estimate the factor structure of the MBI-SS instrument in Chilean and Spanish university students, b) estimate the reliability of the assessment instrument applied in Chilean and Spanish university students, and c) estimate the factorial invariance of the assessment instrument applied in Chilean and Spanish university students.

With respect to the above, we seek to provide information on the concept of burnout for future research on the Maslach Burnout Inventory-Student Survey (MBI-SS) instrument by testing the factorial structure of the instrument and its psychometric equivalence in groups of Spanish and Chilean students. In the context of intergroup comparison, it is essential to consider the need to adapt a psychological measurement instrument that meets all the criteria for equivalence, but above all to consider whether the same factor structure is applicable to different groups of subjects or, more generally, to different populations (Abalo et al., 2006).

Method

Design

The methodology used in this research is quantitative with a cross-sectional design. In addition, this study is defined as instrumental since "this category includes all those works that analyze the psychometric properties of psychological measurement instruments" (Ato et al., 2013, p. 5). Also, the objective of instrumental research is to propose the creation of a new instrument or the adaptation of an existing tool to a new context of application relevant to the current time (Argumedo et al., 2016).

Participants

The sampling was non-probabilistic and by quotas. The sample consisted of 207 students, of whom 103 belonged to a public university in northern Chile (49.8%) and 104 to a Spanish public university located in Catalonia (50.2%). Based on sex, 127 (61.4%) were women and 80 (38.6%) were men. Their ages ranged from 18 to 45 years (M = 22.37; SD = 4.13).

The inclusion criteria considered for the participants were the fulfillment of the age of majority established by their country of residence, having current enrollment in different semesters or academic degrees, from first year to sixth year, within a university level career in the universities considered in this study. On the other hand, the exclusion criteria were to be exchange students or to be circumstantially at the university.

Instruments

The instrument used in this study was the Maslach Burnout Inventory-Student Survey (MBI-SS) which is a modified version of the Maslach Burnout Inventory-General Survey (MBI-GS) (Schaufeli et al., 1996). For this purpose, the academic activity was modified and adapted to the role of the university student as the equivalent of the role of a formal employee. Initially, the instrument had 16 questions, but it was adapted to 15 questions after the validation process of Schaufeli et al., (2002).
The questionnaire that measures Academic Burnout Syndrome in students assesses three dimensions: Exhaustion, Cynicism and Efficacy.

In this instrument, the student must respond through the frequency in which they has experienced the descriptions of the mentioned items and dimensions, using a Likert scale of six alternatives (0 = Never; 1 = Few times a year or less; 2 = Once a month or less; 3 = Few times a month; 4 = Once a week; 5 = Few times a week; 6 = Every day). High scores on Exhaustion and Cynicism and low scores on Efficacy are indicative of burnout.

Schaufeli and collaborators published in 2002 the psychometric characteristics of the MBI-SS in 1,661 university students from three countries: Spain, Portugal, and the Netherlands. The results showed, by factor analysis, that three factors were perfectly adjusted to the study domains (Exhaustion, Cynicism, and Academic Achievement), with good levels of reliability according to Cronbach's alpha (Exhaustion between .74 and .80 depending on the country; Cynicism between .79 and .86, and Academic Achievement between .67 and .76) (Loayza-Castro et al., 2016).

Procedures

To recruit the 207 participants stipulated in this study, as a first step, a contact was made with both universities to have formal acceptance for the application of the questionnaire to the students. After this permission, the students who agreed to participate in the research were given a link to a questionnaire in the Google Forms platform, which initially showed them an informed consent, where the ethical criteria of the research, its objectives, and the methodology used were made known and detailed. Once the participant agreed to participate through the informed consent, they filled in their data and assured that they was participating under their own free will.

Subsequently, the Maslach Burnout Inventory-Student questionnaire with 15 items was presented. The study was guided by the ethical standards of the National Research and Development Agency (ANID, by its initials in Spanish), which has laws protecting the integrity of individuals within Chile. In Spain, this study adhered to the ethical standards of the Spanish National Research Council (CSIC, by its initials in Spanish), which consists of the care of personal data of individuals participating in scientific research. It also adhered to a universal format with the Ethical Principles of Psychologists and Code of Conduct of the American Psychological Association (APA, 2017).

Análisis de datos

First, the MBI-SS items were analyzed through descriptive statistics: mean, standard deviation, skewness, and kurtosis. Their normality was verified by considering skewness and kurtosis values between -1 and 1 (Darlington & Hayes, 2017). Multivariate normality was corroborated using Mardia's coefficient (Esnaola et al., 2011).

The method for calculating the reliability of the instrument was carried out using the McDonald Omega coefficient, given that this indicator manages to overcome various shortcomings of Cronbach's Alpha (Ventura-León & Caycho-Rodríguez, 2017).

For the evaluation of the validity of the instrument, confirmatory factor analysis was used, which due to its statistical framework allows empirical evaluation and corroboration of the validity and conceptual structure of the construct (Herrero, 2010). A procedure based on the Diagonal Weighted Least Squares (DWLS) method was used, recommended when the number of response options decreases, the sample size is small, or when the observed data do not have a normal distribution (Rigo & Donolo, 2019).

This research uses factorial invariance, which is conceptualized as the verification process in which the measurement properties of the instruments or their items are independent of the characteristics of the groups evaluated, but not of the construct that the instrument is measuring (Byrne, 2008).

The indices considered in the confirmatory factor analysis, as in the estimation of factorial invariance were: Chi2/gl, the Tucker-Lewis index (TLI), and the comparative fit index (CFI). The recommendations of Hu and Bentler (1999), who recommend values higher than 0.95 in the CFI and TLI to consider an adequate adjustment, were considered. Likewise, values lower than 0.06 in RMSEA are considered adequate. When comparing the models, the one with higher values in the CFI and TLI and lower values in RMSEA compared to the others is considered to be the best.

A multigroup confirmatory factor analysis was performed, which is understood as an analytical tool that can be used to examine the validity and equivalence/invariance of score measurements in various groups. It should be noted that this is a progressive process where, in the case of this research, the equivalence of the structure of the MBI-SS in the Chilean and Spanish samples was first explored (configural invariance), then the statistical equality of the factor loadings was ascertained (metric invariance), subsequently of the thresholds (strong invariance), and of the residuals (strict invariance) (Pendergast, et al., 2017). For the above, the differences between the models (configural, metric, scalar, and strict) were estimated, using the variations of the CFI (ΔCFI) and RMSEA (ΔRMSEA) indexes, considering values ΔCFI ≤.01 and ΔRMSEA ≤.015 (Cheung & Rensvold, 2002).

Results

First, the descriptive analysis of the items was carried out. In this regard, it is possible to point out that the highest means were found in the items *How often do you feel enthusiastic when you achieve your student goals* (*M = 4.21; SD = 1.22*), belonging to the Exhaustion dimension, and the items *How often have you learned interesting things during your studies* (*M = 4.79; SD = 1.11*) and *How often do you feel exhausted at the end of a day at the university* (*M = 4.42; SD = 1.34*), belonging to the Academic Efficacy dimension.

As for the lowest means we highlight *How often do you make derisive comments about the usefulness of what you study (M = 2.49; SD = 2.20)* and *How often do you doubt about the importance of your studies (M = 1.92; SD = 1.78)* both from the Cynicism subscale.

The scale items were analyzed to establish their normative behavior. Skewness and kurtosis values between -1 and 1 were considered to indicate normality of the variable (Darlington & Hayes, 2017). The items presented values less than 1, except for the item "How often do you feel enthusiastic when you achieve your student goals", which would result in an abnormal variable.

Multivariate normality was assessed by means of a Mardia analysis for multivariate skewness and kurtosis. A skewness coefficient of 19.76 (X^2 *= 681.54, gl = 364, p <.001)* and a kurtosis coefficient of 185.98 (*z = 7.06; p<.001*) were found, thus confirming the absence of a multivariate normal distribution of the data. Given the above, and also considering the Likert-type response system of the instrument, it was decided to develop the confirmatory factor analysis through the Diagonal Weighted Least Squares (DWLS) method.

Table 1
Descriptive Statistics Items

Ítem	Media	Standard deviation	Skewness	Kurtosis
Ítem 1	4.29	1.36	-.91	.26
Ítem 2	4.42	1.34	-.73	.13
Ítem 3	3.93	1.60	-.37	-.82
Ítem 4	3.24	1.55	-.19	-.42
Ítem 5	3.95	1.40	-.54	-.07
Ítem 6	2.88	1.62	.06	-.73
Ítem 7	3.56	1.58	-.17	-.81
Ítem 8	2.49	2.20	.26	-1.47
Ítem 9	1.92	1.78	.53	-.93
Ítem 10	4.35	1.10	-.36	-.14
Ítem 11	3.56	1.40	-.40	-.22
Ítem 12	3.77	1.47	-.42	-.33
Ítem 13	4.82	1.22	-1.18	1.29
Ítem 14	4.79	1.11	-.85	.70
Ítem 15	3.87	1.38	-.55	.09

Confirmation of the instrument structure was verified by means of confirmatory factor analysis (CFA). In this case, the goodness-of-fit estimation of the model was performed using the Diagonal Weighted Least Squares (DWLS) method. The indices considered in the CFA were: chi2, chi2/gl, the Goodness-of-Fit Index (GFI), the Tucker-Lewis Index (TLI), and the Comparative Fit Index (CFI).

The three-factor model evidenced adequate fit indicators for the total sample (X^2= *159.30, gl = 87, p < .001;* X^2*/gl = 1.83; TLI = .959; CFI = .962; RMSEA= .064*) and for the Chilean and Spanish samples separately (see Table 2). However, low factor loadings (below .4) were found for some items in the Chilean and Spanish samples (see Table 3). In this case, item 8 (*How often do you make derisive comments about the usefulness of what you study*) was found in the Chilean sample and items 11 and 13 (How often do you think you can make an effective contribution in the classes you attend, How often do you feel enthusiastic when you achieve your student goals) in the Spanish sample.

Considering what was stated in the previous paragraph, a new model was verified based on a 12 item instrument, showing an improvement in the goodness-of-fit indicators in the total sample (X^2 *= 82.04, gl = 51, p <.01;* X^2*/gl = 1.609; TLI = .972; CFI = .979; RMSEA = .054*). The standardized factor loadings and reliability of this model can be seen in Table 4.

The reliability of the dimensions of the instrument in the Chilean and Spanish sample was also considered through McDonald's ω, with values of .70 or higher for acceptable reliability (George & Mallery, 2003), with values above this range being appreciated in all dimensions in the Chilean and Spanish sample (see Table 4).

Table 2

Structural Models, Total Sample, Chilean Sample, and Spanish Sample

	X2	DF	p	CFI	TLI	RMSEA	SRMR
Three Factors 15 items	159.298	87	.000	.962	.954	.064 [.048-.079)	.084
Three Factors 12 Items	82.038	51	.004	.979	.972	.054 [.031-.075]	.077
Three Factors 15 items (Chile)	102.519	87	.122	.985	.982	.042 [.000-.071)	.103
Three Factors 12 Items (Chile)	59.411	51	.196	.989	.986	.040 [.000-.078]	.077
Three Factors 15 items (Spain)	82.930	87	.604	1.000	1.005	.000 [.000-.048)	.082
Three Factors 12 Items (Spain)	51.792	51	.443	.999	.999	.012 [.000-.065]	.082

Table 3

Standardized Factor Loadings and Reliability of the Original Instrument in the Chilean and Spanish Sample

	Chile			Spain		
	Exhaustion	Cynicism	Efficiency	Exhaustion	Cynicism	Efficiency
Item 1	.828			.808		
Item 2	.601			.580		
Item 3	.674			.760		
Item 4	.811			.774		
Item 5	.873			.830		
Item 6		.863			.744	
Item 7		.875			.864	
Item 8		.358			.642	
Item 9		.672			.562	
Item 10			.603			.511
Item 11			.724			.379
Item 12			.775			.801
IÍtem 13			.540			.349
Item 14			.406			.522
Item 15			.757			.626
McDonald's ω	.869	.792	.831	.865	.783	.739
IC del 95%	[.828-.909]	[.727-.856]	[.781-.881]	[.823-.906]	[.715-.852]	[.664-.813]

Table 4

Standardized Factor Loadings and Reliability of the 12 Item Instrument in the Chilean and Spanish

	Chile			España		
	Exhaustion	**Cynicism**	**Efficiency**	**Exhaustion**	**Cynicism**	**Efficiency**
Item 1	.839			.799		
Item 2	.605			.600		
Item 3	.671			.764		
Ítem 4	.799			.781		
Item 5	.878			.811		
Item 6		.837			.738	
Item 7		.884			.853	
Ítem 9		.624			.506	
Item 10			.571			.531
Item 12			.672			.718
Item 14			.449			.447
Item 15			.739			.622
McDonald's ω	.869	.838	.772	.865	.750	.726
IC del 95%	[.828-.909]	[.785-.891]	[.702-.841]	[.823-.906]	[.674-.826]	[.641-.811]

Invarianza factorial según país

When performing the factorial invariance procedure on the 15 item instrument (see Table 5), comparing the corresponding models, the results of the metric, and configural invariance show significant differences (*ΔCFI= .018 and ΔRMSEA = -.022*); therefore, it is not possible to verify the equivalence of the factor loadings of both instruments. The same thing happens when comparing the metric and scalar model (*ΔCFI= .016 and ΔRMSEA = -.011*), which indicates that the intercepts are invariant. Therefore, there is no evidence to affirm that the 15 item instrument is invariant in both samples.

As can be seen in Table 6, the fit indexes aimed at determining the factorial invariance of the 12 item instrument in the Chilean and Spanish university samples show values that allow us to recognize its equivalence in both groups. The adjustments of the model with which the configural invariance was determined showed adequate values (*TLI = .992; CFI = .994; RMSEA = .03*0).

The same picture is seen in the values representing the metric invariance fit (*TLI = .993; CFI = .994; RMSEA = .028*). When comparing the results of metric and configural invariance, no significant differences were found (*ΔCFI= .000 and ΔRMSEA = .002*). The results allow us to establish that the factor loadings are invariant between both groups. The model with which the scalar invariance was determined also showed favorable values (*TLI = .983; CFI = .985; RMSEA = .043*). When comparing the results for metric and scalar invariance, no significant changes were observed (*ΔCFI = .009 and ΔRMSEA = -.015*), which indicates that the intercepts are invariant. Finally, the model with which strict invariance was determined also showed adequate values (*TLI = .987; CFI = .987; RMSEA = .037*). The differences between the fit values of the scalar and strict model were adequate (*ΔCFI = -.002 and ΔRMSEA = .006*), allowing us to provide empirical support for strict invariance

Table 5
Factorial Invariance of the 15 Item Instrument between the Chilean and Spanish Sample

	X^2	gl	p	CFI	TLI	RMSEA	ΔCFI	ΔRMSEA
Configural	185.449	171	.213	.993	.991	.029		
Metric	232.148	183	.008	.975	.971	.051	.018	-.022
Scalar	277.102	198	.000	.959	.957	.062	.016	-.011
Strict	296.005	213	.000	.957	.958	.062	.002	.000

Table 6
Factorial Invariance of the 12 Item Instrument between the Chilean and Spanish Sample

	X^2	gl	p	CFI	TLI	RMSEA	ΔCFI	ΔRMSEA
Configural	111.203	102	.251	.994	.992	.030		
Metric	119.969	111	.264	.994	.993	.028	.000	.002
Scalar	142.734	120	.077	.985	.983	.043	.009	-.015
Strict	151.026	132	.123	.987	.987	.037	-.002	.006

Discusión

The aim of this study was to verify the psychometric properties of the Maslach Burnout Inventory-Student Survey (MBI-SS) in students from Spain and Chile. Although the original instrument showed adequate psychometric properties, in terms of reliability and factorial structure, it was possible to appreciate an improvement in its indicators, especially structural, by shortening its length to only 12 items. Other studies have found exceptions to this, showing that the behavior of the items of the scale is unstable, suggesting the correction or elimination of items from the instrument (Grajales, 2001). Likewise, other authors such as Pérez-Fuentes et al. (2020) also managed to visualize a better fit of the instrument in a 12 item version.

With respect to the instrument, all the dimensions that composed it present adequate reliability (Exhaustion, Cynicism, and Academic Efficacy). In this sense, both the 15 item and 12 item versions of the MBI-SS for university students have shown to have a defined factorial structure and adequate reliabilities that allow its use for these purposes in both Chilean and Spanish university populations, evidencing McDonald omegas values above .70 in all the factors of the instrument. Likewise, an adequate goodness-of-fit of the three-factor model of the instrument is appreciated.

In accordance with the potential source of bias evidenced in the original 15 item instrument, this phenomenon could be associated with the cultural background of those evaluated and the university system in which they are immersed. Although this would apply to the samples that considered European and Latin American students (Campos & Marôco, 2012), it is not replicated in Charry et al. (2018) whose groups

had these characteristics (Colombia and Spain).

Although the factorial invariance of the original 15 item version of the instrument was not verified, the structural invariance of the instrument was verified for the sample of students from Chile and Spain, considering the proposed 12-item version.

The results of other research have not shown the same (Campos & Marôco, 2012; Schaufeli et al., 2002). There have also been questionings of the MBI, creating reasonable doubt about the cultural equivalence of the construct (Kulakova et al., 2017). This is why it is important to carry out cross-cultural studies, in different continents, with different customs and cultures, such as Europe and Latin America (Kulakova et al., 2017).

In conclusion, this study revealed that the 12 item MBI-SS instrument shows a better structural adjustment than the original 15 item instrument. In turn, the 12 item instrument allows the equivalence of its application both in Chile and Spain. In addition, it was verified that all dimensions, Exhaustion, Cynicism, and Efficacy, have good and/or adequate reliability. As for the model, it is invariant for both the Spanish and Chilean samples, strictly speaking, with the 12 items, it is possible to compare the results.

The limitations of this study are that it consists of a non-probabilistic sample and is limited in each of the populations studied. However, it allows us to visualize the instrument comparatively in both realities; therefore, in future research, the use of larger, representative samples is suggested. It is important to have valid instruments for diagnosis and research on mental health in university students in countries such as Chile and Spain, in order to contribute to their well-being.

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