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ORIGINAL ARTICLE

Disconnection from social others: a RULS Loneliness Short Scale

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BACKGROUND
This study aimed to develop a brief, psychometrically sound scale for assessing loneliness.

PARTICIPANTS AND PROCEDURE
A total of 39 unidimensional models derived from the Revised UCLA Loneliness Scale (RULS) were evaluated. In the first study, robust fit indices and construct reliability (CR) were analysed for all the models via data from 329, 525, and 623 Argentine participants. A five-item model emerged with consistently good fit and high reliability. In the second study, the five-item instrument was administered to a new sample of 870 Argentine participants, and its associations with relevant psychological variables were analysed.

RESULTS
The five-item scale demonstrated a good robust fit (scaled $\chi^2(5) = 2.41$, ns; robust CFI = 1.000; robust SRMR = .004) and high reliability (CR = .893). Furthermore, the expected associations were confirmed, with inverse relationships found between the new scale and various dimensions of well-being and direct relationships with negative emotional states.

CONCLUSIONS
The new instrument, named *Desconexión de Otros Sociales de la RULS* (DOS-RULS), effectively captures the critical loneliness factor of lacking a supportive social network. It showed good model fit, high reliability, and meaningful associations with relevant psychological constructs, supporting its utility as a brief, robust measure of a crucial aspect of loneliness. In the context of the ongoing replication crisis, replication was achieved.

KEY WORDS
confirmatory factor analysis; loneliness; test construction

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BACKGROUND

Loneliness is distinct from social isolation. The former denotes the subjective and negative experience of feeling alone, and the latter indicates the objective state of being alone (de Jong Gierveld et al., 2006). Loneliness has been linked to both mental and physical health decline (Ho et al., 2023; Holt-Lunstad et al., 2015; Smith et al., 2023).

The relationships between loneliness and various psychological phenomena have been extensively studied. For example, loneliness can play a predictive role in the symptoms of anxiety or depression, with this symptomatology also being identified as a precursor of loneliness (Cacioppo et al., 2010; Luo, 2023; McDowell et al., 2021). Additionally, research has shown that loneliness is linked to problematic internet use (Balcerowska & Bereznowski, 2022). Conversely, findings suggest that resilience can act as a protective factor against loneliness in children who have experienced parental separation due to migration (Nguyen et al., 2023).

Theoretical models of the internal structure of loneliness differ. While some authors assumed that loneliness was composed of several dimensions, Russell (1996) proposed loneliness as a unidimensional construct primarily reflecting a single global factor (Kenny et al., 2023; Pollet et al., 2022). Russell et al. (1978) developed the University of California Los Angeles–Loneliness Scale (UCLA-LS) to measure loneliness. Later, a revised version of the UCLA-LS, named the Revised UCLA-LS (RULS; Russell et al., 1980), was developed. This scale consists of 10 items from the original UCLA-LS and 10 new positively worded items, differentiating it from its predecessor by including reverse scoring for the new items. The UCLA-LS instrument and its variations have been identified as the most widely used and recommended scales for assessing loneliness (Ip et al., 2024; Panayiotou et al., 2023).

However, the exploration of the factorial structure of the RULS yielded divergent results across different studies. Several factor analyses have revealed multidimensional outcomes, identifying up to five factors with varying compositions (e.g., Ausín et al., 2019; Austin, 1983; Hojat, 1982; Kwiatkowska et al., 2018; Newcomb & Bentler, 1986; Zakahi & Duran, 1982). These results did not support the idea that the RULS is a unidimensional measure for assessing loneliness in a general manner.

THE PRESENT STUDY

Brief scales are considered useful for several reasons: they reduce data collection costs, decrease response burden and participant frustration, and increase participation (Shi et al., 2022). The objective of this research was to identify a brief scale to assess loneliness on the basis of the RULS, which demonstrated good data fit and high reliability.

While the development of a brief loneliness scale based on the RULS could have followed different paths, such as conducting an inductive study to select a few items from responses to the full version of the measurement instrument, we chose to build on results obtained from previous studies. In this research, the strategy was to examine the fit and reliability of unidimensional models corresponding to scales and subscales based on the RULS. This approach preserves the content validity of the factor ultimately selected (Hair et al., 2019) and enables the replication of previous findings, even in the context of the ongoing replication crisis (Flake et al., 2022).

The procedure for developing a brief loneliness scale based on the RULS followed two studies. The first study involved conducting analyses of robust fit and construct reliability (CR) for each unidimensional model evaluated with data from different samples of Argentine participants. This step aimed to select a model with good fit and high reliability. In the second study, the measurement instrument corresponding to the model selected in the previous stage was examined in terms of its psychometric properties in a new sample, and its relationship with variables of interest was established.

STUDY 1: SELECTION OF THE MODEL

PROCEDURE

Various scales and subscales based on the RULS were analysed to assess the fit of the models and their reliability. Given that unidimensional models with 3 items are exactly identified and that their solutions cannot be evaluated via goodness-of-fit indices or refuted by the data (Brown, 2006; Goodboy & Kline, 2017), the analyses were conducted on models with at least 4 indicators. Table S1 (see Supplementary materials) shows the 39 scales and subscales considered in our study. Given this, and since the goal was to identify a brief scale, the results are reported only for unidimensional models with up to 10 items, which is half the total number of items from the original length of the RULS.

To determine the fit of the various models to the data, two criteria were considered: first, the chi-square (χ^2) statistic was not statistically significant, and second, the comparative fit index (CFI) exceeded 0.95, whereas the standardized root mean square residual (SRMR) was less than 0.08 (Hooper et al., 2008; Hu & Bentler, 1999; Steiger, 2007). Specifically, in this study, the root mean square error of approximation (RMSEA) is not considered a practical fit index for two reasons. First, it has been recommended to use

the SRMR over the RMSEA for evaluating models with ordinal variables (Shi et al., 2020), as the former provides better results across various model complexities and sample sizes than does the latter. Second, the RMSEA has been reported to incorrectly indicate worse fit in models with low degrees of freedom, suggesting that this index should not be calculated for such models (Kenny et al., 2015; Shi et al., 2022). For example, Panayiotou et al. (2023) did not consider RMSEA results for RULS loneliness models with fewer than twenty degrees of freedom. Consequently, in the context of this study, which aimed to select small models and included a comparative evaluation of models with ordinal measurement indicators and low or very low degrees of freedom, the RMSEA was not taken into account. Nevertheless, RMSEA values and their confidence intervals are presented for informational purposes.

With respect to convergent validity, the convergence of indicators with respect to the latent variable was assessed via the average variance extracted (AVE; Fornell & Larcker, 1981). It has been suggested that, as a rule of thumb, the AVE indicator, sometimes referred to as communality, should be at least 0.50 to be considered acceptable. The standardized factor loadings (regression weights) should preferably be ≥ 0.70, although they are considered acceptable if they are ≥ 0.50 (Hair et al., 2019). The individual loadings were reported for the model selected in Phase 1 to confirm its adequacy.

With respect to reliability, which can be considered another indicator of convergent validity, unidimensional scales composed of ordinal-level items were considered highly reliable when their construct reliability (CR) was greater than or equal to 0.80. Alpha reliabilities were also reported due to their widespread use and appropriateness for path analysis studies (Cheung et al., 2024; Hair et al., 2019, 2021; Kalkbrenner, 2023).

Finally, in this study, we followed the recommendation of Goodboy and Kline (2017), who suggested that, compared with slightly overidentified models (e.g., degrees of freedom = 1 or 2), as in unidimensional models with 4 indicators, selecting models with more degrees of freedom is preferable. Therefore, although we presented results for scales or subscales of the RULS composed of 4 items, our evaluation considered models comprising at least 5 indicators. Additionally, we preferred models with fewer items than those with more indicators.

PARTICIPANTS

Three samples of data were collected from Argentine volunteers via a nonprobabilistic sampling method. The first sample comprised 329 participants (58.7% female) with a mean age of 40.7 years (*SD* = 13.8, range 18-85), predominantly residing in the Metropolitan Area and the Province of Buenos Aires (89.9%). The second sample included 525 participants (53.1% female), with a mean age of 41.1 years (*SD* = 14.5, range 18-80), the majority of whom also resided in the aforementioned area of Argentina (90.0%). The final sample consisted of 623 participants (54.9% female), with a mean age of 38.7 years (*SD* = 14.2, range 18-87), who primarily resided in the previously mentioned area (93.2%).

Three distinct samples of volunteers were collected at different times. The sample consisted of 525 participants collected from December 2020 to February 2021; the sample consisted of 623 participants collected from March to May 2022; and the sample comprised 329 participants collected from January to February 2023. This approach facilitated the replication of findings across individuals, times, and social conditions, thereby enhancing the consistency and reproducibility of the results.

In particular, the use of diverse participant samples was undertaken to engender greater confidence in the conclusions, despite differences in mandatory quarantine intensity at that time. Notably, the quarantine in Argentina due to the coronavirus pandemic of 2020 began in March 2020, with restrictions being eased in November 2020, and ended in August 2022. Consequently, the participants in the first two samples experienced varying degrees of mandatory quarantine intensity, whereas those in the last sample were not subject to mandatory isolation or social distancing restrictions.

All the participants were recruited from a university in Argentina that received academic credit for this activity. The students selected participants who were adults of all ages and genders, aiming to generate heterogeneous samples. The participants were provided with a link to the SurveyMonkey platform from which they completed the survey. The data were subsequently downloaded and analysed.

MEASURE

This study used the Spanish adaptation of the RULS scale, as presented by Vázquez Morejón and Jiménez García-Bóveda (1994). We implemented minimal modifications to the wording. For instance, in item 19, we replaced the term *charlar* with *hablar* (e.g., Borges del Rosal et al., 2008). The items used a scale ranging from 1 to 4, corresponding to the labels *frequently*, *sometimes*, *rarely*, and *never*, respectively.

RESULTS

For data analysis, the R package (version 4.3.3) lavaan (Rosseel, 2012) was used to calculate the fit of each

model to the data, and semTools (Jorgensen et al., 2022) was used to compute the reliability of each set of items. The results of the analyses are presented in Table S2 (see Supplementary materials). Model 10 was selected on the basis of the preestablished criteria. The individual factor loadings for the selected model were above 0.70 in all three samples. The factor loadings for items 10, 15, 16, 19, and 20 of the RULS were 0.719, 0.715, 0.730, 0.932, and 0.959 for the sample of 329 individuals; 0.835, 0.827, 0.847, 0.872, and 0.924 for the sample of 525 participants; and 0.742, 0.837, 0.771, 0.879, and 0.890 for the sample of 623 volunteers.

DISCUSSION

The items from Model 10 were selected to achieve the best results on the basis of the preestablished criteria for this study. These items correspond to Factor 2 from Austin (1983), Factor 2 from Neto (1992), and Factor 2 from the full version of Hawkley et al. (2005). Both Austin and Hawkley et al. reported correlations between factors: in their studies, Factor 2 was found to correlate with other factors in each study within a range of |.55| to |.82|, considering samples of young adults and older adults.

STUDY 2: VALIDITY STUDIES

Research suggests that loneliness, according to Russell's model, is a predictor of, or associated with, depression, anxiety, and stress, as indicated by the Lovibond and Lovibond model (Ali et al., 2022; Besharart et al., 2020; Panicker & Sachdev, 2014; Velotti et al., 2021). Additionally, studies have shown that loneliness, as measured by the UCLA or other variants, is linked to the emotional, social, and psychological wellbeing dimensions of the Keyes model (Klinkosz et al., 2023; Mascaro et al., 2022; Nahar et al., 2025). Consequently, the associations of social disconnection, an important characteristic of loneliness, with variables such as depression, anxiety, and stress, which are expected to have positive associations, were examined. Conversely, negative associations are anticipated with emotional, social, and psychological well-being. Additionally, a unifactorial model with five indicators was studied for confirmatory factor analysis.

PARTICIPANTS

Data were obtained nonprobabilistically from Argentine volunteers. The sample consisted of 870 participants (54.4% female) with a mean age of 35.4 years (*SD* = 12.3, range 18-81), predominantly residing in the Metropolitan Area and Province of Buenos Aires (87.9%). The samples were collected between August and November 2023. The procedures for participant contact and data collection were identical to those employed in Study 1.

MEASURES

Loneliness. The Desconexión de Otros Sociales de la RULS (DOS-RULS; Disconnection from Others Scale of the RULS) includes five items (numbers 10, 15, 16, 19, and 20) from the Spanish adaptation of the RULS by Vázquez Morejón and Jiménez García-Bóveda (1994). The DOS-RULS items are responded to on a Likert scale ranging from 1 (*frequently*) to 4 (*never*; see Appendices A and B in the Supplementary materials). The scores are summed across the five items to obtain a total score. The range of scores is from 5 to 20, with higher scores indicating a greater degree of loneliness as disconnection from social others.

Depression, anxiety, and stress. The Depression Anxiety Stress Scale (DASS) developed by Lovibond and Lovibond (1993) includes a full 42-item version and a 21-item abbreviated version (DASS-21). This research employed the DASS-21 version adapted for Argentina by Lupano Perugini and Castro Solano (2023), which is a Chilean version (Antúnez & Vinet, 2012). This scale assesses negative emotional symptoms of depression, anxiety, and stress (Lovibond & Lovibond, 1995). The items are responded to on a Likert scale reflecting perceived symptomatology over the past week, with four response options ranging from 0 (*not at all*) to 3 (*very much or almost always*). Higher scores on each scale indicate greater levels of negative emotional symptoms. The reliability results for these scales indicated McDonald's hierarchical omega coefficients (with Cronbach's alpha in parentheses) of 0.90 (0.88), 0.87 (0.84), and 0.94 (0.91) for the stress, anxiety, and depression factors, respectively.

Well-being. The Mental Health Continuum-Short Form (MHC-SF; Keyes, 2005) assesses three types of well-being from hedonic and eudaimonic traditions: emotional, psychological, and social well-being (Lamers et al., 2012). This instrument consists of 14 items evaluating how individuals have felt over the past month, with responses on a Likert scale ranging from 0 (*never*) to 5 (*every day*). The MHC-SF adaptation used in this study is psychometrically reliable and valid (Lupano Perugini et al., 2017). Higher scores on each subscale indicate higher levels of well-being. The internal consistency for categorical items in this sample yielded McDonald's hierarchical omega coefficients (with Cronbach's alpha in parentheses) of 0.83 (0.83), 0.85 (0.75), and 0.85 (0.84) for emotional, social, and psychological well-being factors, respectively.

RESULTS

The analysis revealed that the instrument demonstrated good psychometric properties in terms of both robust fit (χ^2 scaled(5) = 2.41, *ns*; robust CFI = 1.000; robust SRMR = .004) and reliability (CR = α = .89). The observed associations between social disconnection and relevant variables corroborated the hypothesized directions of the relationship. All correlations attained statistical significance at the $p < .001$ level. Social disconnection was positively correlated with adverse psychological states, namely, depression ($r = .28$), anxiety ($r = .22$), and stress ($r = .22$). Conversely, social disconnection was negatively correlated with various dimensions of well-being. The most pronounced negative association was observed with emotional well-being ($r = -.31$), followed by psychological well-being ($r = -.29$) and social well-being ($r = -.22$).

DISCUSSION

This study demonstrated that the DOS-RULS scale, as a unifactorial replication of the subscale found in other studies using the RULS instrument, is structurally robust and highly reliable. Additionally, the relationships with relevant variables successfully replicated the direction of the associations, confirming their external validity. Therefore, as the original item content of the factor has been preserved, the DOS-RULS scale presents all three components of construct validity: substantive, structural, and external (Clark & Watson, 2019).

GENERAL DISCUSSION

This study successfully developed a new scale that represents a central aspect of loneliness: disconnection from social others. The DOS-RULS scale is both brief and robust in terms of structure and reliability. It corresponds to the same factor, both in its identifying number and in the composition of its indicators, as identified in the research by Austin (1983), Neto (1992), and Hawkley et al. (2005). These findings can be supplemented by the identification of Factor 2 by McWhirter (1990), who also refers to it as *Social Others*, in line with Austin's research, and which consists of the same indicators found by Hawkley et al. for their brief scale.

The study of associations confirms that the more individuals are disconnected from social others (i.e., the fewer supportive social contacts they have), the lower is their level of emotional, social, and psychological well-being. Conversely, higher levels of negative emotional states, such as symptoms of depression, anxiety, and stress, are associated with a greater degree of disconnection from social others.

FUTURE RESEARCH

Future research will study the psychometric properties of the DOS-RULS in other populations, such as military or clinical groups. Additionally, it may be of interest for future studies to confirm the Factor 1 solution by Neto with 6 indicators, either as a unifactorial scale or in combination with Factor 2 (i.e., DOS-RULS).

CONCLUSIONS

The DOS-RULS scale assesses the level of disconnection with one's social network, which represents a key aspect of loneliness. This brief and structurally robust scale aligns with findings from previous research, confirming its validity in capturing this construct, and achieves replication in the context of the current replication crisis.

Supplementary materials are available on the journal's website.

Disclosures

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