

## Social and Emotional Loneliness Scale: psychometrics evidences in the Brazilian northeast *Social and Emotional Loneliness Scale for Adults: evidencias psicométricas en el noreste de Brasil*

### *Social and Emotional Loneliness Scale for Adults: evidências psicométricas no nordeste brasileiro*

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**Abstract:** The research aimed to adapt the Social and Emotional Loneliness Scale for Adults (SELSA) to Brazil, gathering evidence of validity and accuracy. Two studies were carried out: in Study 1, 319 university students ( $M_{age} = 24.36$ ) answered the SELSA and demographic questions. The exploratory factor analysis results indicated a three-factor structure (Family, Romantic and Social), explaining 70.38% of the total variance, with a Cronbach's alpha ( $\alpha$ ) ranging from .84 to .92; in Study 2, with 200 university students ( $M_{age} = 25.35$ ) who answered the same instruments of the previous study. Confirmatory factorial analysis indicated adequate indicators (CFI = 0.98, TLI = .98, RMSEA = .07, Pclose = .06). Reliability was satisfactory (.77 to .93). It is concluded that the instrument presented good psychometric parameters, being an alternative tool for researchers investigating loneliness and its correlates, proposing new studies with a more representative sample.

**Key words:** Loneliness, university students, scale, validity, reliability

**Resumo:** A pesquisa objetivou adaptar a *Social and Emotional Loneliness Scale for Adults* (SELSA) para o Brasil, reunindo evidências de validade e precisão. Realizaram-se dois estudos: no Estudo 1, participaram 319 universitários ( $M_{idade} = 24.36$ ) que responderam a SELSA e a questões demográficas. Os resultados da AFE indicaram uma estrutura trifatorial (Familiar, Romântica e Social), explicando 70.38% da variância total, com um alfa de Cronbach ( $\alpha$ ) variando de 0.84 a 0.92; no Estudo 2, participaram 200 universitários ( $M_{idade} = 25.35$ ) que responderam aos mesmos instrumentos do estudo anterior. A análise fatorial confirmatória apontou indicadores adequados (CFI = 0.98, TLI = 0.98, RMSEA = 0.07, Pclose = 0.06). A confiabilidade foi satisfatória (0.77 a 0.93). Conclui-se que o instrumento apresentou bons parâmetros psicométricos, mostrando-se uma ferramenta alternativa para os pesquisadores que investigam a solidão e seus correlatos, propondo-se novos estudos com uma amostra mais representativa.

**Palavras-chave:** solidão, universitários, escala, validade, confiabilidade

**Resumen:** La investigación objetivó adaptar la *Social and Emotional Loneliness Scale for Adults* para el Brasil, reuniendo evidencias de validez y precisión. Se realizaron dos estudios: en el Estudio 1, participaron 319 universitarios ( $M_{edad} = 24.36$ ) que respondieron a la SELSA y cuestiones demográficas. Los resultados de la AFE indicaron una estructura trifatorial (Familiar, Romántica y Social), explicando el 70.38% de la variación total, con un alfa de Cronbach ( $\alpha$ ) variando de 0.84 a 0.92; en el Estudio 2, participaron 200 universitarios ( $M_{edad} = 25.35$ ), que respondieron los mismos instrumentos del estudio anterior. Un análisis factorial confirmatorio apuntó indicadores adecuados (CFI = 0.98, TLI = 0.98, RMSEA = 0.07, Pclose = 0.06). La confiabilidad fue satisfactoria (0.77 a 0.93). Se concluye que el instrumento presentó buenos parámetros psicométricos, mostrando una herramienta alternativa para los investigadores que investigan la soledad y sus correlatos, proponiendo nuevos estudios con una muestra más representativa.

**Palabras Clave:** soledad, universitarios, instrumento, validez, confiabilidad



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## Introduction

Loneliness is considered a serious social problem (De Jong-Gierveld & Tilburg, 2010) and a public health issue (Holt-Lunstad, Smith, Baker, Harris, & Stephenson, 2015). It refers to a negative expression of feelings that can manifest in people of all ages, being more recurrent in women of any age and in single elderly men (De Jong-Gierveld, Tilburg, & Dykstra, 2016; Pocinho & Macedo, 2017). It is experienced differently by people (De Jong Gierveld et al., 2016) and arises when there is a gap between the intimacy achieved by the individual and the idealized one (Asher & Weeks, 2014).

According to the literature, people who feel lonely present an intense feeling of emptiness and abandonment, depressive symptoms, cognitive decline, poor quality of life, impaired physical health and sleep disorders (Kuznier, Souza, Mata, & Chianca, 2016; Pocinho & Macedo, 2017). Such characteristics contribute to the loneliness being recognized as a risk factor for the individual's mental health (Ouakinin & Barreira, 2015; Reichl, Schneider, & Spinath, 2013).

According to Pocinho, Farate and Dias (2010), loneliness has been studied from two perspectives: (1) a sociological one, in which loneliness is caused solely by external factors; and (2) an interactionist one, which perceives

loneliness as a combination of situational and personality factors. In addition to these, two other approaches help in the understanding of the theme and allowed the elaboration of instruments for its evaluation: (1) one-dimensional and (2) multidimensional.

The one-dimensional approach conceives of loneliness as an experience common to all people, ignoring the specific causes that may cause it (Chen, 2015), i.e. individuals tend to similarly experience feelings of loneliness, varying only in their frequency or intensity (Russell, 1982; Russell, Peplau, & Ferguson, 1978). From a multidimensional perspective, the perception of loneliness depends on the number or quality of relationships (desired and experienced), with two specific types widely accepted in the literature (Exposito & Moya, 1999): (1) social loneliness and (2) emotional loneliness, which will be briefly described.

This research addresses the multifaceted character of loneliness, as it has a broader view of the phenomenon. Such perspective, initially defended by Weiss (1973), proposes a separation between the social and personal factors of the construct. This author defined loneliness as a deficient condition, in which two types of specific relational dispositions are absent: a) social loneliness, which refers to a deficit in social relations, generating a growing need to be with family, friends and neighbors; and b)

emotional loneliness, which refers to a feeling caused by the absence of a specific personal relationship, whether of a loving partner or friends, which conveys acceptance and understanding.

In short, social loneliness is a feeling resulting from the individual's lack of involvement with their social circle, a fact that occurs due to inadequate social relationships and rejection in the desired groups (DiTommaso & Spinner, 1993); and emotional loneliness refers to the need for someone who provides emotional support and security. It is often experienced by individuals who have experienced loss, such as the death of close relatives or divorce proceedings (Chen, 2015), and is associated with fear of child abandonment, anxiety symptoms, or feelings of emptiness.

Augusto, Oliveira and Pocinho (2008) highlight three components that directly interfere with the feeling of loneliness: (1) the cognitive component - how does one perceive oneself in a given social situation, if negatively, the individual strays away from the group and isolates himself; (2) the affective component - refers to negative emotional experiences lived by a person, which can be expressed through disorientation and / or loss; and (3) the time component – the permanence time of the feeling, whether it is temporary or lasting, and may vary depending on significant changes in life (e.g. job loss, relationship conflict) or through more persistent conflict or chronic experience, in which the person experiences a lasting isolation from human contact or socialization (Belford, 2017).

That said, it is important to emphasize the relationship between social isolation and loneliness. Holt-Lunstad et al. (2015) state that by socially relating and establishing perennial affective bonds with people, the psychological, emotional and physical well-being is affected. Thus, as the frequency of relationships in the social circle increases, the intensity of loneliness decreases (De Jong Gierveld et al., 2016). However, it can be considered that loneliness should not be understood solely as the absence of companionship, but as something deeper, which can accompany

feelings of boredom and lack of perspective on life (Ferreira, 2012).

Researchers such as De Jong-Gierveld et al. (2016) have investigated the factors associated with loneliness, considering different samples, especially groups of elderly individuals and women, because they are more vulnerable to loneliness. Dahlberg and McKee (2014) conducted a study in the United Kingdom of 1,255 elderly individuals who are over 65 years-old and found that 7.7% of participants experienced severe levels of loneliness, while 38.3% had moderate levels. Moreover, they demonstrated that variables such as being widowed, a low self-esteem and poor social contact with family and friends were predictors of loneliness.

These results corroborate the data found in the longitudinal survey (28 years) with 469 elderly individuals, between 60 and 86 years-old, who were residents of the city of Tampere, Finland (Aartsen & Jylhä, 2011). The researchers found that approximately one third of participants developed feelings of loneliness due to the loss of a loving partner. Such situation led them to reduce social and physical activities, generating an increased sense of worthlessness and moodiness. Such symptoms were more present in women, especially widows.

Given the above, the need to understand and measure the level of loneliness in individuals stands out. Thus, in the literature consulted it is possible to find instruments for this purpose, based on the two perspectives presented (one-dimensional and multidimensional). In the one-dimensional approach, loneliness as a global construct, the following instruments were identified: the Loneliness Scale (Russell et al., 1978), the Loneliness Rating Scale (Scalise, Ginter, & Gerstein, 1984), and the Differential Loneliness Scale (Schmidt & Sermat, 1983), in addition to the University of California Los Angeles Loneliness Scale (UCLA; Russell, Peplau, & Cutrona, 1980).

However, although the UCLA scale was originally conceived in a one-dimensional model, some later studies challenged its dimensionality, with multifactor structures

being verified, with two (Wilson, Cutts, Lees, Mapungwana, & Maunganidze, 1992), three (Pikea, Parpa, Tsilika, Galanos, & Mystakidou, 2016) and four factors (Borges, Prieto, Ricchetti, Hernández-Jorge, & Rodríguez-Naveiras, 2008). In Brazil, the one-dimensional structure has been corroborated (Fonsêca, Couto, Melo, Guimarães, & Pessoa, 2018).

Given the above, despite the complexity of the theme, it seems coherent to consider the multifaceted character of loneliness. Thus, based on the typology proposed by Weiss (1973), which is widely accepted by researchers, covering two facets of the construct (social and emotional), DiTommaso and Spinner (1993) elaborated the Social and Emotional Loneliness Scale for Adults (SELSA), initially composed of 37 items, distributed in three factors: a) social, b) family and c) romantic. In the meantime, although further research showed favorable evidence of psychometric adequacy of the measure (Cramer & Barry, 1999), DiTommaso, Brannen and Best (2004) proposed a reduced version, arguing that a short instrument with similar psychometric qualities could be more effective, besides being commonly used in clinical or research context. This instrument gathered 15 items, evenly distributed among the three theorized factors, with adequate validity (CFI = 0.92; NFI = 0.92; TLI = 0.91; RMSEA = 0.09) and accuracy (ranging from 0.87 to 0.90), with different versions of the measure in several contexts: Spanish (Yarnoz-Yaben, 2008), Iranian (Jowkar, 2012), Polish (Adamczyk & DiTommaso, 2014) and Turkish (Cecen, 2007).

In this sense, despite finding measures to assess loneliness with satisfactory psychometric indices, even in the Brazilian context, there is still little research on loneliness as a multifaceted construct, highlighting the need to consider this aspect of the construct. Faced with this limitation and allied to the understanding of the importance of having psychometrically adequate measures, as they can help in the detection of loneliness and its correlates, as well as enabling proposals for more effective

preventive interventions (Dahlberg & McKee, 2014), the main objective of this study was to adapt the Social and Emotional Loneliness Scale for Adults (SELSA) to Brazil, verifying its psychometric adequacy. To achieve these objectives, two studies (exploratory and confirmatory) were performed, which will be described below.

## **Study 01- Initial Evidence of Validity and Accuracy of the SELSA**

### **Materials and Method**

#### ***Participants***

A total of 319 university students participated this study, from a northeastern capital of Brazil, over 18 years-old, recruited by convenience (non-probabilistic sample), with face-to-face and online recruitment, with a mean age of 24.36 years (SD = 6.52). Most of them were women (84.4%), single (46%) and Catholic (40.9%).

#### ***Instruments***

The participants answered a booklet containing the following instruments:

Social and Emotional Loneliness Scale for Adults (SELSA; DiTommaso et al., 2004): consists of 15 items, answered on a 7-point scale, ranging from 1 = Strongly Disagree to 7 = Strongly Agree, which indicate the degree of agreement or disagreement with each statement. The items cover three factors of loneliness, named as follows: social (e.g., Item 09 - I feel part of a group of friends), family (e.g., Item 11 - I feel close to my family) and romantic (e.g., Item 02 - I would like to have a more satisfying love relationship). Internal consistency, as assessed by Cronbach's alpha ( $\alpha$ ), was satisfactory: social ( $\alpha = 0.90$ ), family ( $\alpha = 0.89$ ) and romantic ( $\alpha = 0.87$ ). In addition, four items have inverted scores, namely items: 1, 3, 7 and 14.

Sociodemographic questionnaire: in order to characterize the sample, the following information was requested: the participant's age, gender, marital status and religion.

## *Procedure*

Initially, the researchers of this study sought to adapt the SELSA to Brazilian Portuguese through the Back-Translation method. For this, two independent, bilingual translators provided assistance. Thus, the measure was translated into Brazilian Portuguese and then translated into English (native language) through blind translations, aiming to verify the equivalence of the items of the two versions (Portuguese and English), which were synthesized for evaluation of semantic, idiomatic, experiential and conceptual equivalence of the translations of each item, as recommended by Borsa, Damásio and Bandeira (2012). This last version underwent a semantic validation (Pasquali, 2016), which was answered by 20 people living in a capital of the northeast region of Brazil, divided equally according to their educational level (lower and higher strata of the target population), who verified the comprehension of the instructions and the items of the measure that, after the evaluation, did not need any modifications.

Subsequently, data collection was performed, providing participants with all ethical clarifications about the research, requesting their written consent, which was done by signing the Informed Consent Form. On average, participants needed 10 minutes to complete their answers. It is noteworthy that, prior to filling in the participants' answers, the research objective was exposed and its voluntary and anonymous character was ensured, in accordance with the National Health Council Resolutions 466/12 and 510/16, which deal with scientific research involving human beings. The study was approved by the Ethics Committee of Research on Human Beings of the Health Sciences Center of the UFPB (CAAE: 73301717.0.0000.518, Protocol No. 2.309.859).

## *Data analysis*

For the analysis, three programs were used, respectively: (1) SPSS (version 21), used for the calculation of descriptive statistics; (2) FACTOR 10.5, for analysis of the polychoric correlation matrix, Common Part Accounted For (CAF) adjustment indices, recommended for non-normally distributed data (Lorenzo-Seva & Ferrando, 2006), and the Minimum Average Partial (MAP) extraction method. In addition to checking the Kaiser-Meyer-Olkin (KMO) and Bartlett's Sphericity Test (Tabachnick & Fidell, 2013); and (3) the R software, using the routine included in the PSYCH package (Revelle, 2017), verifying the internal consistency index (precision), using Cronbach's alpha coefficient ( $\alpha$ ) based on polychoric correlations and on McDonald's omega ( $\omega$ ). To this end, the Likert response scale must be considered as ordered categories (Lara, 2014).

## **Results**

Initially, an exploratory factor analysis was performed, aiming to know the factor structure of the polychoric correlation matrix among the 15 items of the SELSA. The adequacy of the sample was verified by the Kaiser-Meyer-Olkin index ( $KMO = 0.85$ ) and the Bartlett sphericity test,  $\chi^2(105) = 3404.8$ ;  $p < 0.001$ . The Hull method suggested a three-factor solution, explaining 70.38% of the total variance, with the social factor explaining 37.22% of it, followed by the family (22.29%) and romantic (10.87%) factors. A Promin rotation was performed, adopting values equal to or greater than  $|0.50|$  as factor saturation criteria. The data can be seen in Table 1.

Table 1  
*Factorial Structure of the Social and Emotional Loneliness Scale for Adults.*

Item	Content description	Factors			
		I	II	III	h <sup>2</sup>
09.	I feel part of a group of friends.	0.80*	-0.02	0.03	0.63
14.	I have no friends who understand me, but I would like to have.	0.77*	0.02	0.03	0.62
08.	My friends understand my causes and ideas.	0.72*	-0.07	0.03	0.48
03.	I have no friends to share my ideas with, but I would like to have.	0.72*	0.08	0.03	0.60
15.	I can rely on the help from my friends	0.60*	0.01	-0.10	0.34
06.	I feel part of my family	-0.31	0.97*	0.09	0.83
11.	I feel close to my family	-0.02	0.94*	-0.02	0.85
13.	My family really cares about me	0.12	0.82*	-0.08	0.77
01.	I feel lonely when I'm with my family	-0.08	0.77*	0.12	0.57
10.	There is no one in my family that I can depend on for support and encouragement, but I wish I had	0.10	0.49*	-0.01	0.30
05.	I have a loving partner with whom I share my most intimate thoughts and feelings.	-0.03	0.01	0.95*	0.90
12.	I have a loving or marital partner who gives me the support and encouragement I need	0.01	0.01	0.95*	0.91
04.	I have a loving partner with whom I contribute to his/her happiness.	-0.33	0.02	0.92*	0.85
07.	I Have an unmet need for a loving relationship	0.05	-0.03	0.70*	0.50
02.	I would like to have a more satisfying loving relationship	0.06	0.07	0.64*	0.46
Number of items		05	05	05	
Eigenvalue		5.58	3.34	1.63	
% of the variance explained %		37.22	22.29	10.87	
Cronbach's $\alpha$		0.83	0.88	0.92	
McDonald's $\Omega$		0.87	0.91	0.95	

Note: F1 = Social; F2 = Family; F3 = Romantic; \* a factorial load considered satisfactory, i.e.,  $> |0.30|$ . h<sup>2</sup> = commonality.  $\alpha$  = Cronbach's alpha based on polycoric correlations.  $\Omega$  = omega.

According to Table 1, the factors were distributed and named as follows: factor I (Social Loneliness) composed of five items, with factorial loads from 0.60 (Item 15) to 0.80 (Item 09), Cronbach's alpha ( $\alpha$ ) = 0.83 and McDonald's omega ( $\omega$ t), = 0.87; Factor II (Family Loneliness) gathered five items, with loads ranging from 0.49 (Item 10) to 0.97 (Item 06),  $\alpha$  = 0.86 and  $\omega$ t = 0.89; and factor III (Romantic Loneliness), which grouped five items, with the factorial saturation ranging from 0.64 (Items 02) to 0.95 (Item 12), ( $\alpha$ ) from 0.92 and the  $\omega$ t of 0.95.

In a nutshell, the results presented in Table 1 showed satisfactory evidence about

the validity of the SELSA, presenting a three-factor structure, as theorized, bringing together 15 items, which were equitably grouped in each factor. Subsequently, in order to gather complementary evidence regarding the factorial structure of the aforementioned instrument, it is necessary to rely on more robust statistical techniques, such as the Confirmatory Factor Analysis (CFA), considering the ordinal measure Weighted Least Squares Mean and Variance -Adjusted (WLSMV; Muthén & Muthén, 2014). Thus, Study 2 was performed as described below.

## Study 02- Proof of the SELSA Factorial Structure

### Method

#### *Participants*

This study included a sample of 200 university students from a northeastern Brazilian capital, distributed equally between men and women, between 18 and 56 years-old ( $M = 25.35$ ;  $SD = 6.80$ ), with face-to-face and online recruitment, by convenience. Most of them were single (43.5%) and Catholic (47%).

#### *Instruments*

The participants responded to a booklet containing the same instruments described in Study 1, but with the adapted and validated version of the Social and Emotional Loneliness Scale for Adults (SELSA; DiTomasso et al., 2004).

#### *Procedure*

The procedures performed in the present study were similar to those of Study 1, including the guidelines provided for in Resolution 466/12 and 510/16 of the National Health Council. The study was approved by the Ethics Committee of Research on Human Beings of the Health Sciences Center of the UFPB (CAAE: 73301717.0.0000.518 and Protocol No. 2.309.859).

#### *Data analysis*

For the accomplishment of Study 2, the R software was used, in which the Lavaan package (Rosseel, 2012) was run, which allowed the researchers to perform the categorical (ordinal) confirmatory factor analysis (CFA) Weighted Least Squares Mean and Variance-Adjusted (WLSMV; Muthén & Muthén, 2014).

To verify the adequacy of the model, the following indicators were used: (1)  $\chi^2 / g.l.$  (the ratio between the  $\chi^2$  and the degrees of freedom) in an attempt to make  $\chi^2$  less dependent on the sample size; In this case, the adjustment can be considered perfect ( $1 < \chi^2 / g.l. < 3$ ), acceptable ( $3 < \chi^2 / g.l. < 5$ ) and unacceptable ( $\chi^2 / g.l. > 5$ ); (2) Comparative Fit Index (CFI) is a comparative index whose values, when above 0.90, indicate an adjusted model; (3) Tucker-Lewis Index (TLI), a measure of parsimony between the indices of the proposed model and the null, ranging from 0 to 1, being acceptable  $> 0.90$ ; (4) Root-Mean-Square Error of Approximation (RMSEA) and its 90% confidence interval (CI90%), with values between 0.05 and 0.08 being acceptable, but with values up to 0.10 still being valid; and (5) Root Mean Square Residual (RMSR), square root error matrix divided by the degree of freedom, which indicates a suitable model with values  $< 0.08$ . Finally, with the routine included in the PSYCH package, the internal consistency was calculated by Cronbach's alpha coefficient based on polycoric correlations and McDonald's omega ( $\omega$ ) (Byrne, 2010; Marôco, 2014; Tabachnick & Fidell, 2013).

### Results

In the present study, a Confirmatory Factor Analysis (CFA) was performed, adopting the Weighted Least Squares Mean and Variance - Adjusted (WLSMV) estimation method, aiming to evaluate the adjustment quality of the SELSA three-factor structure, observed in Study 1. After the analysis, it was found that the three-factor model presented adjustment indices considered as adequate:  $\chi^2 / g.l. = 1.85$ ,  $CFI = 0.98$ ,  $TLI = 0.98$ ,  $RMSEA (IC90\%) = 0.07 (0.05-0.08)$ ,  $P_{close} = 0.06$  and  $RMSR = 0.06$ .

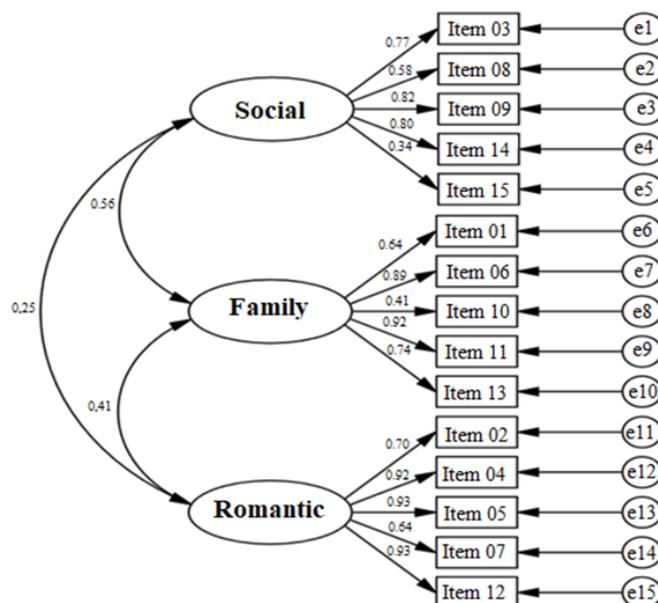


Figure 1.

Factorial structure of the Social and Emotional Loneliness Scale for Adults.

As shown in Figure 1, specifically in the Social Loneliness factor, the factorial loads ranged from 0.34 (Item 15) to 0.82 (Item 09), Cronbach's alpha ( $\alpha$ ) = 0.77 and McDonald's omega ( $\omega$ ) = 0.83; in Family Loneliness, the factorial weights ranged from 0.41 (Item 10) to 0.92 (Item 11),  $\alpha$  = 0.86 and  $\omega$  = 0.89; In the Romantic Loneliness factor, the factorial saturation ranged from 0.64 (Item 07) to 0.93 (Item 05 and 12), with  $\alpha$  = 0.90 and  $\omega$  = 0.94.

In short, it can be seen that the results endorse complementary evidence of construct validity and internal consistency of the Social and Emotional Loneliness Scale for Adults in the northeast region of Brazil, corroborating the three-factor structure observed in Study 1.

## Discussion

The present study aimed to adapt the Social and Emotional Loneliness Scale for Adults (SELSA) to the northeast region of Brazil, checking its psychometric adequacy. To achieve the objectives, two studies were conducted (exploratory and confirmatory). In this sense, it is considered that the objectives have been achieved, because the SELSA psychometric evidences made it possible to verify their suitability for the considered context.

Regarding the main findings of this research, specifically in Study 1, through an exploratory factor analysis, evidence of factorial validity and accuracy was gathered, and a three-factor structure was found, as theoretically proposed and similar to the original study (DiTomasso & Spinner, 1993). In the Brazilian version, the instrument also had 15 items, evenly distributed among the three factors of loneliness (Social, Family and Romantic). Internal consistency (accuracy) was verified by two indices: Cronbach's alpha and McDonald's omega. This, in turn, when compared to Cronbach's alpha, has shown more robustness (Dunn, Baguley, & Brunson, 2014; McDonald, 1999).

Taking the findings from Study 1, it was sought to gather complementary psychometric evidence regarding the SELSA through confirmatory factor analysis (AFC; Byrne 2010), considering the categorical (ordinal) measure and the Weighted Least Squares Mean and Variance-Adjusted estimator (WLSMV; Muthén & Muthén, 2014). Considering this, satisfactory adjustment indices were observed considering the structure indicated in Study 1, indicating that the model fits the empirical data (e.g., CFI and TLI > 0.95 and RMSEA < 0.08; Byrne, 2010; Marôco, 2014).

Moreover, reliability was assessed by Cronbach's alpha (polychoric matrix) and McDonald's omega indicators, which presented values between 0.77 and 0.93, respectively, considered meritorious (Cohen, Swerdlik, & Sturman, 2014; Nunnally, 1978; Zinbarg, Revelle, Yovel, & Li, 2005). These results corroborate the three-factor structure, endorsed by studies performed in other countries, such as Poland, Turkey and Iran (Adamczyk & DiTommaso, 2014; Cecen, 2007; Jowkar, 2012).

However, despite the results assuring the metric quality of the instrument, it is necessary to point out the potential limitations of this research, as well as indicating future possibilities, aiming to overcome such limits and to enable advances in the study of loneliness, especially in the Brazilian scenario. Thus, regarding the limitations, it should be noted that the sample, although people from different age groups were recruited, was mostly composed by young volunteers, perhaps due to easy access to social networks, since the instruments were applied both face-to-face and online. Another issue that deserves attention refers to the residents being only from a capital of northeast region of Brazil, a fact that makes it impossible to extrapolate the findings beyond the sample considered. However, it is noteworthy that the present research did not intend to generalize results, but to present a measure with good psychometric qualities for the Brazilian context.

Moreover, having an instrument that conceives loneliness from a multidimensional perspective enables a better understanding of loneliness in specific situations and contexts. For example, considering gender, it is evident that women show significant differences only in the emotional factor compared to men, which is possibly explained by the fact that men tend to keep their feelings under control when compared to women. On the other hand, women have a better quality in their social and intimate relationships, which are deeper and longer lasting in contrast to the relationships nourished by men (Samili & Bozorgpour, 2012). In addition, studies focusing on specific

situations can be planned, such as people who have experienced loss (e.g., divorce and death of close relatives; Chen, 2015), especially in the elderly individuals group, which has been shown to be more vulnerable, for they have loneliness levels ranging from moderate to severe. Specifically, it has been shown that widowhood, low self-esteem, and abandonment from family and friends are significant predictors of social and emotional loneliness (Dahlberg & McKee, 2014).

Thus, considering the above and taking into account the territorial amplitude of Brazil, and consequently the cultural diversity of the country, it is suggested that the SELSA is applied to samples from other Brazilian states to obtain comparative parameters and reach a standard for the Brazilian population. That said, it is estimated that future studies will reach more representative samples of the population, taking into account sociodemographic variables, particularly considering age, gender, and marital status, considering different age groups, such as the groups of adolescents, the elderly individuals and women, as they present higher vulnerability to loneliness. More specifically, previous studies have shown that age is an important variable in explaining loneliness, especially in elderly individuals (Dahlberg & McKee, 2014), with a higher prevalence in people over 65 years-old who experience moderate and severe levels of loneliness, especially in widowhood (De Jong-Gierveld et al., 2016).

In addition, evidence of construct validity needs to be complemented by more robust and sophisticated analyzes, such as factorial invariance (comparing different groups such as gender, cities or states) or even Item Response Theory (IRT), allowing for a refinement of the measure. It would be equally interesting to consider related constructs (antecedents and consequences) that help explain the phenomenon of loneliness in contemporary times, such as internet or smartphone addiction, as well as social anxiety, which has been related in other studies (Cotten, Anderson, & McCullough, 2013; Darcin et al., 2016; Tan, Pamuk, &

Dönder, 2013). In addition, it would be relevant to gather evidence of convergent-discriminant validity and criterion.

### Conclusions

In a nutshell, the results found in this research endorse evidence of the adequacy of the SELSA, specifically considering the northeastern context of Brazil. Strictly speaking, it is a measure composed of 15 items, distributed in three factors, with good psychometric qualities, that satisfy the criterion of parsimony. Given this, it is understood that this tool can be a useful alternative for researchers interested in the theme and its correlates, perhaps supporting proposals for interventions in groups that are proven to be experiencing different levels and types of loneliness.

From a practical point of view, providing a measure that assesses the multifaceted character of the construct can help identify specific characteristics of loneliness, assisting in a broader understanding of the phenomenon by considering its emotional and social aspects.

#### Authors' participation:

a) Conception and design of the work; b) Data acquisition; c) Analysis and interpretation of data; d) Writing of the manuscript; e) Critical review of the manuscript.

L.A.G.A. has contributed in a,b,c,d, e; P.N.F. in a,b,c,d,e; G.M.A.M. in a,b,c,d,e; C.L.C.G. in c,d,e; P.G.N.S. in c,d,e.

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