

RESEARCH REPORT

Psychological Assessment

Editor

Tatiana de Cássia Nakano

Conflict of interest

The authors declare that there is no conflicts of interest.

Received

August 17, 2021

Version final

August 2, 2023

Approved

July 4, 2024

# Psychometric properties of the Brazilian version of the Philadelphia Geriatric Center Morale Scale

## *Propriedades psicométricas da versão brasileira da Philadelphia Geriatric Center Morale Scale*

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**How to cite this article:** Barbosa, A. J. G., & Freitas, E. R. (2025). Psychometric properties of the Brazilian version of the Philadelphia Geriatric Center Morale Scale. *Estudos de Psicologia* (Campinas), 42, e210146. <https://doi.org/10.1590/1982-0275202542e210146>

### Abstract

#### Objective

To obtain validity evidence and reliability estimates for the Brazilian version of the Philadelphia Geriatric Center Morale Scale, the principal measure of older adults' morale.

#### Method

Older adults ( $N = 338$ ;  $M = 72.43$ ;  $SD = 8.48$ ) dwelling in the community or in long-term care institutions responded to measures of morale, quality of life and depressive symptoms.

#### Results

Confirmatory factor analysis attested that the Philadelphia Geriatric Center Morale Scale-Brazilian is three-dimensional with a second-order factor. The scale and factors showed adequate internal consistency. The measure also showed evidence of convergent validity with quality of life and the discriminant validity with depressive symptoms.

#### Conclusion

The Philadelphia Geriatric Center Morale Scale-Brazilian is a measure with good psychometric properties and is a promising tool for assessing Brazilians older adults' morale.

**Keywords:** Aged; Mental health; Psychological well-being; Reliability of results; Validation study.

### Resumo

#### Objetivo

Obter evidências de validade e estimativas de fidedignidade para a versão brasileira da Philadelphia Geriatric Center Morale Scale, principal medida de ânimo de idosos.

#### Método

Idosos ( $N = 338$ ;  $M = 72,43$ ;  $DP = 8,48$ ) residentes na comunidade ou em instituições de longa permanência responderam a medidas de ânimo, qualidade de vida e sintomas depressivos.

#### Resultados

Análises fatoriais confirmatórias atestaram que a Philadelphia Geriatric Center Morale Scale-Brazilian é tridimensional com um fator de segunda ordem. A escala e os fatores apresentaram

*consistência interna adequada. A medida também apresentou evidências de validade convergente com qualidade de vida e discriminante com sintomas depressivos.*

### **Conclusão**

*A Philadelphia Geriatric Center Morale Scale-Brazilian é uma medida com boas propriedades psicométricas e é promissora para a avaliação do ânimo de idosos brasileiros.*

**Palavras-chave:** *Idosos; Saúde mental; Bem-estar psicológico; Fidedignidade dos resultados; Estudo de validação.*

The Philadelphia Geriatric Center Morale Scale (PGCMS) (Lawton, 1975) is one of the most widely used measures of morale in old age (Doseděl et al., 2020; Klusman et al., 2020; Marquez et al., 2020). Morale can be defined as a generalized feeling of well-being that encompasses specific indicators such as absence of distressing symptoms, self-satisfaction, harmony between self and the environment, and the ability to strive while accepting what cannot be changed (Lawton, 1975). It is considered a mediator for the perception of physical and mental health (Kukihara et al., 2017) and an essential aspect of age well (Näsman et al., 2020).

Despite being distinct, morale and other constructs, such as psychological well-being, subjective well-being, quality of life, and life satisfaction, have sometimes been used as synonyms (Marquez et al., 2020). This is possibly due to both the overlap between them and the indiscriminate use of such terms in research. Thus, the PGCMS has also been considered a measure of psychological well-being (Freitas et al., 2016; Kinoshita et al., 2022; McDowell, 2006; Paúl, 1992; Tsubouchi et al., 2022), life satisfaction (Kooshlar et al., 2012), or quality of life (Ma et al., 2009; Quiroz et al., 2020; Santana-Berlanga et al., 2020). There is evidence that PGCMS scores are negatively associated, with depression, for example (Almevall et al., 2021; Niklasson et al., 2017; Pourtaghi et al., 2019) and positively with quality of life (Miki & Kawabata, 2020; Pinar & Oz, 2011; Quiroz et al., 2013).

The PGCMS has been widely used in research (Näsman et al., 2020; Pourtaghi et al., 2019). Furthermore, it is recommended for use by geriatricians, psychologists and other health professionals for older adults' professional practice - Abramson Senior Care (<https://abramsonseniorcare.org>) (Freitas et al., 2016; Lawton, 1975). PGCMS has been developed in response to longer, "complicated" instruments that considered morale to be a one-dimensional construct (Lawton, 1975). Its strengths include its multidimensionality and the fact that it can be used with older adults in different settings (e.g., community and long-term care facilities) and with different profiles (e.g., with and without cognitive impairment) (Lawton, 1975).

Validity evidence and reliability estimates of the PGCMS were previously summarized by McDowell (2006), who presented validity evidence based on the internal structure – a multidimensional instrument with a second-order factor – and internal consistency coefficients for the measurement factors (0.62 to 0.85). The six studies reviewed by the author confirmed the three-dimensional structure of the scale.

The PGCMS has therefore been considered a multidimensional measure with a second-order factor, and despite exceptions, the three-factor structure has proven to be the most appropriate (Lawton, 1975; Ma et al., 2009; McDowell, 2006; Niklasson et al., 2015; Paúl, 1992; Pinar & Oz, 2011): Attitude toward Own Aging; Agitation; and Lonely Dissatisfaction. The first encompasses beliefs, feelings and tendencies of action in relation to the changes resulting from old age, or, in simple terms, it is a "balance" between past and present aspects. The second encompasses the anxiety experienced by older adults and the presence of anxiogenic cognitions and behaviors. The third encompasses items on beliefs regarding the environment and the support of social networks, which may or may not result in dissatisfaction with loneliness.

Regarding the internal consistency of the PGCMS, Ma et al. (2009) present the  $\alpha$  for each factor at three different points in time: pre-test, post-test (two months) and late post-test (12 months). The scores were, respectively: 0.68, 0.64 and 0.54 for Attitude toward Own Aging; 0.72, 0.73 and 0.68 for Lonely Dissatisfaction; and 0.75, 0.77 and 0.74 for the Agitation domain.

The internal consistency (Kuder Richardson - KR-20) of the total PGCMS is 0.92 in the study by Pinar and Oz (2011). For the factors, the scores are 0.76 for Lonely Dissatisfaction, 0.81 for Attitude toward Own Aging and 0.85 for Agitation.

In research with long-lived participants (85 years or older) (Niklasson et al., 2015), the  $\alpha$  of the PGCMS was equal to 0.74. For the factors, the scores were 0.65 (Agitation), 0.48 (Attitude toward Own Aging) and 0.62 (Lonely Dissatisfaction).

Although there are versions with different quantities of items, such as the one with 22 (McDowell, 2006), 15 (Pinar & Oz, 2011), 14 (Paúl, 1992) and 11 items (Liang et al., 1987), the version of the PGCMS investigated here includes 17 questions, like the original (Lawton, 1975), and is easy to understand, with answers that are to be given in a dichotomous manner, such as “yes” and “no”. Lawton (1975) emphasizes that the questions were formulated in the simplest way possible and without several answer alternatives to facilitate the understanding of the respondent. Lawton (1975) also emphasizes that the questions length was also limited to avoid causing fatigue or lack of attention.

To compute the PGCMS scores, one point is assigned if the responses to the items indicate high morale. If the response indicates low morale, no score is assigned, i.e., zero is computed. Thus, the total score measuring low/high morale ranges from zero to 17. Although the PGCMS does not have cutoff points, morale can be classified as low (zero to nine points), medium (10 to 12 points) or high (13 to 17 points) (Benito-León et al., 2010; Lawton, 1975).

Because it is quick to apply, easy to understand and can be used with older adults with different profiles, the PGCMS has been used in a variety of geriatric studies in different countries. Examples include its translated versions with evidence of validity for Japanese (Liang et al., 1987), Portuguese (Paúl, 1992) and Turkish-speaking older adults (Pinar & Oz, 2011).

The satisfactory psychometric properties of the PGCMS attest to the suitability of cross-national comparisons (Benito-León et al., 2010). In Brazil, the scale has already been used (Cardoso & Ferreira, 2009). However, it appears that, to date, it has not undergone a strict process of adaptation and obtainment of validity evidence for the national context, a process that is essential for its use in research and professional practice. Thus, the present study aimed to describe the procedures for translating and adapting the PGCMS (Lawton, 1975) for the Brazilian context (PGCMS-Br), present evidence of validity – based on the internal structure and the relationship with other variables (convergent and discriminant) – and analyze the internal consistency of the PGCMS-Br with data from a sample of community-dwelling older adults and residents of Long-Term Care Facilities (LTCF) for older adults.

## Method

### PGCMS-Br Translation

The Brazilian-Portuguese version of the PGCMS called PGCMS-Br, followed procedures recommended in the literature (Hernández et al., 2020). Two bilingual translators with experience in aging and psychological assessment independently translated the original scale. The two versions

resulting from this first process were melted into a single version by experts. A bilingual translator back-translated the PGCMS-Br. After comparing the back-translated version and the original PGCMS, a Brazilian-Portuguese version of the scale was developed and used as a pilot application in older adults ( $n = 4$ ).

## Participants

This investigation participants ( $N = 338$ ) were older adults ( $\geq 60$  years) living in the community or living in LTCF who were assessed in two studies: “Virtudes, forças do caráter e bem-estar psicológico em idosos” (Study 1 -  $n = 181$ ; 53.5%) and “Adaptação cultural e obtenção de evidências de validade de uma escala de bem-estar psicológico para idosos” (Study 2 -  $n = 157$ ; 46.5%). In both studies, sampling was non-probabilistic.

## Instruments

As previously mentioned, the PGCMS-Br is composed of 17 items, originally subdivided into three factors: Agitation (items 4, 7, 12, 13, 16, 17), Attitude toward Own Aging (items 1, 2, 6, 8, 10) and Lonely Dissatisfaction (items 3, 5, 9, 11, 14, 15). The total score is obtained from the sum of the three factors, which ranges from zero to 17. The scores for the dimensions Agitation and Lonely Dissatisfaction range from zero to six and, in the case of Attitude toward Own Aging, between zero and five. For higher scores to reflect greater morale, six items (2, 3, 5, 8, 10 and 15) ought to be assessed.

The WHOQOL-Old (Fleck et al., 2006) is an instrument that was developed by the WHOQOL group of the World Health Organization (WHO) to assess the quality of life of elderly people. It contains 24 items, subdivided into six factors: 1) Sensory Abilities; 2) Autonomy; 3) Past, Present and Future Activities; 4) Social Participation; 5) Death and Dying; and 6) Intimacy. Information on correction and scoring of the Brazilian version of the instrument is available in its manual (<https://www.ufrgs.br/qualidep/index.php/projeto-whoqol-old>). Evidence of validity based on the relationship with other variables (correlations between -0.61 and -0.50 with measures of depression and hopelessness and another quality of life instrument), internal consistency ( $\alpha$  between 0.71 and 0.88) and test-retest (correlation coefficients between 0.58 and 0.82) of this measure for the Brazilian context can be found in Fleck et al. (2006). In this study, the WHOQOL-Old ( $\alpha = 0.869$ ; 95% CI = 0.839  $\geq$  0.895. GLB [Greatest Lower-Bound] = 0.956; 95% CI = 0.957  $\geq$  0.974) and its factors Sensory Abilities ( $\alpha = 0.751$ ; 95% CI = 0.686  $\geq$  0.804. GLB = 0.786; 95% CI = 0.730  $\geq$  0.841), Autonomy ( $\alpha = 0.642$ ; 95% CI = 0.549  $\geq$  0.720. GLB = 0.660; 95% CI = 0.582  $\geq$  0.755), Past, Present and Future Activities ( $\alpha = 0.726$ ; 95% CI = 0.658  $\geq$  0.784. GLB = 0.755; 95% CI = 0.680  $\geq$  0.822), Social Participation ( $\alpha = 0.788$ ; 95% CI = 0.731  $\geq$  0.834. GLB = 0.810; 95% CI = 0.744  $\geq$  0.879), Death and Dying ( $\alpha = 0.782$ ; 95% CI = 0.724  $\geq$  0.831. GLB = 0.813; 95% CI = 0.756  $\geq$  0.867) and Intimacy ( $\alpha = 0.795$ ; 95% CI = 0.741  $\geq$  0.840. GLB = 0.833; 95% CI = 0.769  $\geq$  0.891) showed adequate internal consistency.

To screen for depression, the Geriatric Depression Scale – short version (GDS-15) (Almeida & Almeida, 1999) was used, which is widely used to screen for depressive symptoms in older adults. It contains 15 questions answered with “yes” or “no”. One point is assigned for each symptom of depression present and, therefore, the GDS-15 score ranges from zero to 15. The reliability of this scale has been attested, for example, with test-retest ( $\rho = 0.86$ ) (Almeida & Almeida, 1999). The  $\alpha$  (0.791; 95% CI = 0.740 - 0.834) and the GLB (0.882; 95% CI = 0.854 - 0.931) of the GDS-15 in this study show that it presented satisfactory internal consistency.

The Mini-Mental State Examination (MMSE) (Brucki et al., 2003) is a screening instrument for cognitive decline consisting of 30 items. For each item, the score is either zero or one. In this study, the cutoff points proposed by Bertolucci et al. (1994) were used. The psychometric properties of this measure have been reexamined (Melo et al., 2020) and, despite the limitations, we can state that it is a measure that presents sufficient validity evidence and reliability estimates. It was not possible to estimate the internal consistency of the MMSE in Studies 1 and 2, since the data were with high collinearity and variance equal to zero respectively.

A questionnaire was also used to characterize the sample. It contains questions regarding demographic variables, such as gender and age.

## Procedures

The ethical aspects were considered, including securing approvals from the research ethics committees of the Federal University of Juiz de Fora (Study 1 – under number 14978913.8.0000.5147, and Study 2 – under number 43189015.5.0000.5147) and reporting to the Madlyn and Leonard Abramson Center for Jewish Life / Polisher Research Institute about the development of the PGCMS-Br; data were collected from community-dwelling or LTCF for older adults. In the latter case, sampling was intentional for the institutions and accidental for the participants. In the collection of data from community-dwelling older adults, the “snowball” strategy was adopted.

All those who signed the Free and Informed Consent Form (FICF) were assessed with the use of the MMSE and answered the PGCMS-Br as well as the demographic questionnaire. Participants who did not show signs of cognitive decline also answered the other instruments, with the WHOQOL-Old being applied in Study 1, and the GDS-15 in Study 2. All the instruments were applied in the form of structured individual interviews.

Older adults screened for cognitive decline were referred to the health services for assessment. It was decided not to include those individuals in the study sample because, although, as described in the literature review, it is possible to use the PGCMS even in individuals with cognitive impairment, it was a very small subgroup ( $n = 2$ ) and the other measures are not recommended for this type of respondent.

Regarding the application of the PGCMS-Br, we ought to clarify that the participants received the following instructions: “I would like to ask you a few questions. You can only answer yes or no to most of them. There is no right or wrong answer; what really matters is what you feel and think. For each question, two answer options will be presented; choose only one”.

## Data Analysis

Since the internal structure of the PGCMS with three factors (Lonely Dissatisfaction, Attitude toward Own Aging, and Agitation) and a second-order factor (Morale) has been corroborated and widely used, Confirmatory Factor Analyses (CFAs) were performed to test the PGCMS-Br internal structure. For parsimony, this factor structure was contrasted with a one-dimensional solution. CFAs were performed using the JASP software, version 0.14.1.

Since the data did not present a multivariate normal distribution (Mardia – Skewness = 46.291;  $df = 969$ ;  $p = 1.000$ . Kurtosis = 351.091;  $p < 0.001$ ) and the PGCMS items were answered in a categorical measure, the Diagonally Weighted Least Squares (DWLS) estimator was used. In addition, the robust method, standardization for latent variables and, for factor scaling, the coding of effects were adopted.

The adequacy of the models tested was analyzed based on the following adjustment indices (Niemand & Mai, 2018): absolute, considering adjusted those that presented chi-square ( $\chi^2$ ) with a p-value greater than 0.05, chi-square ratio by degrees of freedom ( $\chi^2/df$ ) less than five, Goodness-of-Fit Index (GFI) greater than or equal to 0.90, root mean square error of approximation (RMSEA) with a 95% confidence interval (95% CI) less than or equal to 0.06 and the Standardized Root Mean Square Residual (SRMR) less than or equal to 0.08; incremental, with the Comparative Adjustment Index (CFI) and the Tucker-Lewis index (TLI) being greater than or equal to 0.95 in adjusted models; and parsimonious, based on the Parsimony Normed Fit Index (PNFI), which, although it does not necessarily have a cutoff point, is generally higher than 0.5 in adjusted models. To compare the models tested the Expected Cross-Validation Index (ECVI) was used, and the one with the lowest ECVI was considered more appropriate.

In addition to the adjustment indices, the CFA factor loadings were also considered, and they should be different from zero, positive and significant in the Wald Test (Z) ( $p < 0.05$ ). If p was greater than 0.05 for Z, the exclusion of the item would not jeopardize the adjustment of the model, since it does not contribute to the measurement of the latent factor.

The analysis of the internal consistency of the scale was estimated based on  $\alpha$  and GLB, with values equal to or greater than 0.65 considered adequate (Vaske et al., 2017). It was decided to present both estimators because, although the first is the most reported in the literature, the second is considered a more appropriate alternative (McNeish, 2018) to estimate the internal consistency of measures such as the PGCMS-Br.

Resampling (1000) with Bootstrap was performed to solve possible problems of normality and homogeneity in the Pearson correlation ( $r$ ), which was used to obtain evidence of validity based on the relationship with external variables. The significance level adopted was 5% by default.

## Results

The demographic characteristics of the sample and subsamples are shown in Table 1. The mean age of the participants in years was 72.43 ( $SD = 8.48$ ). In general, this is a sample composed of women ( $\chi^2(1) = 104.568$ ;  $p < 0.001$ ), who self-identified as white ( $\chi^2(1) = 459.744$ ;  $p < 0.001$ ), with incomplete elementary education ( $\chi^2(1) = 242.701$ ;  $p < 0.001$ ) and dwelling in the community ( $\chi^2(1) = 179.041$ ;  $p < 0.001$ ).

**Table 1**  
Characteristics of the sample and subsamples, Juiz de Fora, 2015

1 of 2						
Variable	Study 1		Study 2		Total	
Age	M = 74.55; SD = 8.00		M = 70.00; SD = 8.38		M = 72.43; SD = 8.48	
Variable	n	%	n	%	n	%
Gender						
Male	144	79.56	119	75.80	263	77.81
Female	37	20.44	38	24.20	75	22.19
Skin color/Race <sup>a</sup>						
White	109	60.89	109	69.43	218	64.88
Brown	30	16.76	34	21.66	64	19.05
Black	32	17.88	10	6.37	42	12.50
Yellow	7	3.91	2	1.27	9	2.68
Indigenous	1	0.56	2	1.27	3	

**Table 1**  
 Characteristics of the sample and subsamples, Juiz de Fora, 2015

2 of 2

Variable	Study 1		Study 2		Total	
Age	M = 74.55; SD = 8.00		M = 70.00; SD = 8.38		M = 72.43; SD = 8.48	
Variable	n	%	n	%	n	%
Education <sup>b</sup>						0.89
Incomplete Elementary Education	81	45.51	71	45.22	150	44.78
Complete Elementary Education	40	22.47	19	12.10	62	18.51
Complete High School	24	13.48	12	7.64	35	10.45
Complete Higher Education	17	9.55	23	14.65	35	10.45
Incomplete Higher Education	4	2.25	16	10.19	23	6.87
No Schooling	10	5.62	9	5.73	19	5.67
Incomplete High School	2	1.12	7	4.46	11	3.28
Origin						
Community	135	74.58	157	100	292	86.39
Institution (LTCF)	46	25.42	-	-	46	13.61

Note: <sup>a</sup>N = 336; two participants did not report. <sup>b</sup>N = 335; three participants did not report.

Table 2 summarizes the fit indices of the models tested with CFAs. Based on the ECVI, we can state that the three-dimensional model is the most adequate. Furthermore, all the fit indices (absolute, incremental and parsimonious) of this model are adequate. Except for the value of  $\chi^2$ , df and  $p$ , the one-dimensional model also presents adequate fit indices. To achieve these adjustments, no respecifications were necessary.

Table 3 presents the factor loadings of the items of the three-dimensional model of the PGCMS-Br. We can observe that Z is significant for all items, with Item 2 ( $\lambda = 0.598$ ; 95% CI = 0.384  $\geq$  0.812) of the Attitude toward Own Aging factor and Item 17 ( $\lambda = 1.408$ ; 95% CI = 1.209  $\geq$  1.608) of the Agitation factor presenting the lowest and highest factor loadings respectively. The factor loadings are also significant and they correlate positively and moderately: Attitude toward Own Aging – Agitation ( $r = 0.382$ ; 95% CI = 0.287  $\geq$  0.470;  $p < 0.001$ ); Attitude toward Own Aging – Lonely Dissatisfaction ( $r = 0.519$ ; 95% CI = 0.437  $\geq$  0.593;  $p < 0.001$ ); and Lonely Dissatisfaction – Agitation ( $r = 0.509$ ; 95% CI = 0.426  $\geq$  0.584;  $p < 0.001$ ).

**Table 2**  
 Adjustments of the internal structure models of the Brazilian version of the Philadelphia Geriatric Center Morale Scale (PGCMS-Br) tested with confirmatory factor analysis, Juiz de Fora, 2015

Index	One-dimensional	Three-dimensional
Absolute adjustment		
$\chi^2$ ; df; $p$	162.502; 119; 0.005	113.515; 116; 0.548
$\chi^2/df$	1.366	0.979
GFI	0.996	0.997
RMSEA (95% CI)	0.033 (0.019 $\leq$ 0.045)	0.000 (0.000 $\leq$ 0.0.026)
SRMR	0.060	0.051
Incremental adjustment		
CFI	0.976	1.000
TLI	0.972	1.002
Parsimonious adjustment		
PNFI	0.802	0.803
Similar samples		
ECVI	0.684	0.556

Note:  $\chi^2$ : chi-squared test. df: degrees of freedom;  $p$ :  $p$ -value;  $\chi^2/df$ : ratio of the  $\chi^2$  to the df; GFI: Goodness of Fit Index; RMSEA (95% CI): 95% confidence interval of a Root Mean Square Error of Approximation; SRMR: Standardized Root Mean Square Residual; CFI: Comparative Fit Index; TLI: Tucker-Lewis Index; PNFI: Parsimony Normed Fit Index; ECVI: Expected Cross Validation Index.

**Table 3**

Factor loadings and internal consistency indicators of the Brazilian version of the Philadelphia Geriatric Center Morale Scale (PGCMS-Br), Juiz de Fora, 2015

Factor	$\gamma$	$\gamma$ 95% CI		Z	$\alpha$	GLB
		$\leq$	$\geq$			
Attitude toward Own Aging	1.003	0.883	1.122	16.432*	0.623	0.686
Item 1	1.031	0.832	1.230	10.152*	0.552 <sup>b</sup>	0.620 <sup>a</sup>
Item 2	0.598	0.384	0.812	5.481*	0.614 <sup>b</sup>	0.654 <sup>a</sup>
Item 6	1.067	0.885	1.249	11.494*	0.553 <sup>b</sup>	0.602 <sup>a</sup>
Item 8	1.218	1.051	1.385	14.280*	0.518 <sup>b</sup>	0.563 <sup>a</sup>
Item 10	1.086	0.877	1.294	10.214*	0.600 <sup>b</sup>	0.632 <sup>a</sup>
Agitation	0.862	0.735	0.990	13.224*	0.643	0.712
Item 4	1.388	1.170	1.606	12.493*	0.566 <sup>b</sup>	0.651 <sup>a</sup>
Item 7	0.762	0.497	1.027	5.643*	0.635 <sup>b</sup>	0.710 <sup>a</sup>
Item 12	0.702	0.458	0.947	5.632*	0.630 <sup>b</sup>	0.706 <sup>a</sup>
Item 13	1.086	0.857	1.315	9.294*	0.596 <sup>b</sup>	0.651 <sup>a</sup>
Item 16	0.654	0.438	0.869	5.941*	0.621 <sup>b</sup>	0.677 <sup>a</sup>
Item 17	1.408	1.209	1.608	13.835*	0.541 <sup>b</sup>	0.593 <sup>a</sup>
Lonely Dissatisfaction	1.135	0.985	1.284	14.878*	0.684	0.727
Item 3	1.086	0.911	1.261	12.181*	0.602 <sup>b</sup>	0.638 <sup>a</sup>
Item 5	1.045	0.849	1.241	10.444*	0.664 <sup>b</sup>	0.708 <sup>a</sup>
Item 9	0.777	0.578	0.976	7.668*	0.642 <sup>b</sup>	0.685 <sup>a</sup>
Item 11	1.335	1.129	1.542	12.703*	0.635 <sup>b</sup>	0.678 <sup>a</sup>
Item 14	0.981	0.785	1.177	9.817*	0.687 <sup>b</sup>	0.733 <sup>a</sup>
Item 15	0.775	0.595	0.955	8.455*	0.628 <sup>b</sup>	0.657 <sup>a</sup>

Note: \* $p < 0.001$ ;  $\gamma$ : factor load;  $\gamma$  95% CI: 95% confidence interval of the  $\gamma$ ;  $\alpha$ : Cronbach's alpha; <sup>a</sup>GLB if item is deleted; <sup>b</sup>Cronbach's alpha if item is deleted. Z: Z-value (standardized value); GLB: Greatest Lower-bound.

Regarding the internal consistency of the PGCMS-Br estimated with  $\alpha$ , a score of 0.808 (95% CI = 0.776  $\geq$  0.836) was observed, and when excluding item 2 this value increased to 0.810. It was also found that  $\alpha$  of the factors (Table 3) varies between 0.623 (Attitude toward Own Aging) and 0.684 (Lonely Dissatisfaction). Only in the case of the Lonely Dissatisfaction factor, the exclusion of one item (Item 14) would improve the internal consistency by two thousandths.

A GLB of 0.881 (95% CI = 0.870  $\geq$  0.910) was obtained for the PGCMS-Br, and the exclusion of item 7 increased this score by one thousandth. In the case of factors (Table 3), the GLB varies between 0.686 for Attitude toward Own Aging and 0.727 in the case of Lonely Dissatisfaction. Excluding Item 14 would also improve, based on the GLB, the internal consistency of this factor (0.733).

Regarding the validity evidence based on the relationships with external variables (Table 4), Agitation ( $M = 10.26$ ;  $SD = 1.57$ ; 95% CI = 10.01  $\geq$  10.51), Attitude toward Own Aging ( $M = 8.15$ ;  $SD = 1.51$ ; 95% CI = 7.92  $\geq$  0.39), Lonely Dissatisfaction ( $M = 10.79$ ;  $SD = 1.41$ ; 95% CI = 10.57  $\geq$  11.01) and the Total PGCMS-Br ( $M = 29.20$ ;  $SD = 3.66$ ; 95% CI = 29.78  $\geq$  28.63) correlate significantly, moderately and negatively with symptoms of depression tracked with the GDS-15. When correlating quality of life in old age and morale, we found that 26 of the 28 correlations between the factors [Lonely Dissatisfaction ( $M = 10.32$ ;  $SD = 1.64$ ; 95% CI = 10.08  $\geq$  10.56), Attitude toward Own Aging ( $M = 7.71$ ;  $SD = 1.52$ ; 95% CI = 7.49  $\geq$  7.93) and Agitation ( $M = 10.08$ ;  $SD = 1.60$ ; 95% CI = 9.85  $\geq$  10.32)] and the Total ( $M = 28.12$ ;  $SD = 3.76$ ; 95% CI = 27.57  $\geq$  28.67) of the PGCMS-Br and the WHOQOL-Old scores are significant and positive, three of them being weak and the others moderate. No significant correlation was observed between Agitation and Autonomy and between Lonely Dissatisfaction and Death and Dying.

**Table 4**

Correlations between scores of the Brazilian version of the Philadelphia Geriatric Center Morale Scale (PGCMS-Br), depression and quality of life, Juiz de Fora, 2015

External Variable	PGCMS-Br			
	Agitation	Attitude toward Own Aging	Lonely Dissatisfaction	Total
GDS-15 <sup>a</sup> ( <i>M</i> = 2.47; <i>SD</i> = 2.67; 95% CI = 2.05, 2.89)	<i>r</i> = -0.612 <i>p</i> < 0.001	<i>r</i> = -0.567 <i>p</i> < 0.001	<i>r</i> = -0.717 <i>p</i> < 0.001	<i>r</i> = -0.771 <i>p</i> < 0.001
Sensory Abilities <sup>b</sup> ( <i>M</i> = 15.60; <i>SD</i> = 3.34; 95% CI = 15.11, 16.09)	<i>r</i> = 0.295 <i>p</i> < 0.001	<i>r</i> = 0.368 <i>p</i> < 0.001	<i>r</i> = 0.284 <i>p</i> < 0.001	<i>r</i> = 0.397 <i>p</i> < 0.001
Autonomy <sup>b</sup> ( <i>M</i> = 13.80; <i>SD</i> = 3.13; 95% CI = 13.34, 14.25)	<i>r</i> = 0.112 <i>p</i> = 0.132	<i>r</i> = 0.384 <i>p</i> < 0.001	<i>r</i> = 0.442 <i>p</i> < 0.001	<i>r</i> = 0.395 <i>p</i> < 0.001
Past, Present and Future Activities <sup>b</sup> ( <i>M</i> = 14.57; <i>SD</i> = 2.48; 95% CI = 14.21, 14.94)	<i>r</i> = 0.362 <i>p</i> < 0.001	<i>r</i> = 0.343 <i>p</i> < 0.001	<i>r</i> = 0.446 <i>p</i> < 0.001	<i>r</i> = 0.487 <i>p</i> < 0.001
Social Participation <sup>b</sup> ( <i>M</i> = 14.84; <i>SD</i> = 2.94; 95% CI = 14.41, 15.28)	<i>r</i> = 0.361 <i>p</i> < 0.001	<i>r</i> = 0.403 <i>p</i> < 0.001	<i>r</i> = 0.438 <i>p</i> < 0.001	<i>r</i> = 0.507 <i>p</i> < 0.001
Death and Dying <sup>b</sup> ( <i>M</i> = 15.36; <i>SD</i> = 4.07; 95% CI = 14.76, 15.96)	<i>r</i> = 0.325 <i>p</i> < 0.001	<i>r</i> = 0.200 <i>p</i> = 0.007	<i>r</i> = 0.144 <i>p</i> = 0.053	<i>r</i> = 0.281 <i>p</i> < 0.001
Intimacy <sup>b</sup> ( <i>M</i> = 14.20; <i>SD</i> = 3.79; 95% CI = 13.65, 14.76)	<i>r</i> = 0.243 <i>p</i> = 0.001	<i>r</i> = 0.333 <i>p</i> < 0.001	<i>r</i> = 0.497 <i>p</i> < 0.001	<i>r</i> = 0.454 <i>p</i> < 0.001
Total - WHOQOL-Old <sup>b</sup> ( <i>M</i> = 88.38; <i>SD</i> = 13.38; 95% CI = 86.42, 90.34)	<i>r</i> = 0.414 <i>p</i> < 0.001	<i>r</i> = 0.488 <i>p</i> < 0.001	<i>r</i> = 0.537 <i>p</i> < 0.001	<i>r</i> = 0.607 <i>p</i> < 0.001

Note: <sup>a</sup>Study 1 (*n* = 157); <sup>b</sup>Study 2 (*n* = 181); *r*: Pearson correlation coefficient; *p*: *p*-value.

## Discussion

Despite the fact that the morale mediates health perception (Kukihara et al., 2017) and constitutes an essential aspect for age well (Näsman et al., 2020), there is a lack of instruments in the Brazilian-Portuguese language to assess this construct in older adults. Thus, a Brazilian version of the PGCMS (Lawton, 1975) was developed, which, we should reiterate, is one of the most widely used measures to assess morale in old age (Doseděl et al., 2020; Klusmann et al., 2020; Marquez et al., 2020), called PGCMS-Br. This scale was applied to samples of community-dwelling and institutionalized older adults and some of its psychometric properties were examined.

Regarding the validity evidence based on the internal structure, AFCs identified that, like the original version (Lawton, 1975), the PGCMS-Br is a three-dimensional measure (Lonely Dissatisfaction, Attitude toward Own Aging and Agitation) with a second-order factor (Morale). This corroborates the studies of McDowell (2006), as well as those of Ma et al. (2009), Niklasson et al. (2015), Paúl (1992), and Pinar and Oz (2011).

By correlating the PGCMS-Br scores with symptoms of depression tracked by the GDS-15 (Almeida & Almeida, 1999), evidence of discriminant validity was obtained for that scale, since its scores (total and factors) correlated significantly, moderately and negatively with the symptoms in question. These results corroborate those obtained by Almevall et al. (2021), Niklasson et al. (2017) and Pourtaghi et al. (2019) and signal, as highlighted by Kukihara et al. (2017), the contributions of morale to mental health.

Evidence of convergent validity was also obtained for the PGCMS-Br, more precisely with quality of life. However, although morale (total and factors) correlated significantly, positively and moderately with the total WHOQOL-Old (Fleck et al., 2006), the correlations between the factors of the two measures sometimes were weak or lacked significance although, in general, the investigations by Miki and Kawabata (2020), Pinar and Oz (2011) and especially by Quiroz et al. (2013) were corroborated.

Quiroz et al. (2013) also used the WHOQOL-Old and, as in the case of the study reported here (that had a correlation of  $r = 0.607$ ), the correlation between the totals of the two measures was

significant, positive and moderate ( $r_s = 0.624$ ). However, the scores of the PGCMS and WHOQOL-Old factors were not correlated. It should be noted that only the scores of Lonely Dissatisfaction and Agitation of the PGCMS-Br did not present a significant correlation with the quality of life domains, Death and Dying and Autonomy respectively. Thus, although these two morale components correlated positively with all the other WHOQOL-Old factors, their association with quality of life should be scrutinized in further research. The results indicate that morale and quality of life, although positively correlated, are distinct constructs, especially with regard to some domains. The magnitude of the correlations and the lack of correlation between some factors support the hypothesis stated above. Therefore, the PGCMS and its Brazilian version should not be considered measures of quality of life.

Although parsimoniously, we can state that evidence of convergent validity with quality of life was obtained for the PGCMS-Br. However, the evidence of discriminant validity with depression is more robust.

In addition to the validity evidence based on the internal, convergent and discriminant structure, reliability estimates were obtained for the PGCMS-Br, more precisely internal consistency. When considering " $\alpha$ ", it was observed that, in general, this scale presents satisfactory internal consistency ( $\alpha > 0.65$ ) (Vaske et al., 2017), converging with the outcome of Niklasson et al. (2015) and Pinaz and Oz (2011) investigations. However, both factors Attitude toward Own Aging ( $\alpha = 0.623$ ) and Agitation ( $\alpha = 0.643$ ) did not reach the cutoff point. This circumscription in the internal consistency of the Attitude toward Own Aging factor is in line with the results obtained by Ma et al. (2009) and Niklasson et al. (2015). We ought to consider, as a hypothesis that explains these unsatisfactory internal consistencies, the limitations of the estimator used, that is,  $\alpha$  (Xiao & Hau, 2023).

When computing the GLB, satisfactory internal consistency ( $\alpha > 0.65$ ) was observed (Vaske et al., 2017) for both the PGCMS-Br and its factors. It is important to reaffirm that this estimator is the most appropriate option when dealing with nominal measures (McNeish, 2018). It is worth noting, again, that excluding an item would increase the internal consistency of the scale, but not significantly. The same would occur in the case of the Lonely Dissatisfaction factor. Thus, we can state that the PGCMS-Br has adequate overall internal consistency.

It should be noted that, in order to obtain these "good" psychometric properties for the PGCMS-Br, it was not necessary to modify the number of items on the scale thus maintaining the same 17 items from the original version, nor to substantially modify their wording. It should be noted that versions for other countries (Liang et al., 1987; McDowell, 2006; Paúl, 1992; Pinar & Oz, 2011) excluded or included items. Despite contributing to obtaining "good" psychometric properties, this type of procedure makes it difficult or even impossible to conduct cross-national studies.

Although it did not compromise the internal consistency and adjustment of the three-dimensional model, it was found during data collection that item 9 caused some confusion when answered. This probably happened because it has a negative formulation that should be answered negatively or affirmatively. Initially, the option was to keep it with a wording that was as similar as possible to that of the PGCMS (Lawton, 1975). Therefore, additional care should be exercised when the PGCMS-Br is self-completed; in addition items adequacy should be re-examined in future studies.

Although the psychometric properties of the PGCMS-Br are initially quite adequate, our investigation has limitations that should be addressed in other studies. External validity is the main one. Having a larger, randomized sample that is more representative of the elderly population in

Brazil is essential, for example, to establish cut-off points. In this connection, Lawton (1975) already recommended the development of standards for different population groups.

Regarding internal validity, research should be designed to obtain, for example, evidence of criterion validity for the PGCMS-Br and test its factorial invariance between community-dwelling older adults and LTCF for older adults and between self-completion and interviews. Furthermore, it is suggested that the examination of psychometric properties with Classical Test Theory be combined with IRT (Item Response Theory), using, for example, Rasch Analysis to examine item difficulty.

Due to these and other limitations, it is suggested at this point, that the PGCMS-Br be used sparingly in professional practice. More research is still needed to make available to psychologists and other health professionals a measure of morale that, as indicated by Lawton (1975), be multidimensional, easy to apply and, consequently, can be applied to older adults who have very different profiles (e.g., those with cognitive decline). This is a fundamental prerequisite for measuring this generalized feeling of well-being in old age.

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