

## **Brazilian-Portuguese version of the Friendship Scale to assess social isolation: cross-cultural adaptation and psychometric properties**

**Versão português brasileiro da Escala da Amizade para avaliar o isolamento social: adaptação transcultural e propriedades psicométricas**

**Versión brasileño-portuguesa de la Escala de la Amistad para evaluar el aislamiento social: adaptación transcultural y propiedades psicométricas**

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### **Abstract**

**Aim:** To translate, cross-cultural adapt and investigate the measurement properties of the 25-point Friendship Scale to Brazilian-Portuguese. **Methods:** Translation and adaptation of the 25-point Friendship Scale to Brazilian-Portuguese was conducted at first. Then, the new version was administered to 160 Brazilians to investigate test-retest reliability, internal consistency, standard error of the measurement (SEM), minimal detectable change (MDC), ceiling and floor effects, and concurrent validity. To investigate concurrent validity, the Brazilian-Portuguese version of the 0-100 EuroQol Visual Analog Scale (EQ VAS) was used to assess people's self-reported health status. **Results:** The Brazilian-Portuguese version has good to excellent reliability (ICC of 0.76, 95% CI 0.61 – 0.85) and had moderate internal consistency (Cronbach's alpha value of 0.78, 95% CI: 0.73 – 0.83). To avoid measurement error and to exceed variability, scores need to be greater than 1.33 (SEM) and 3.69 (MDC) on the 25-point scale, respectively. There was no ceiling and floor effects. For concurrent validity, there was a small positive correlation between the Friendship Scale and the EQ VAS (Spearman  $r_s = 0.24$ ;  $p < 0.01$ ). **Conclusions:** The new Brazilian-Portuguese version of the Friendship Scale has acceptable measurement properties to assess people over 18 years old's perception of social isolation.

**Keywords:** Friendship scale; Translation; Isolation; Validation; Social isolation.

### **Resumo**

**Objetivo:** Traduzir, adaptar transculturalmente e investigar as propriedades de medida da escala de amizade de 25 pontos para o português brasileiro. **Métodos:** Inicialmente foi realizada a tradução e adaptação da Escala de Amizade

de 25 pontos para o português do Brasil. Em seguida, a nova versão foi administrada a 160 brasileiros para investigar a confiabilidade teste-reteste, consistência interna, erro padrão da medida (SEM), mudança mínima detectável (MDC), efeitos teto e piso e validade concorrente. Para investigar a validade concorrente, a versão em português do Brasil da Escala Visual Analógica EuroQol 0-100 (EQ VAS) foi usada para avaliar o estado de saúde autorreferido das pessoas. Resultados: A versão em português do Brasil tem confiabilidade boa a excelente (CCI de 0,76, IC 95% 0,61 – 0,85) e consistência interna moderada (valor alfa de Cronbach de 0,78, IC 95%: 0,73 – 0,83). Para evitar erros de medição e exceder a variabilidade, os escores precisam ser maiores que 1,33 (SEM) e 3,69 (MDC) na escala de 25 pontos, respectivamente. Não houve efeitos de teto e piso. Para validade concorrente, houve uma pequena correlação positiva entre a Escala de Amizade e a EQ VAS (Spearman  $r_s = 0,24$ ;  $p < 0,01$ ). Conclusões: A nova versão em português do Brasil da Escala de Amizade tem propriedades de medida aceitáveis para avaliar a percepção de isolamento social de pessoas maiores de 18 anos.

**Palavras-chave:** Escala de amizade; Tradução; Isolamento; Validação; Isolamento social.

### Resumen

Objetivo: Traducir, adaptar culturalmente e investigar las propiedades de medición de la escala de amistad de 25 puntos al portugués brasileño. Métodos: Inicialmente, la Escala de Amistad de 25 puntos fue traducida y adaptada al portugués brasileño. Luego, la nueva versión se administró a 160 brasileños para investigar la confiabilidad test-retest, la consistencia interna, el error estándar de medición (SEM), el cambio mínimo detectable (MDC), los efectos techo y piso y la validez concurrente. Para investigar la validez concurrente, se utilizó la versión en portugués brasileño de la escala analógica visual EuroQol 0-100 (VAS EQ) para evaluar el estado de salud autoinformado de las personas. Resultados: La versión en portugués brasileño tiene una confiabilidad buena a excelente (ICC 0,76, IC 95% 0,61 - 0,85) y consistencia interna moderada (valor alfa de Cronbach 0,78, IC 95%: 0,73 - 0,83). Para evitar errores de medición y exceder la variabilidad, las puntuaciones deben ser superiores a 1,33 (SEM) y 3,69 (MDC) en la escala de 25 puntos, respectivamente. No hubo efectos de techo y suelo. Para la validez concurrente, hubo una pequeña correlación positiva entre la Escala de Amistad y el EQ VAS (Spearman  $r_s = 0,24$ ;  $p < 0,01$ ). Conclusiones: La nueva versión en portugués brasileño de la Escala de Amistad tiene propiedades de medición aceptables para evaluar la percepción de aislamiento social de personas mayores de 18 años.

**Palabras clave:** Escala de amistad; Traducción; Aislamiento; Validación; Aislamiento social.

## 1. Introduction

Social isolation is defined as an inappropriate quality and quantity of social relationship with other people at individual, group and community levels where human interaction occurs (Zavaleta et al., 2017). The lack of social relationships is a risk factor for morbidity (e.g., cardiovascular diseases) (Guzik et al., 2020; Yu et al., 2020) and mortality (Holt-Lunstad et al., 2010; House et al., 1998), and a potential prognostic factor for disability related to chronic conditions (i.e., low back pain) (Henschke et al., 2016; Oliveira et al., 2014). Furthermore, social isolation is also associated with a sedentary lifestyle and the global burden of cardiovascular disease (Peçanha et al., 2020). Socially isolated patients are approximately four times more likely to be hospitalized again in one year, when compared with patients with lower level of isolation (Mistry, 2011). In this context, as the world population is undergoing social restriction measures due to the new outbreak of coronavirus disease (COVID-19) and social isolation may have potential clinical and behavioral repercussions on people's lives, (Guzik et al., 2020; Loades et al., 2020) it is important to investigate social isolation using a valid and reliable instrument.

Among the instruments that assess social isolation, the Perceived Isolation Scale (Nicholson et al., 2020) and the Social Isolation Scale (Cornwell & Waite, 2009) assess perception of social isolation, and were studied in older people. One option to assess people's perceived social isolation in different age groups is the Friendship Scale developed by Hawthorne, with good measurement properties (e.g., internal consistency and reliability) to assess perception of social isolation in the last four weeks, that was tested in different countries (e.g., Australia and Denmark) (Hawthorne, 2006; Kent et al., 2015). The other advantages of the Friendship Scale are that it is self-administered and short, it takes about three minutes to complete (Hawthorne, 2006; Kent et al., 2015). The Friendship Scale consists of six items, that cover different domains of isolation: the ease of relating to others; feeling isolated; having someone to share feelings; ability to get in touch with others; feeling separate from other people; and being alone and friendless. Each of the six items are assessed with a 5-point Likert scale: almost always; most of the time; about half of the time; occasionally; and not at all. A final score is reached by summing responses

from all six items, ranging from 0 to 24 points, with higher scores meaning lower individual's perception of social isolation. Individual's perception of social isolation may also be categorized using the scores: very socially isolated (from 0 to 11); socially isolated (from 12 to 15); some isolation (from 16 to 18); socially connected (from 19 to 21); and very socially connected (from 22 to 24) (Hawthorne, 2006).

The Friendship Scale is an important instrument for health care professionals and patients to assess perception of social isolation, an important social factor often overlooked by studies. The scale has been used to investigate this important social factor in different countries (Hawthorne, 2006; Henschke et al., 2016; Oliveira et al., 2014) however, its Brazilian-Portuguese version is not available. The cross-cultural adaptation may help to gather valid social information on the Brazilian population and may improve the decision-making process when managing different health conditions. Besides, it is important to investigate whether reliability and validity of the new version are consistent with the original version (Terwee et al., 2007). The measurement properties are the parameters that indicate if this is an appropriate instrument to assess perceived social isolation in Brazilians (Terwee et al., 2007). Therefore, the aim of the study was to conduct a translation and cross-cultural adaptation to Brazilian-Portuguese, and to investigate the measurement properties of test-retest reliability, internal consistency, standard error of the measurement (SEM), minimal detectable change (MDC), ceiling and floor effects, and concurrent validity of the new Brazilian-Portuguese version of the 25-point Friendship Scale.

## **2. Methodology**

### **2.1 Study design and participants**

This cross-sectional study was conducted in two stages following the COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN) (Mokkink et al., 2010). At first, we translated and adapted the Friendship Scale to Brazilian-Portuguese with the instrument developers' consent. Then, a sample of Brazilians responded the new Brazilian-Portuguese version to investigate the measurement properties of test-retest reliability, internal consistency, SEM, MDC, ceiling and floor effects, and concurrent validity.

To investigate the measurement properties of the Portuguese-Brazilian version of the Friendship Scale, we collected data from 160 Brazilians registered in the Brazilian Twin Registry (BTR) of 18 years old or over who responded the new Brazilian-Portuguese version of the Friendship Scale at baseline (Ferreira et al., 2016). Individuals who had incomplete data and who did not have sufficient cognition to answer the questionnaire were excluded. Our sample size exceeded COSMIN benchmarks to be considered a study with appropriate methodological quality to investigate measurement properties (i.e., at least 100 participants) (Mokkink et al., 2010). Volunteer registration of twins occurs online in the BTR. In the registration process, Brazilian twins respond to questionnaires on sociodemographic, lifestyle and health conditions. The new translated and adapted Brazilian-Portuguese version of the Friendship Scale was included for the twins who consented to participate. The project was approved by the local ethics committee (CAAE 75120117.1.0000.5108) and participants agreed to participate.

### **2.2 Translation and cross-cultural adaptation of Friendship Scale to Brazilian-Portuguese**

The translation process followed the COSMIN guideline (Mokkink et al., 2010). The initial translation was done by two bilingual translators, native to Brazilian-Portuguese (T1 and T2), who independently translated the original Friendship Scale from English to Brazilian-Portuguese. T1 had medical training and T2 did not. Then, the authors and translators compared the two versions for possible ambiguous terms, obtaining a consensual version of the translated scale. After that, the consensual version was translated into English by two other bilingual translators (T3 and T4) who did not know the original version of the Friendship Scale. Then, a committee of experts (i.e., health professionals, translators, back-translators, authors) checked before the final version. They analyzed all versions of the questionnaire, discussed, and developed the pre-final

version with the appropriate cultural equivalence. Finally, a pilot test was carried out with the pre-final version, by self-administering it online in 30 (Henrica et al., 2011) people over 18 years old. The aim of the pilot was to identify possible items that could be difficult for Brazilians to understand. Participants answered the scale and were asked about the comprehension and difficulty of completing the scale using an open-ended question. If the pilot study identified difficulty of at least 20% with the pre-final version, the identified items would be reformulated by two investigators involved in this step.

### **2.3 Test-retest reliability, internal consistency, standard error of the measurement (SEM), minimal detectable change (MDC), ceiling and floor effects, and concurrent validity**

The new version of the Friendship Scale and descriptive data (i.e., age, sex, educational level, and monthly income) were collected online. To investigate test-retest liability, SEM and MDC, the Brazilian-Portuguese version of the Friendship Scale was applied online in 50 Brazilians, with an interval of six days between the first and the second application. Internal consistency, ceiling and floor effects, and concurrent validity of the new version were investigated in a sample of 160 participants. The social isolation has been negatively associated with people's health status (Guzik et al., 2020; Henschke et al., 2016; Mistry, 2011; Oliveira et al., 2014; Peçanha et al., 2020; Yu et al., 2020): greater social isolation levels associate with worse health status. One way to assess health status is using the 0-100 EuroQol Visual Analog Scale (EQ VAS) ("EuroQol--a new facility for the measurement of health-related quality of life," 1990). The EQ VAS records people's self-rated health status on a 0-100 points vertical visual analogue scale, where the closer to 100 points is considered "Best imaginable health state" and the closer to 0 point means "Worst imaginable health state". The advantages of this instrument are that it is validated for the Brazilian population (Santos et al., 2016), it is easy to understand and is short. Due to the fact that it is used in the BTR (Ferreira et al., 2016), we chose EQ VAS to assess concurrent validity of the new version. Therefore, the EQ VAS (Santos et al., 2016) was also collected from our sample of 160 Brazilians. We hypothesize that lower scores on the 25-point Friendship Scale (i.e., higher perceived social isolation) would be associated with lower scores on the 0-100 EQ VAS (i.e., lower self-reported health status) (Santos et al., 2016).

### **2.4 Statistical analysis**

Descriptive data were presented using frequencies, medians and interquartile ranges because data from the 160 participants were not normally distributed according to the Kolmogorov Smirnov test (Portney & Watkins, 2015). To investigate test-retest reliability, we used type 3,1 intraclass correlation coefficient ( $ICC_{3,1}$ ) (Portney & Watkins, 2015). ICC values  $<0.40$  represent poor reliability, values  $\geq 0.40$  and  $<0.75$  represent moderate reliability, values  $\geq 0.75$  and  $<0.90$  substantial reliability, and values  $\geq 0.90$  represent excellent reliability (Terwee et al., 2007). The SEM represents the smallest change on a given measure that indicates a real change for a group of individuals, and the MDC represents the smallest change for a single individual (Streiner et al., 2015; Terwee et al., 2007). Formulas used for calculating the SEM and MDC were  $SEM = SD \sqrt{1-ICC}$  and  $MDC = 1.96 \sqrt{2} SEM$ . For SEM, we calculate the corresponding percentage of SEM in relation to the total score of the scale. The percentage of SEM related with the total score of the questionnaire is considered an important indicator of agreement (absolute measurement error) and should be interpreted as: values  $<5\%$  represent "very good"; values  $>5\%$  and  $\leq 10\%$  represent "good"; values  $>10\%$  and  $\leq 20\%$  represent "doubtful"; and values of  $>20\%$  represent "negative". Because the MDC is based on the SEM, no criteria for the MDC were defined (Ostelo et al., 2004; Terwee et al., 2007).

To investigate internal consistency of items of the new version of the Friendship Scale, we used Cronbach's alpha. An alpha coefficient ranging from 0.70 to 0.95 was considered adequate (Terwee et al., 2007). Ceiling and floor effects were investigated by calculating the percentage of respondents who answered the maximum score (ceiling effect) and the minimum score (floor effect), and it was present when more than 15% of the respondents answered the maximum and/or minimum score,

respectively (Costa et al., 2008). If floor or ceiling effects were missing it indicates us that responsiveness and content validity were not limited, and the reliability was not reduced (Terwee et al., 2007).

To investigate concurrent validity of the Brazilian-Portuguese version of the Friendship Scale, the association with self-reported health status (i.e., the 0-100 EQ VAS) was investigated using Spearman's correlations (Spearman  $r_s$ ), with  $p < 0.05$ : Spearman  $r_s < 0.25$  is small; Spearman  $r_s > 0.25$  and  $< 0.50$  is fair; Spearman  $r_s > 0.50$  and  $< 0.75$  is moderate to good; Spearman  $r_s > 0.75$  is considered good to excellent. (Portney & Watkins, 2015) The statistical analysis was conducted using SPSS® (Version 24.0).

### 3. Results

#### 3.1 Translation and cross-cultural adaptation of the Friendship Scale to Brazilian-Portuguese

The process of translation followed the recommendations, and the pilot study was performed to verify if there was ambiguity in understanding the Brazilian-Portuguese version of the scale. Participants reported clarity and understanding of all items; therefore, no items were revised after the pilot study. There was no translation conflict and Table 1 presents the original and the new Brazilian-Portuguese versions of the Friendship Scale. Descriptive data of the 30 piloted participants are in Table 2. The new Brazilian-Portuguese version of the Friendship Scale is available in the Table 3.

**Table 1.** Final version Brazilian-Portuguese version of the 25-point Friendship Scale and the original English version.

	QS	MPT	CMT	O	N
*1. Tem sido fácil me relacionar com os outros. <i>It has been easy to relate to others.</i>	0	1	2	3	4
2. Eu me senti isolado de outras pessoas. <i>I felt isolated from other people.</i>	0	1	2	3	4
*3. Eu tinha alguém para compartilhar sentimentos. <i>I had someone to share my feelings with.</i>	0	1	2	3	4
*4. Eu achei fácil entrar em contato com os outros quando eu precisava. <i>I found it easy to get in touch with others when I needed to.</i>	0	1	2	3	4
5. Quando com outras pessoas, senti-me separado delas. <i>When with other people, I felt separate from them.</i>	0	1	2	3	4
6. Eu me senti sozinho e sem amigos. <i>I felt alone and friendless.</i>	0	1	2	3	4

\* Items 1, 3 and 4 are reversed before scoring; QS, Quase Sempre/Almost Always; MPT, A maior parte do tempo/Most of the time; CMT, Cerca da metade do tempo/About half the time; O, Ocasionalmente/Occasionally; N, Nunca/Not at all. Source: Authors.

**Table 2.** Descriptive characteristics of the pilot study population (n = 30).

	Values*	
Age (years), median	27	(21-52)
Sex		
Female	21	(70.0%)
Male	9	(30.0%)
Marital Status		
Single	23	(76.7%)
Married	5	(16.7%)
Divorced	1	(3.3%)
Widow	1	(3.3%)
Education		
Primary School	1	(3.3%)
High School	20	(66.7%)
University degree	9	(30.0%)
Monthly Income (US\$)		
Less than a minimum wage <231.8	5	(16.7%)
Between 1 and 5 minimum wages 231.8 to 1159.0	14	(46.7%)
Between 6 and 10 minimum wages 1390.8 to 2318.0	7	(23.3%)
More than 10 minimum wages >2318.0	4	(13.3%)
Friendship Scale Score (values 0 - 24points), median	18	(10-24)

\* values presented in absolute numbers and percentage or median and interquartile ranges; US\$, American dollar. Source: Authors.

**Table 3.** Brazilian-Portuguese version of the 25-point Friendship Scale.

<b>Durante as últimas quatro semanas:</b>	
*1. Tem sido fácil me relacionar com os outros:	2. Eu me senti isolado de outras pessoas:
0 Quase sempre	0 Quase sempre
1 A maior parte do tempo	1 A maior parte do tempo
2 Cerca de metade do tempo	2 Cerca de metade do tempo
3 Ocasionalmente	3 Ocasionalmente
4 Nunca	4 Nunca
*3. Eu tinha alguém para compartilhar meus sentimentos:	*4. Eu achei fácil entrar em contato com os outros quando eu precisava:
0 Quase sempre	0 Quase sempre
1 A maior parte do tempo	1 A maior parte do tempo
2 Cerca de metade do tempo	2 Cerca de metade do tempo
3 Ocasionalmente	3 Ocasionalmente
4 Nunca	4 Nunca
5. Quando com outras pessoas, senti-me separado delas:	6. Eu me senti sozinho e sem amigos:
0 Quase sempre	0 Quase sempre
1 A maior parte do tempo	1 A maior parte do tempo
2 Cerca de metade do tempo	2 Cerca de metade do tempo
3 Ocasionalmente	3 Ocasionalmente
4 Nunca	4 Nunca

Brazilian-Portuguese version of the 25-point Friendship Scale. Each item is scored 0-4, as indicated. Total score is the sum of all 6 items, ranging from 0 to 24 points (\*Items 1, 3 and 4 are reversed before scoring). Higher scores mean lower individual's perception of social isolation. Individual's perception of social isolation may also be categorized using the scores: very socially isolated (from 0 to 11); socially isolated (from 12 to 15); some isolation (from 16 to 18); socially connected (from 19 to 21); and very socially connected (from 22 to 24). Source: Authors.

### **3.2 Test-retest reliability, internal consistency, standard error of the measurement (SEM), minimal detectable change (MDC), ceiling and floor effects, and concurrent validity**

The new version was applied to 160 people, 104 females and 56 males, with median age of 30 years old, most with at least high school and with monthly income of US\$ 231.8 to US\$ 1,159.0 (Quote on 08/19/2022, \$1 = R\$ 5.20) (Quotes 2022)(Cotações, 2022) (Table 4). The median self-reported health status was 90 points (40-100). The median of perceived social isolation was 20 points (2-24). The distribution of respondents by score the Friendship Scale in our sample was: 6.9% very socially isolated (n = 11); 10% socially isolated (n = 16); 18.1% with some social support (n = 29); 33.8% socially connected (n = 54); and 31.2% very socially connected (n=50). Therefore, high proportions of respondents indicated that they



had some social support or social relationships (83.1%). Table 5 describes distributions of each of the six Friendship Scale items applied of the study population.

**Table 4.** Descriptive characteristics of the study population (n = 160).

	Values*	
Age (years), median	30	(20-69)
<60	150	(93.25%)
≥60	10	(6.25%)
Sex		
Female	104	(65.00%)
Male	56	(35.00%)
Marital Status		
Single	11	(6.90%)
Married	2	(1.30%)
Divorced	1	(0.60%)
Null	146	(91.30%)
Education		
Primary School	2	(1.30%)
High School	84	(52.50%)
University degree	67	(41.90%)
Null	7	(4.40%)
Monthly Income (US\$)		
Less than a minimum wage <231.8	8	(5.00%)
Between 1 and 5 minimum wages 231.8 to 1159.0	73	(45.60%)
Between 6 and 10 minimum wages 1390.8 to 2318.0	40	(25.00%)
More than 10 minimum wages >2318.0	32	(20.00%)
Less than a minimum wage <231.8	7	(4.40%)
EQ VAS (values 0 - 100points), median	90	(40-100)

\* values presented in absolute numbers and percentage or median and interquartile ranges; US\$, American dollar; EQ VAS, EuroQol Visual Analog Scale for self-reported health status. Source: Authors.



**Table 5.** Data distributions of each of the six Friendship Scale items applied in the study (n = 160); n (%).

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6
Almost Always	64 (40.0%)	3 (1.9%)	74 (46.3%)	101 (63.1%)	2 (1.3%)	6 (3.8%)
Most of the time	65 (40.6%)	7 (4.4%)	66 (41.3%)	41 (25.6%)	11 (6.9%)	31 (19.4%)
About half the time	13 (8.1%)	5 (3.1%)	7 (4.4%)	5 (3.1%)	16 (10.0%)	7 (4.4%)
Occasionally	8 (5.0%)	75 (46.9%)	8 (5.0%)	8 (5.0%)	65 (40.6%)	39 (24.4%)
Not at all	10 (6.3%)	70 (43.8%)	5 (3.1%)	5 (3.1%)	66 (41.3%)	77 (48.1%)

\* Item 1, It has been easy to relate to others Item; Item 2, I felt isolated from other people; Item 3, I had someone to share my feelings with; Item 4, I found it easy to get in touch with others when I needed to; Item 5, When with other people, I felt separated from them; Item 6, I felt alone and without friends. Source: Authors.

The Brazilian-Portuguese version of the Friendship Scale revealed substantial reliability based on  $ICC_{3,1} = 0.76$  (95% CI: 0.61 - 0.85). The SEM ranged from 0.36 to 0.71 for items, and SEM of the total score was 1.33 points (5.5%) (Table 6). The MDC varied from 1.00 to 1.98 for the items, and the MDC of the total score was 3.69 points, so scores above the MDC characterize a change in an individual's score above the measurement error. The analysis of internal consistency showed a Cronbach's alpha coefficient of 0.78 (95% CI: 0.73–0.83). Exclusion of individual items did not alter the internal consistency, with Cronbach's alpha levels remaining in the range of 0.72–0.80. The Friendship Scale did not exhibit either floor or ceiling effects: 12.5% of the scores were of the highest scale score; and 0% of the scores were of the lowest scale score. In addition, there was a small positive correlation between social isolation and health status Spearman  $r_s = 0.24$  ( $p < 0.001$ ), supporting hypothesis that lower scores on the 25-point Friendship Scale is associated with lower scores on the 0-100 EQ VAS.

**Table 6.** Median and interquartile ranges, intraclass correlation coefficient (ICC) and 95% confidence intervals (CIs), standard error of measurement (SEM), and minimal detectable change (MDC) of each item and of the total score of the Brazilian-Portuguese version of the 25-point Friendship Scale.

	Median	ICC (95%CI)	SEM (%)	MDC
It has been easy to relate to others.	3 (0 - 4)	0.57 (0.34–0.73)	0.61	1.68
I felt isolated from other people.	3 (0 - 4)	0.55 (0.32–0.71)	0.61	1.68
I had someone to share my feelings with.	3 (0 - 4)	0.76 (0.61–0.85)	0.36	1.00
I found it easy to get in touch with others when I needed to.	4 (0 - 4)	0.70 (0.53–0.82)	0.46	1.27
When with other people, I felt separate from them.	3 (0 - 4)	0.39 (0.12–0.60)	0.70	1.98
I felt alone and friendless.	3 (0 - 4)	0.64 (0.44–0.78)	0.50	1.27
Total score of the 25-point Friendship Scale	20 (2 - 24)	0.76 (0.61–0.85)	1.33 (5.54%)	3.69

Source: Authors.

#### 4. Discussion

This study reports the translation and cultural adaptation of the Friendship Scale from English into Brazilian-Portuguese, following internationally recommended guidelines (Beaton & Guillemin, 2000; Mokkink et al., 2010; Portney & Watkins, 2015). The Friendship scale (Hawthorne, 2006) was chosen as it is often employed in social isolation research (Hawthorne, 2006, 2008; Kent et al., 2015; Oliveira et al., 2014). During the process of translation and cultural adaptation, the Brazilian-Portuguese version of the Friendship Scale showed excellent acceptability and comprehension. The new version showed appropriate reliability and internal consistency to assess the construct. The SEM and MDC were 1.33 and 3.69, respectively. The MDC found in our study showed that scores should be higher than 3.69 to surpass the measurement error. Besides, concurrent validity supported hypothesis that higher perceived social isolation is associated with lower self-reported health status (Santos et al., 2016). These results are consistent with previous versions showing that the instrument has good measurement properties to assess the perceived social isolation (Hawthorne, 2006; Kent et al., 2015).

The Brazilian version of the Friendship Scale showed internal consistency estimates similar to the original English (Hawthorne, 2006) and Danish versions (Kent et al., 2015). The Cronbach's alpha coefficients of the two versions reported above were 0.83 and 0.70, respectively, and values were similar to coefficients of the Brazilian version (i.e., 0.78). Internal consistency indicated that all items on the scale adequately measured the construct related to the perception of social isolation. The COSMIN (Mokkink et al., 2010) also recommends the report of SEM and MDC. For the Friendship Scale, there are no previous reports describing SEM and MDC. The SEM and MDC values in this study determined the magnitude of the change needed to have a real change and not a difference related to the measurement error. Test-retest for reliability was not described for the Danish and original versions of the Friendship Scale (Hawthorne, 2006), however, the Brazilian-Portuguese version showed an adequate reliability with ICC of 0.76 (95% CI: 0.61 - 0.85) (Terwee et al., 2007).

Occurrence of floor and ceiling effects mean that extreme items are missing at the lower or upper end of the scale, indicating limited content validity. Consequently, individuals with the lowest or highest possible score cannot be distinguished from each other, and reliability is reduced. Besides, responsiveness is limited because changes cannot be measured in these

individuals. Therefore, absence of floor and ceiling effects in the current study suggested that the Brazilian-Portuguese version of the Friendship Scale has no limitation on responsiveness and content validity, and reliability is not reduced (Terwee et al., 2007).

Although it is not possible to directly compare our results with results from other populations (Australian and Danish) (Hawthorne, 2006; Kent et al., 2015) the Brazilian study showed results similar to previous studies from other countries with different socioeconomic characteristics. In the previous Danish and Australia studies, higher percentages of participants were categorized as very socially connected people (scores ranging from 22 to 24 on the 25-point Friendship Scale) (Hawthorne, 2006; Kent et al., 2015). In the Brazilian sample, the highest percentage was of people connected socially (scores ranging from 19 to 21 points). The Brazilians reported perception of low levels of social isolation, and it was also consistent with previous studies conducted in Denmark and Australia. It is important to clarify that these three studies collected data before the undergoing social restriction measures due to the new outbreak of coronavirus disease (COVID-19).

We found that low levels of self-reported health status are associated with higher perception of socially isolation (Spearman  $r_s = 0.24$ ;  $p < 0.001$ ). Our result is consistent with findings from the original study, (Hawthorne, 2006) that showed weak to moderate correlations of social isolation with quality of life and health status. Other previous studies also showed that social isolation negatively affects people's health status and quality of life (Guzik et al., 2020; Henschke et al., 2008; Mistry, 2011; Oliveira et al., 2014; Peçanha et al., 2020; Yu et al., 2020). Therefore, we suggest that future longitudinal studies should be conducted to investigate whether this is an important predictor.

One potential limitation of this study is that our sample was young (median of 30 years old), well-educated (94.4% of individuals in high school or more), and with monthly income of US\$ 231.8 to US\$ 1,159.0. We suggest future studies to investigate potential differences on perceived social isolation for age, civil status, sex and socioeconomic status. It was not in the scope of the current study and we were underpower to conduct these analyses. Other limitation of this study is that our results may not be generalized to the Brazilian population, since we used a convenient sample.

## 5. Conclusion

This study reports the translation, cultural adaptation, and investigation of the psychometric properties of the Brazilian-Portuguese version of the Friendship Scale. The instrument is culturally appropriate and has been shown to be easily understood by the Brazilian people, with performance characteristics similar to the original English version. The results showed that the Friendship Scale has appropriate reliability and internal consistency. We recommend this instrument to health providers to gather important valid social information in the Brazilian population with different health conditions to improve the decision-making process. Improving the perceived social isolation might optimize self-reported health status and reduce the health care differences and costs.

Finally, we suggest that future longitudinal studies be carried out to investigate whether quality of life or self-reported health status is an important predictor of social isolation. In addition, we suggest future studies to investigate potential differences on perceived of social isolation for age, civil status, sex and socioeconomic status.

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