

A Revised 6-Item Rasch-Type Loneliness Scale (R-RTLS-6)

Participant-visible method context. Results, discussion, captions, and the target figure are excluded.

Participants and Procedure The cross-sectional data used in our analysis were collected within the Petrarca Project, funded by the Swiss National Science Foundation, which focuses on the development and maintenance of loneliness. Participants were recruited through recruiting platforms (e.g., SurveyCircle), social media, and internet forums (e.g., www.psychic.de). The sample included individuals from the general population who were at least 18 years old and could read and understand German. Initially, a total of 324 individuals who passed two attention checks were considered for analysis. However, 37 participants (11.4%) did not complete the entire survey. Consequently, the final sample comprised $N = 287$ individuals. The ethics committee of the Faculty of Human Sciences of the University of Bern approved this study. Data collection was carried out from May 2021 to June 2022.

Measure Revised Rasch-Type Loneliness Scale (R-RTLS-6) A revised 6-item version of the German RTLS-6 (Table E1 in the online material on OSF) was used (Huxhold et al., 2019). Participants responded on a 4-point Likert-type scale (1 = does not apply at all to 4 = fully applies). The correlation between the two subscales was moderate ($r = .59$, $p < .001$). Internal consistency of the full scale was high with $\alpha = .90$ and lower for the subscales of emotional ($\alpha_{\text{emo}} = .79$) and social loneliness ($\alpha_{\text{soc}} = .88$).

Data Analysis We employed the PCM to assess the scale's functioning using conditional maximum likelihood estimation (Mair & Hatzinger, 2007). Before fitting the PCM, we tested two crucial assumptions, that is, the unidimensionality of the scale and local stochastic independence. The scale's dimensionality was assessed through three competitive confirmatory factor analyses (CFA): (1) a unidimensional model (global loneliness), (2) a 2-factor model with the facets of emotional and social loneliness, and finally (3) a bifactor model comprising a general factor (global loneliness) along with the specific subscales of emotional and social loneliness. Mardia's test for multivariate normality revealed significant results for both skewness ($p < .001$) and kurtosis ($p < .001$); therefore, all analyses were conducted using maximum likelihood estimation with robust standard errors and a Satorra-Bentler scaled statistic (MLR) suitable for nonnormal data (Savalei & Rosseel, 2022). Model fit was

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evaluated based on the Satorra-Bentler scaled χ^2 -test (Satorra & Bentler, 1994), Robust Comparative Fit Index (CFI $> .90$), Robust Tucker Lewis Index (TLI $> .90$), the Scaled Root Mean Square Error of Approximation (RMSEA $< .08$), and the Scaled Standardized Root Mean Square Residual (SRMR $< .08$) (Hu & Bentler, 1999). To examine local stochastic independence, pairwise inter-item correlations of the PCM residuals per subscale were evaluated. Any item residual correlation should not exceed $> .20$ above the average item residual correlation (Christensen et al., 2017). We investigated item-specific threshold disordering by reviewing the category characteristic curves (CCC) in an extended person-item map (Plccc; Kabic & Alexandrowicz, 2023). We calculated infit and outfit mean-square statistics to identify unexpected responses and to evaluate the fit between items and the PCM. The acceptable fit ranges between 0.5 and 1.5 (Linacre, 2002). Finally, differential item functioning (DIF) was conducted based on several split criteria (e.g., gender, education, job status, age group) using Rao Score Tests (Rao, 1948). All analyses were performed in R (R Core Team, 2022). The electronic supplemental material, along with the data and R script, can be accessed at <https://osf.io/8bnqe/>.