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Original Article

The Maslach Burnout Inventory-Student Version's Factorial Structure and Cross-Cultural Validity in a Nigerian University.

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Abstract

Background: The Maslach Burnout Inventory (MBI) is the most widely accepted tool for assessing burnout among students worldwide. However, no studies have yet tested the validity of the student version of the MBI in Nigeria. The study aimed to assess the factorial structure and cross-cultural validity of the Maslach Burnout Inventory-Student Version MBI-GS (S) in a Nigerian university.

Methodology: An online cross-sectional study was conducted among 536 undergraduate students from three departments in the Faculty of Basic Medical Science at a Nigerian university. Data were collected using MBI-GS (S) and a confirmatory factor analysis was performed to explore its factor structure.

Results: The results revealed that the three-factor, 15-item structure of the MBI-GS (S) demonstrated a valid factorial structure among Nigerian undergraduate students, evidenced by the extraction of three components with eigen values exceeding 1, accounting for 73.7% of the variance, in line with the three-factor structure of the original MBI. The internal consistency of the questionnaire was high, with a Cronbach's alpha value of 0.901. The Cronbach's alpha for emotional exhaustion, cynicism, and academic efficacy were 0.901, 0.841, and 0.941, respectively. A weak negative correlation was observed between emotional exhaustion and cynicism, and a moderate negative correlation was found between emotional exhaustion and academic efficacy, and cynicism and academic efficacy.

Conclusions: These findings suggest that the MBI-GS (S) is a reliable tool for assessing burnout levels among Nigerian university students. They provide strong evidence for the factorial validity and reliability of the MBI-GS (S), supporting its cross-cultural validation for assessing burnout.

Keywords: Burnout; Student; Nigerian; Cross-Cultural Validity; Factorial Structure.

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Quick Response Code:

Introduction

Globally, the Maslach Burnout Inventory (MBI) is the most established measure of burnout[1,2]. First introduced in 1981 as the MBI Human Services Survey (MBI-HSS), a measure of burnout among human service providers, it has since been extended to include several versions for various occupational sectors, such as medical personnel - MBI-HSS (MP),educators - MBI-ES, other occupational groups beside human services and education - MBI-GS, and students - MBI-GS (S) [2].

Burnout has been defined as a syndrome characterized by three distinct feelings: emotional exhaustion, depersonalization, and low personal accomplishment as a result of psychological response to daily work experience[2]. Although students do not work in a traditional work environment, they are still engaged in intense activities such as attending classes and completing assignments with the goal of taking exams for evaluation, promotion, and graduation, all of which can have a similar psychological impact as formal work[2,3]. Therefore, the MBI-GS (S) was developed from the MBI-GS to suit this category. While it shares a three-factor structure with its parent version, there are some differences. The MBI-GS (S), consists of 16 items, whereas the parent instrument has 22 items[2]. The number of items in the MBI-GS (S) has been the subject of debate, with some authors[3] finding the 16-item questionnaire to be the most appropriate, while others [4,5] have demonstrated that Item C3 (i.e., 'I just want to do my job and not be bothered') does not align well with the cynicism subscale and has been eliminated, leaving a 15-iteminventory. As a result, the current widely accepted version of the MBI-GS (S) consists of 15 items. Nevertheless, the three-factor dimensions of the MBI-GS (S)have been validated in studies among students in different countries[3,4,6,7].

While numerous studies on burnout have been conducted worldwide, very few have focused on Africa[8] or Nigeria[9]. Dubale et al., in their systematic review of burnout among health workers in Africa which included 65 publications noted that " prior studies have not validated the MBI in healthcare workers in sub-Saharan Africa" and emphasized the "need to design studies aimed at evaluating the reliability of various burnout screening instruments cross-culturally"[8]. In Nigeria, specifically, only two studies have examined the validation and reliability of the MBI. Coker et al. examined the psychometric properties of the MBI-GS by assessing reliability coefficients and its concurrent validity coefficient against the Psychophysiological Symptoms Checklist in a cohort of 150 doctors, nurses, and students[10].Ogunsuji et al. compared the reliability and validity of the Copenhagen Inventory and the Oldenburg Burnout Inventory with the MBI but did not investigate the factor structure of the MBI[11]. Additionally, it is worth noting that these studies did not utilize the MBI-GS (S).

The primary aim of this study is to investigate the factorial validity of the MBI-GS (S) among a cohort of Nigerian undergraduates in the Anatomy, Physiology, and Nursing departments of the College of Medicine, Ekiti State University, Ado-Ekiti. The study will contribute to the existing literature on burnout among Nigerian students by providing evidence of the reliability and validity of the MBI-GS(S) in our cohort. It will also enhance our understanding of burnout across different cultural contexts by examining its manifestation and measurement among Nigerian students, thus adding to existing cross-cultural research.

The following hypothesis will be tested:

Hypothesis 1: The MBI-GS (S) will demonstrate a valid factorial structure among Nigerian undergraduate students in the Anatomy, Physiology, and Nursing departments of the College of Medicine, Ekiti State University, Ado-Ekiti.

Hypothesis 2: The factorial structure and dimensionality of the MBI-GS (S) observed in previous studies conducted in different countries will be replicated among Nigerian undergraduate students, indicating cross-cultural validity.

Methodology

Study design**:** This study employed an online, cross-sectional design using a questionnaire on Google Forms. The survey link was distributed to students in the Faculty of Basic Medical Sciences (Anatomy, Physiology, and Nursing) via WhatsApp. The survey was conducted for a period of two weeks, from June3 to June 17, 2023.The three courses typically span a period of four years from inception to graduation andare equivalent to eight semesters. Even though students from one department may enroll in courses offered by other departments, we sampled participants exclusively based on their primary departmental affiliation. This approach ensures that each student is represented according to their main field of study, thus maintaining the integrity and specificity of our sampling methodology. Table 1 presents the characteristics of the participating undergraduates in the three departments. The proportion of students enrolled in the study as a percentage of the entire student population in each department ranged from 19.6 to 53.1%.

Table 1: Characteristics of the students in the three departments

Department	Number of students	Response from students (%)	Percentage of total student enrollment
Anatomy	540	283 (52.4%)	53.1 %
Nursing	222	105 (47.2%)	19.6 %
Physiology	506	145 (28.6%)	27.2 %

Study population: The study was conducted among the students in three departments of the Faculty of Basic Medical Sciences (FBMS) at Ekiti State University, Ado-Ekiti. All levels of students in the departments of nursing, physiology, and anatomy were eligible to participate in this study. Medical students in the College of Medicine were excluded from this study. Ekiti State University operates a two-semester per session academic calendar, and courses in the Faculty of Basic Medical Sciences span a period of four years for Anatomy and Physiology and five years for Nursing. The student performance is evaluated using Cumulative Grade Point Average (CGPA, a credit-based system with scores ranging from 0 to 5.0.

Survey instrument: The survey consists of three sections. The first section gathers socio-demographic information. The second section contains the Maslach Burnout Inventory- Student Survey (MBI-GS (S) questionnaire[2]. The MBI-GS (S) has thus far been one of the most frequently used tools in international research because of its suitability for assessing student burnout. It measures three well-defined dimensions of burnout: emotional exhaustion, cynicism, and academic effectiveness. The MBI-GS (S)is a 15-item questionnaire with a 7-point rating ranging from 0 (never) to 6 (always), and it measures three subscales of burnout: emotional exhaustion (5 items), Cynicism (4 items), and low academic efficacy (6 items). The students are identified as exhibiting a high level of burnout if their scores for emotional exhaustion and cynicism were greater than 14 and 6, respectively, and less than 23 for academic efficacy. Low levels of burnout are indicated by scores of less than 10 for emotional exhaustion, less than 2 for cynicism, and greater than 27 for academic efficacy. A moderate level of burnout corresponds to scores of 10–14 for emotional exhaustion, 2–6 for cynicism, and 23–27 for low

academic efficacy. Before inviting participants to complete the survey, we conducted a pilot test of the questionnaire with 10 clinical students from the faculty of Clinical Sciences.

Sampling Technique and Sample Size: A purposive sampling technique was employed. According to the Cochran's formula for determination of sample size $n = Z^2 P (1-p)/d^2$ where:

- n stands for the sample size
- Z is the z-score, set at 1.96 to correspond with a 95% confidence interval
- P represents the anticipated prevalence of burnout among medical students
- d is the degree of precision, set at 0.05 for a 95% confidence interval

Given the anticipated prevalence of burnout among university students of 50%[12]. The sample size is $(1.96)^2$ X 0.50 X (1-0.50)/$(0.05)^2$ which equals 384. The addition of 10 percent attrition of 38 made the minimum required sample size to be 422.

Data Analysis: Data analysis was performed using Jeffreys's Amazing Statistics Program (JASP), an open-source statistical software package[13]. Descriptive statistics, such as means, standard deviations, and frequencies, were calculated to summarize the demographic characteristics of the sample. Reliability analysis using Cronbach's alpha coefficient was conducted to assess the internal consistency of the MBI-GS (S)and its subscales with values above 0.70 considered acceptable.

To establish the construct validity of the MBI-GS (S) among our cohorts, a confirmatory factor analysis (CFA) was conducted using structural equation modeling (SEM). Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) test of sampling adequacy were performed to evaluate the suitability of the data for factor analysis. Bartlett's test assessed whether the correlation matrix significantly deviated from an identity matrix, indicating that the variables were interrelated. The KMO test measured the degree of common variance among the variables. This value should be close to 1, with values above 0.60 generally considered acceptable.

The CFA tested the fit of the factor structure of the MBI-GS (S) using the maximum likelihood estimation method. Model fit indices, including the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square Residual were examined to assess the goodness of fit.

To determine the number of factors to retain in the CFA, both the scree diagram and Monte Carlo Parallel Analysis (PA) were utilized. The scree diagram visually inspected the eigenvalues, and the number of factors was determined by identifying the point where the eigenvalues level off. Additionally, Monte Carlo PA compared the observed eigenvalues with randomly generated eigenvalues to identify the number of factors that accounted for the meaningful variation in the data.

The data supporting the findings of this study are openly available in the Open Science Framework (OSF) athttps://osf.io/q7tzs/?view_only=811c68790e8645f99b817aef09ba5c5d

Results

The validation process of the Maslach Burnout Inventory (MBI) involved a total of 536 undergraduates from the Anatomy, Physiology, and Nursing departments of the Faculty of Basic Medical Sciences (FBMS) at Ekiti State University. The demographic and academic characteristics of the three departments are detailed in Table 2, which shows that the distributions of all characteristics across the three departments are significantly different from each other.

Table 21: Demographic and academic characteristics across the three academic departments

Characteristic	Anatomy n (%)	Nursing n (%)	Physiology n (%)	P-Value
Gender				
Female	181 (64.4%)	88 (84.6%)	94 (64.8%)	P<0.001
Male	100 (35.6%)	16 (15.4%)	51 (35.2%)	
Age (Mean years)	21.5 (SD: 2.01)	19.5 (SD: 1.7)	20.5 (SD: 2.0)	P<0.001
Academic Year				
100L	0	29 (27.6%)	32 (22.1%)	
200L	72 (25.4%)	33 (31.4%)	29 (20.0%)	P<0.001
300L	96 (33.9%)	43 (41.0%)	64 (44.1%)	
400L	115 (40.6%)	0	20 (13.8%)	
CGPA (Mean)	3.77 (SD: 0.68)	4.07 (SD: 0.45)	3.79 (SD: 0.58)	P=0.006

P value < 0.05 statistically significant; maximum CGPA is 5

Factor Analysis

To examine the factor structure of the MBI in our sample, a CFA was conducted. Prior to performing the CFA, we assessed the data's suitability for factor analysis. Initial inspection of the correlation matrix revealed numerous coefficients of 0.30 or higher. Second, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy indicated that the data were suitable for factor analysis, and Bartlett's test of sphericity was statistically significant (p .001), indicating that the variables were correlated and suitable for structure detection.

Principal components analysis revealed the presence of three components with eigenvalues exceeding 1, explaining 42.7%, 21.9%, and 9.1% of the variance, respectively. These three factors explained a total of 73.7% of the variance. This three-factor solution adheres to the original MBI dimensions. A Scree plot illustrating the eigenvalues of each factor is presented in Figure 1. This was further supported by the results of Monte Carlo PCA Parallel Analysis, which showed only three components with eigenvalues greater than the criterion values for similarly sized randomly produced data. The consistency of the Scree plot, Eigenvalue rule, and Monte Carlo PCA Parallel Analysis results underscore the robustness of the three-factor structure extracted from our data.

The factors were identified as emotional exhaustion, cynicism, and academic efficacy, consistent with the original construct of the MBI. Each item loaded significantly on their expected factors with loadings ranging from 0.928 to -0.728. The factor loadings for each item are presented in Table 3, and as can be seen, the distributions of the items across the three factors were identical to the loading of the items in the original construct of the MBI. A weak negative correlation was observed between EX and CY (r=0.118), and moderate negative correlations were found between EX and PE (r=-0.367) and CY and PE (r=-0.475).

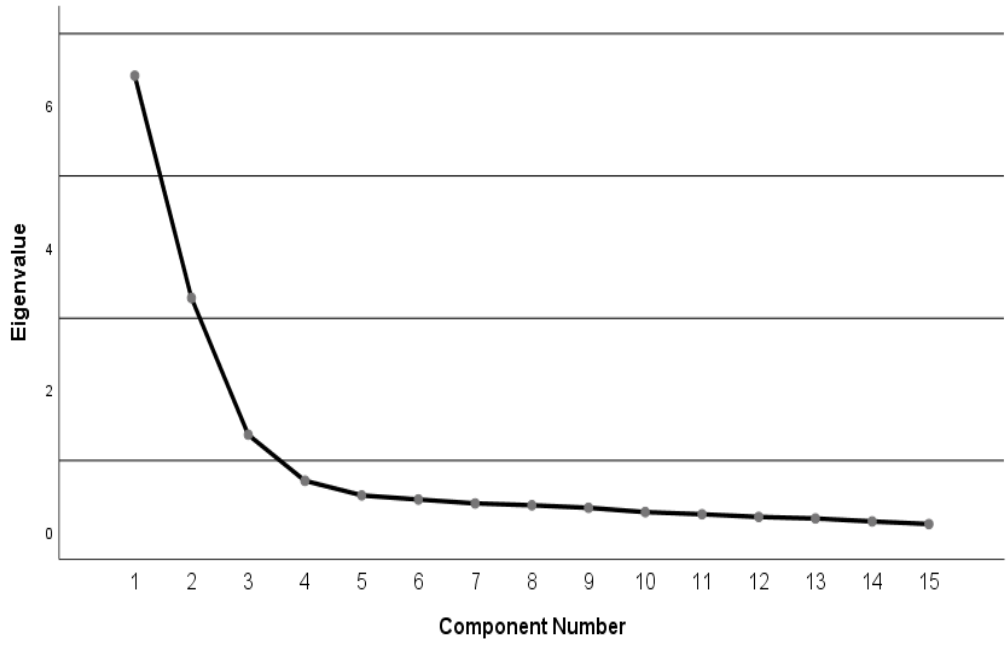

Figure 1: Scree diagram confirming the three-factor structure of MBI-GS (S) among the students. The internal consistency of the questionnaire was high, with Cronbach's alpha value of 0.901. Cronbach's alpha for emotional exhaustion, cynicism, and professional effectiveness were respectively 0.901, 0.841, and 0.941.

Table 32: Factor loading for the MBI items

	Academic Achievement	Cynicism	Emotional Exhaustion
During class, I feel confident that I am effective in getting things done	0.929		
In my opinion, I am a good student	0.889		
I have learned many interesting things during my studies	0.887		
I believe that I make an effective contribution to the classes that I attend	0.864		
I feel stimulated when I achieve my study goals	0.863		
I can effectively solve the problems that arise in my studies	0.781		
I have become less enthusiastic about my studies		0.838	
I doubt the significance of my studies		0.815	

I have become more cynical (skeptical) about the potential usefulness of my studies		0.805	
I have become less interested in my studies since my enrolment at the university		0.804	
I feel burned out from my studies			-0.915
I feel emotionally drained from my studies			-0.856
I feel used up at the end of a day at the university			-0.808
I feel tired when I get up in the morning and I have to face another day at the university			-0.803
Studying or attending a class is really a strain for me			-0.728

As depicted in Figure 2, the path diagram from SEM shows that the standardized coefficients of the relationships between factors and items were all greater than 0.60, ranging from 0.63 to 0.94. SEM demonstrates a good fit of the model (P <0.001, a Comparative Fit Index (CFI) of 0.995, a Tucker-Lewis Index (TLI) of 0.993, a Root Mean Square Error of Approximation (RMSEA) of 0.069 (95%CF: 0.060-0.078) and a Standardized Root Mean Square Residual (SRMR) of 0.062.

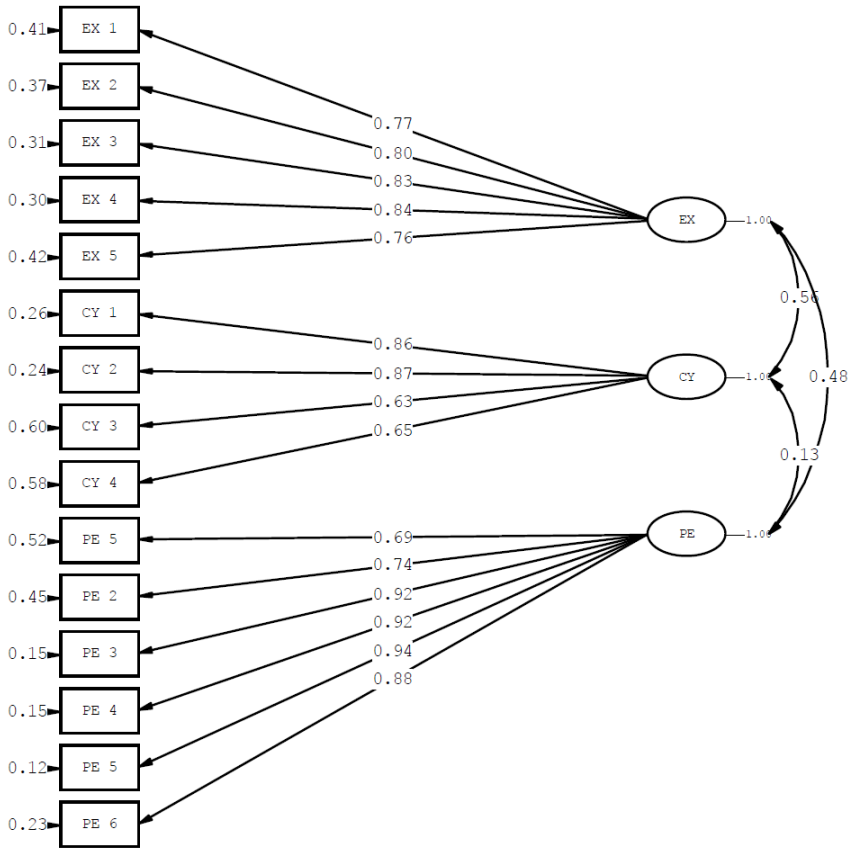

Figure 2: SEM of the MBI-GS (S) among the respondents.

Discussion

This study was designed to investigate the factorial validity of the MBI-GS (S) among Nigerian undergraduates studying Anatomy, Physiology, and Nursing at Ekiti State University, with the goal of enhancing our understanding of burnout across different cultural contexts. The study assessed two hypotheses, namely that the MBI-GS (S) will demonstrate a valid factorial structure among the students and that the factorial structure observed in previous studies conducted in different countries would be replicated among Nigerian undergraduate students, thereby indicating cross-cultural validity.

Our findings provide robust support for both hypotheses. Firstly, the MBI-GS (S) demonstrated a valid factorial structure among Nigerian undergraduate students, consistent with our first hypothesis. This was evidenced by the extraction of three components with eigenvalues exceeding 1, explaining 73.7% of the variance, in line with the three-factor structure of the original MBI[2]. These factors were identified as emotional exhaustion, cynicism, and academic efficacy, mirroring the original construct of the MBI[2,6].Additionally, each item loaded significantly on their expected factors, further substantiating the validity of the factorial structure.

Secondly, the factorial structure and dimensionality of the MBI-GS (S) were found to be consistent with previous studies conducted in different countries, thus supporting our second hypothesis and indicating cross-cultural validity[3,4,7,14]. This is a significant contribution to the literature as it provides evidence that the MBI-GS (S) maintains its factorial structure across different cultural contexts, thereby supporting its use as a reliable tool for cross-cultural research on burnout. Importantly, it serves as a pointer that the instrument can be employed to study burnout among university students across the English-speaking countries of Nigeria and sub-Saharan Africa.

In keeping with reports from other researchers on the reliability of MBI-GS [3,5,7], the internal consistency of the MBI-GS (S) was found to be high, with Cronbach's alpha values exceeding 0.8 for all three factors, further demonstrating the reliability of the MBI-GS (S) as a measure of burnout among students in our cohort. In addition, the model fit statistics, including the CFI, TLI, RMSEA, and SRMR, were all indicative of a good fit; however, the chi-square test, because it was significant, does not suggest a good fit[15,16]. The chi-square test generally provides a suitable indication of model fit for sample sizes ranging from 75 to 200, but when the sample size exceeds 400, the test's sensitivity often leads to the rejection of most models, thus limiting its utility in these situations[17]. According to Little, it is practically impossible to not reject the null hypothesis based on chi-square statistics[18].When the sample size of an SEM is large, it is recommended to disregard the chi-square and instead focus on other model-fitting metrics[19].

Our study also found a weak negative correlation between emotional exhaustion and cynicism, moderate negative correlations between emotional exhaustion and academic efficacy, and cynicism and academic efficacy. These findings are consistent with the conceptualization of burnout as a syndrome where higher levels of emotional exhaustion and cynicism are associated with lower feelings of academic efficacy[20,21].

Through the validation and cultural adaptation of the MBI-GS (S), our study has contributed to the literature on burnout among Nigerian students, a population that has been under-represented in previous research. Our findings suggest that the MBI-GS (S) is a valid and reliable measure for assessing burnout in this population, thereby providing a valuable tool for future research.

This study has a few limitations that should be acknowledged. The sample was drawn from students studying Anatomy, Physiology, and Nursing at one university, which may limit the generalizability of the findings. Future studies should seek to validate the MBI-GS (S) involving more than one university and

among students from different academic disciplines. However, it is important to note that the MBI has demonstrated considerable robustness and adaptability across a variety of cultures and professions. These qualities suggest that, based on the results of our study, the MBI could be effectively used across Nigerian universities. [3,5,7]. Additionally, this study only assessed the factorial validity and reliability of the MBI-GS (S), hence future studies could also investigate its predictive properties and sensitivity to change over time.

In conclusion, this study provides strong evidence for the factorial validity and reliability of the MBI-GS (S) among Nigerian undergraduate students. The outcome underscores the robustness of the MBI-GS (S) as a tool for assessing burnout in Nigerian undergraduates. Furthermore, it demonstrates the cross-cultural validity of the MBI-GS (S), supporting its use in cross-cultural research on burnout. These findings contribute valuable insight to the literature on burnout among Nigerian students, provide a reference for future research, and enhance the broader applicability of this tool in diverse educational settings.

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