ORIGINAL ARTICLE

Adaptation, confirmatory factor analysis, and psychometric properties of the Brazilian version of the Repetitive Eating Questionnaire

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Abstract

Objective: The Repetitive Eating Questionnaire (Rep(eat)-Q) is a brief self-report measure developed to assess grazing behavior—an understudied problematic eating behavior associated with eating disorder psychopathology and poor weight management. This study aimed to adapt and test the psychometric properties and factor structure of the Rep(eat)-Q in a Brazilian community sample.

Method: We used the International Test Commission guidelines for the adaptation of psychological measures between cultures. Participants were recruited from the community and on a university campus and completed a set of questionnaires including the Rep(eat)-Q, psychological measures, and sociodemographic data.

Results: A total of 718 (86.4% female) completed the Rep(eat)-Q and were eligible for the confirmatory factor analysis (CFA). Only 542 completed the entire survey (Rep(eat)-Q and other psychological measures) and were eligible for the analysis of the validity evidence based on the relations to other variables. CFA revealed support for a two first-order model as originally proposed, however, a hierarchical (i.e., second-order) model is proposed. We found support for second-order scalar invariance across sex. Both first- and second-order internal consistency estimates presented very good evidence. Analysis ($n = 542$) revealed moderate to strong correlations (≥.58 to .77) between grazing (total score and subscales) and binge eating and other psychological measures, presenting good convergent evidence.

Discussion: This study reports good psychometric properties of the Rep(eat)-Q for the Brazilian community sample.

Public Significance: Grazing is a problematic eating behavior and the Rep(eat)-Q is one of the measures to assess grazing. The article aimed to adapt and test the psychometric properties of the Rep(eat)-Q in a Brazilian community sample. The results support a two-factor structure and suggest that the Rep(eat)-Q possesses good psychometric properties to be used with the Brazilian populations.

1 | INTRODUCTION

Grazing has been considered a problematic eating behavior that is characterized by the ingestion of small/modest amounts of food in a repetitive and unplanned way, not in response to hunger/satiety sensations (Conceição et al., 2014). Two subtypes of grazing have been proposed (Conceição et al., 2014): (i) compulsive grazing (CG), associated with feelings of not being able to resist the temptation to eat; and (ii) noncompulsive grazing (NCG), in which the person eats repetitively in a distracting/mindless way. Recent literature shows evidence for the two subtypes of grazing (Conceição et al., 2018; Heriseanu et al., 2019; Spirou et al., 2023; Teodoro et al., 2021), and there is increasing evidence to consider grazing in the spectrum of disordered eating (Teodoro et al., 2021). Particularly, the CG subtype, compared to NCG, seems to hold stronger correlations with general and eating disorder psychopathology (Conceição et al., 2018; Heriseanu et al., 2019; Spirou et al., 2023), probably due to the association with high degree of loss of control eating (Teodoro et al., 2021).

Overall, grazing has received increased attention for its association with food addiction (Bonder et al., 2018), disordered eating psychopathology, binge eating (Conceição et al., 2014; Conceição, Mitchell, et al., 2017; Lane & Szabó, 2013), decreased quality of life, increased Body Mass Index (BMI) (Heriseanu et al., 2019; Spirou et al., 2023), and worse weight loss after bariatric surgery (Pizato et al., 2017). Studies showed that grazing or grazing-like behaviors are frequently reported among candidates for bariatric surgery (33%) (Goodpaster et al., 2016), in samples with eating disorders (41.6%) (Kass et al., 2015), in the elderly (16.27%) (Conceição, Gomes, et al., 2017), and among university students and general community (66.5%) (Heriseanu et al., 2019). Unfortunately, research on the construct of grazing and its assessment is still in its infancy and the literature is still inconclusive on whether grazing is associated with age, sex, or weight (Teodoro et al., 2021). Furthermore, the literature has been hindered by the variety of definitions and assessment measures used (Teodoro et al., 2021).

One of the measures proposed to assess grazing is the Rep(eat)-Q. The Rep(eat)-Q was developed in European Portuguese and is based on the definition of grazing proposed by Conceição et al. (2014) as a result of the combined opinion of a group of experts, supporting its content validity. In its original form, it is a 12-item self-report questionnaire answered on a 6-point Likert scale. Respondents' answers relate to the frequency of grazing-like behaviors in the past 28 days. It generates two subscales: (1) repetitive eating—including items that assess the repetitive nature of both CG and NCG; and (2) CG—including items that assess the compulsive nature of CG.

The Rep(eat)-Q (Conceição, Mitchell, et al., 2017) has been adapted for different populations and countries, and has been used across the age and body weight spectrums (Bonder et al., 2018; Conceição et al., 2018; Conceição et al., 2023;Conceição, Mitchell, et al., 2017; Reas et al., 2019). Previous studies carried out in different countries support the proposed two-factor structure of the Rep(eat)-Q (Conceição, Mitchell, et al., 2017; Reas et al., 2019) without deviations from the original measure. Given the amount of evidence for its use across different cultures and populations, the Rep(eat)-Q is currently the grazing measure with the strongest psychometric support in the literature (Conceição et al., 2023).

Overall, research suggests that grazing is a clinically relevant problematic eating behavior due to its association with increased psychopathology and weight gain (Teodoro et al., 2021), warranting further research to better understand its precursors and the impact of this behavior in our society. In Brazil, recent data indicate that 55.7% of Brazilians are overweight and 19.8% are obese (VIGITEL, 2019). The high health and economic impact of eating and weight disorders in Brazil highlights the need to further investigate modifiable behaviors, such as grazing, that could be the target of obesity-related interventions. Recent research suggests that grazing is prevalent in Brazil with rates similar to those of high-income countries (10.2% for CG of and 29.8% for NCG; Spirou et al., 2023). However, the study of grazing in the Brazilian population is still scarce and there is no measure adapted to Brazilian Portuguese to assess this behavior. Despite the original version of the Rep(eat)-Q being developed in European Portuguese, the grammar and the choice of words are frequently different in the two countries. Hence, an adaptation of the language is needed to assure a correct use and understanding of the measure in Brazil. This article aims to adapt the original measure to Brazilian Portuguese, validate the Rep(eat)-Q for a Brazilian sample, and expand the understanding of grazing in Brazil, presenting a characterization of grazing across different sociodemographic and clinical variables.

2 | METHODS

2.1 | Adaptation of the Rep(eat)-Q for Brazilian culture

The procedures followed all the steps recommended by the second edition of the International Test Commission Guidelines for Translating and Adapting Tests (International Test Commission, 2018). A detailed description of the adaptation protocol can be found in Appendix S1. Overall, the main adaptations focused on replacing terms, changing to the gerund tense, and changing the term referring to Grazing in the instrument title ("Rep(eat)-Q—*Questionário de Belisco Contínuo*"). These adaptations were based on Brazilian culture's most common terms and verb tenses.

The final version of the questionnaire is available as Appendix S2. Study data and materials can be accessed by request to the first or corresponding author.

2.2 | Procedure and participants

The Research Ethics Committee of the university involved approved the study protocol. A convenience sample was used. Participants were recruited online via the institutional mailing list of the university involved, or via a post on the social media account of the Brazilian authors and the university involved. The advertisement invited volunteers to participate in a study that investigated eating behaviors in the Brazilian population and included a RedCap® link to respond to the online set of questionnaires. No compensation for participation was offered. All participants signed an online informed consent form. Inclusion/exclusion criteria were age ≥ 18 years and understanding written Brazilian Portuguese. Data collection was conducted from February to August 2021, during the second year of the pandemic. In Brazil, the first half of 2021 was marked by an increase in the number of deaths due to COVID-19, strict lockdown measures in most states, as well as home office and remote classes in schools and universities.

In total, there were 1050 accesses to the provided link, 83 were excluded for not meeting the inclusion criteria and 248 were excluded for not completing the Rep(eat)-Q, resulting in 718 participants eligible for the Confirmatory Factor Analysis (CFA). Only 542 responded to the entire survey and were eligible for the convergent and construct validity analysis—validity evidence based on the relations to other variables. Participants who only responded to the Rep(eat)-Q did not differ from those who responded to the entire set of questionnaires in the Rep(eat)-Q scores ($t_{(717)} = 1.51$, $p = .13$, Cohen's $d = .11$), age ($t_{(717)} = -1.04$, $p = .29$; Cohen's $d = .08$), sex ($\chi^2_{(1)} = .19, p < .21$), BMI ($t_{(717)} = -.36, p = .72$; Cohen's $d = .03$).

2.3 | Measures

Sociodemographic and anthropometric questionnaire—Self-reported questionnaire developed by the authors for the present study. Included self-report sociodemographic and anthropometric items. The World Health Organization (WHO) cutoff values were used to divide participants according to BMI categories (WHO, 2010).

Rep(eat)-Q (Conceição, Mitchell, et al., 2017)—12-item self-report questionnaire to capture features of grazing (CG and repetitive eating). Respondents rated the behavior's frequency using a 6-point Likert scale ranging from 0 (never) to 6 (every day) based on the previous 28 days. Mean scores are computed for each 6-item subscale, that is, CG and repetitive eating, and higher scores indicate more frequent grazing. This version resulted from the adaptation carried out in Study 1 (available in Appendix S1).

Depression anxiety stress scales—DASS-21 (Lovibond & Lovibond, 1995)—21 items self-report questionnaire divided into three 7-item subscales—anxiety, stress, and depression. Items were answered based on the last week and measured throughout a 4-point Likert scale ranging from 0 ("nothing applied to me") to 6 ("applied to me most of the time"). The scores for each subscale are the sum of the subscale items and higher scores indicate more psychological distress. Vignola and Tucci (2014) adapted this instrument for the

Brazilian population. The following cutoff points for the subscales proposed by the authors were used: normal <.5; mild: .5–1.0; moderate 1.0–2.0; severe 2.0–3.0; extremely severe >3.0 (Lovibond & Lovibond, 1995). McDonald's ω was .91 for depression, .90 for stress, and .86 for anxiety scales indicating a good internal consistency for each subscale for our sample.

Binge Eating Scale—BES (Gormally et al., 1982)—16-item self-report questionnaire to assess binge-eating severity and related behaviors. Items are rated on a 4-point Likert scale from 0 to 3 and summed for a total score which is interpreted following the classification: absence of binge eating (scores ≤ 17), moderate binge eating (score between 18 and 26); and severe binge eating (scores ≥ 27). This questionnaire was adapted for Brazil by Freitas et al. (2001). McDonald's ω was .91 for the sample of this study.

2.4 | Data analysis

The R programming language (R Core Team, 2022) via the graphical user interface, RStudio (RStudio Team, 2022) was used to perform statistical analysis. The descriptive statistics were obtained through the skimr package (McNamara et al., 2021), the mode was estimated using the DescTools package (Signorell et al., 2022), the standard error of the mean (SEM) was calculated via the plotrix package (Lemon, 2006), the coefficient of variation (CV) was obtained using the sjstats package (Lüdecke, 2021). The kurtosis (ku) was obtained through the "sample excess" method (i.e., sample kurtosis of the distribution with a value of 3 being subtracted) while the skewness (sk) was calculated using the "sample" method (i.e., sample skewness of the distribution) both were obtained using the PerformanceAnalytics package (Peterson & Carl, 2020). Severe univariate normality violations were considered for absolute values of skewness $|sk| > 3$ and kurtosis $|ku| > 7$ (Finney & DiStefano, 2013; Marôco, 2021).

CFAs were performed to verify the dimensionality of the Rep(eat)-Q. CFAs were conducted using the Weighted Least Squares Means and Variances estimation method (Muthén, 1983) via the lavaan package (Rosseel, 2012). The NFI (Normed Fit Index), TLI (Tucker Lewis Index), CFI (Comparative Fit Index), the RMSEA (Root Mean Square Error of Approximation), χ^2 (chi-square statistic), and the SRMR (Standardized Root Mean Square Residual) were used as goodness-of-fit indices. Values of NFI, TLI, and CFI > .95, SRMR and RMSEA < .08, were considered as indicators of a good fit of the data to the model (Boomsma, 2000; Byrne, 2010; Hoyle, 1995; McDonald & Ho, 2002). The robust versions of the goodness-of-fit indices were used whenever possible (Savalei, 2020). Model modifications were considered based on the analysis of the modification indices (>11; $p < .001$) if supported by the theory (Kline, 2016).

The average variance extracted (AVE; Fornell & Larcker, 1981) was computed as an indication of convergent evidence in terms of internal structure (i.e., the average amount of variation in the items explained by the latent variable). Values of AVE ≥ .5 were considered indicative of acceptable convergent evidence in terms of internal structure (Hair et al., 2019; Marôco, 2021). The discriminant evidence

(in terms of internal structure) was checked (Fornell & Larcker, 1981) to verify whether the manifest variables of each latent factor were strongly correlated with other latent factors. Discriminant evidence for two latent factors x and y was assumed if AVE_x and $AVE_y \geq \rho^2_{xy}$ (squared correlation between the factors x and y).

To benefit from the size of the sample collected, a cross-validation approach was adopted (Chin & Todd, 1995).

Two independent and similar subgroups were created ($n_i = 359$), one of them was used as a calibration subsample, and the second one was used as a validation subsample (Chin & Todd, 1995). The data were split using the *minDiff* package (Papenberg, 2018), and the participant's age and BMI were used as criteria variables, intended to match the two subsamples for these variables. The subgroups were generated using 1000 repetitions to minimalize dissimilarities between them. The less different group assignment was selected. The calibration sample was used to test if the originally proposed structure of the Rep(eat)-Q holds to the data, or if any modification is proposed. While the validation sample was used to verify if the proposed model by the calibration sample holds in the validation one. This approach allows for more robust evidence of the Rep(eat)-Q dimensionality.

The reliability of the scores was evaluated using the internal consistency estimators $\alpha_{ordinal}$ (Oliden & Zumbo, 2008) and $\omega_{ordinal}$ (Raykov, 2001) for the first-order factors. And the $\omega_{partial\ L1}$ (the proportion of observed variance explained by the second-order factor after controlling for the uniqueness of the first-order factor), ω_{L2} (the proportion of the variance of the first-order factors explained by the second-order factor), and ω_{L1} (the proportion of the second-order factor explaining the total score). The internal consistency estimates were obtained via the *semTools* package (Jorgensen et al., 2021). Estimates $\geq .80$ were considered indicative of satisfactory in terms of internal consistency evidence.

The measurement invariance among sex was analyzed via the *lavaan* package (Rosseel, 2012). Considering the small sample of males, the maximum likelihood estimation with robust (Huber–White) standard errors (MLR) was used. As such, several nested models were compared as proposed by Chen et al. (2005): (1) configural invariance, (2) first-order factor loadings, (3) structural weights, (4) intercepts of the indicators, and (5) intercepts of the first-order factors. The Rep(eat)-Q second-order latent means were compared across sex, and Cohen's d was used as effect size (Cohen, 1988). The nested models were compared through two criteria. A value of $\Delta CFI \leq -.010$ indicates that the null hypothesis of invariance should not be rejected. The $\Delta\chi^2$ criterion (Satorra & Bentler, 2001), rejects the null hypothesis of invariance if a significant χ^2 robust difference test is obtained.

The score percentiles, raw means, and standard deviations were obtained via the *doBy* package (Højsgaard & Halekoh, 2018). A Welsh *t*-test (Delacre et al., 2017) was conducted to compare the raw mean scores of Rep(eat)-Q using the *stats* package (R Core Team, 2022). The Hedge's g with a confidence interval was used as an effect size measure (Hedges, 1981) via the *effect size* package (Ben-Shachar et al., 2020).

Spearman's rank coefficient was used to test correlations between the Rep(eat)-Q (sub)scale(s), sociodemographic variables,

other psychological variables, and BMI (convergent evidence). Effect sizes to analyze these correlations were interpreted according to Cohen's (1988) criteria of $.1 = $ small effect, $.3 = $ medium effect, and $.5 = $ large effect. A significance level of 5% was used ($\alpha = .05$) for all statistical analyses.

3 | RESULTS

3.1 | Characterization of the sample

Participants that responded to the Rep(eat)-Q ($n = 718$) were aged between 18 and 71 ($M = 36.8$; $SD = 11.92$); 86.4% were female sex ($n = 620$), 13.5% were male sex ($n = 98$) and .1% ($n = 1$) preferred not to declare. Most participants had BMI at the normal level (44%, $n = 320$), followed by 32% ($n = 226$) with pre-obesity, 14% ($n = 102$) with obesity class I, 4% ($n = 29$) with obesity class II, 4% ($n = 25$) underweight, and 2% ($n = 16$) with obesity class III.

3.2 | Validity evidence based on the internal structure

All items presented the maximum possible range of answers (0–6). None of the items presented severe univariate normality violations, since all of them presented |sk| and |ku| values below 3 and 7, respectively. Item 12 had the highest mean value ($M = 2.85$; $SD = 1.96$) while item 10 had the lowest one ($M = 1.59$; $SD = 1.66$). Globally, all items present adequate psychometric sensitivity in terms of their univariate distributional properties. Table 1 presents the items' distribution properties.

3.3 | Dimensionality

The two first-order latent factor model presented an unsatisfactory fit to the data ($\chi^2_{(53)} = 417.73$; $p < .001$; $CFI = .93$; $TLI = .91$; $NFI = .96$; $SRMR = .04$; $RMSEA = .14$; $P(RMSEA \leq .05) < .01$; 90% CI [.12;.15]). After checking the modification indices, three correlations between items' residual variances were added ($r_{item\ 1,\ item\ 2} = .52$; $p < .01$; $r_{item\ 2,\ item\ 4} = .40$; $p < .01$; $r_{item\ 9,\ item\ 10} = .23$; $p < .01$). The three correlations were established among items of the same latent factor (i.e., residuals might be associated). The CFA conducted with the modified model revealed a satisfactory fit to the data ($\chi^2_{(50)} = 268.33$; $p < .01$; $CFI = .96$; $TLI = .94$; $NFI = .99$; $SRMR = .03$; $RMSEA = .11$; $P(RMSEA \leq .05) < .01$; 90% CI [.09;.13]). Item 11 presented the lowest factor loading ($\lambda_{item\ 11} = .82$). The latent correlation between the two first-order factors was high ($r_{Repetitive\ Eating,\ Compulsive\ Grazing} = .89$; $p < .01$). The two latent factors presented acceptable values of AVE ($AVE_{Repetitive\ Eating} = .74$; $AVE_{Compulsive\ Grazing} = .80$) suggesting convergent evidence. However, the square of the latent correlation between the two factors ($r^2_{Repetitive\ Eating,\ Compulsive\ Grazing} = .81$) was higher than the AVE values, suggesting a lack of discriminant evidence

TABLE 1 Item's distributional properties.

| Item	M	SD	Min	P_{25}	Mdn	P_{75}	Max	SEM	CV	Mode	sk	ku
Item 1	2.43	1.74	0	1	2.0	4	6	.07	.72	1	.50	−.79
Item 2	2.19	1.74	0	1	2.0	3	6	.06	.79	1	.73	−.51
Item 3	1.75	1.68	0	1	1.0	3	6	.06	.96	1	1.01	.05
Item 4	2.08	1.78	0	1	1.5	3	6	.07	.95	1	.76	−.51
Item 5	1.94	1.92	0	0	1.0	3	6	.07	.99	0	.77	−.62
Item 6	1.71	1.74	0	0	1.0	3	6	.06	1.02	1	1.01	0.03
Item 7	1.96	1.84	0	1	1.0	3	6	.07	.94	1	.83	−.43
Item 8	1.98	1.89	0	0	1.0	3	6	.07	.95	0	.71	−.68
Item 9	1.74	1.70	0	0	1.0	3	6	.06	.97	1	.92	−.09
Item 10	1.59	1.66	0	0	1.0	2	6	.06	1.04	1	1.08	.22
Item 11	2.01	2.04	0	0	1.0	4	6	.08	1.02	0	.73	−.85
Item 12	2.85	1.96	0	1	3.0	4	6	.07	.69	2	.16	−1.13

(Marôco, 2021). A large amount of shared variance between the factors might be explained by a second-order factor. As such, a second-order variable—"grazing"—was tested. To test a second-order model with two first-order latent factors the two structural weights from the second-order latent variable to each first-order factor were constrained to be equal (Sinval et al., 2019). The hierarchical model presented the same fit as the previous model (i.e., with three residual correlations) since there was no change in terms of degrees of freedom ($\chi^2_{(50)} = 268.33$; $p < .01$; $CFI = .96$; $TLI = .94$; $NFI = .99$; $SRMR = .03$; $RMSEA = .11$; $P(RMSEA \leq .05) < .01$; 90% CI [.09;.13]). The structural weights were high ($\gamma_i = .95$; $p < .01$). The proposed model was tested in the validation sample which also presented an acceptable fit to the data ($\chi^2_{(50)} = 299.29$; $p < .01$; $CFI = .95$; $TLI = .94$; $NFI = .98$; $SRMR = .04$; $RMSEA = .11$; $P(RMSEA \leq .05) < .01$; 90% CI [.10;.13]). Figure 1 depicts the final model and the corresponding statistics for the validation sample.

3.4 | Reliability of the scores: Internal consistency

The reliability of the scores analyses—using the joint sample ($n = 718$) showed good evidence of internal consistency for both the first-order factors: CG ($\alpha = .95$; $\omega = .94$), and repetitive eating ($\alpha = 95$; $\omega = .91$). The second-order reliability estimates also presented good internal consistency evidence ($\omega_{L1} = .91$; $\omega_{L2} = .94$; $\omega_{partial\ L1} = .96$).

3.5 | Measurement invariance

Table 2 presents the measurement invariance tests, where several nested models were compared. Second-order scalar invariance was achieved via the ΔCFI criterion (Cheung & Rensvold, 2002), however, the $\Delta\chi^2$ criterion (Satorra & Bentler, 2001) only allows second-order measurement invariance to be achieved. The ΔCFI criterion is usually preferred since $\Delta\chi^2$ criterion is usually considered to be too restrictive
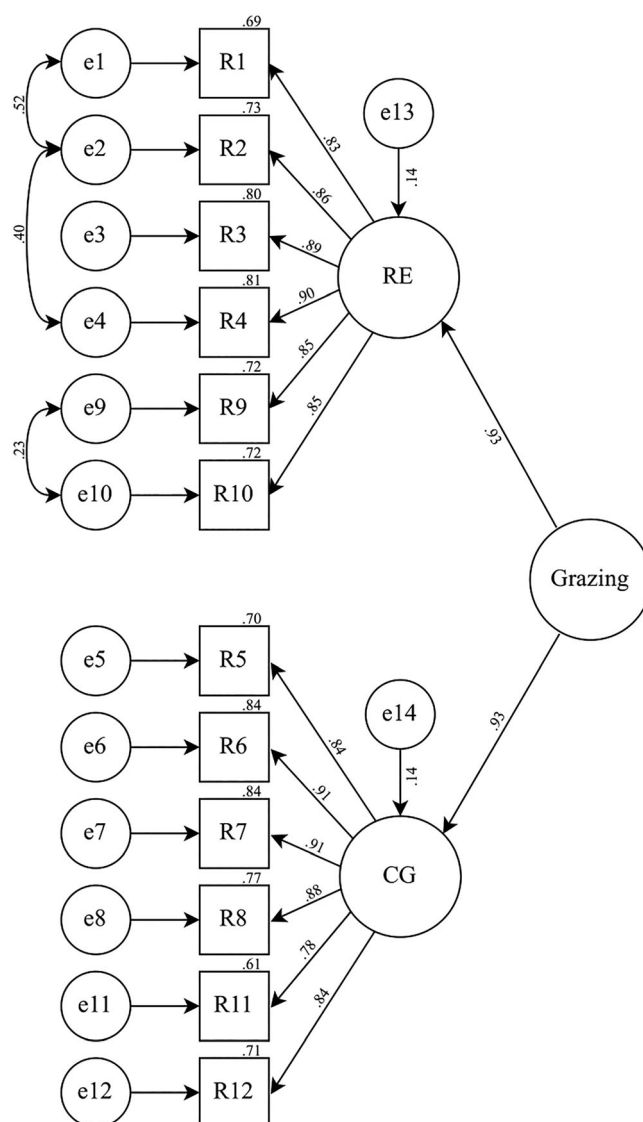
FIGURE 1 Confirmatory factor analyses second-order model. CG, compulsive grazing; RE, repetitive eating; R, Rep(eat)-Q item.

TABLE 2 Measurement invariance across sex.

Sex ($n_{Female} = 620$, and $n_{Male} = 98$)						
Model invariance	χ^2_{scaled}	df	CFI_{robust}	$\Delta\chi^2$	$p(\Delta\chi^2)$	ΔCFI_{robust}
1—Configural	297.374	100	.963	–	–	–
2—First order metric	302.938	108	.963	9.173	.328	.000
3—Second order metric	309.453	111	.963	.096	.992	.000
4—First-order scalar	331.961	121	.962	19.749	.032	.001
5—Second-order scalar	341.969	122	.960	7.447	.006	.002

TABLE 3 Descriptive statistics for the total sample and across sexes.

Dimension	M	SD	Min	P_{25}	Mdn	P_{75}	Max	sk	ku
Total sample ($n = 718$)									
Total score	1.96	1.49	0	.83	1.50	3.00	6	.81	−.13
repetitive eating subscale	2.07	1.66	0	.83	1.67	3.17	6	.71	−.47
compulsive grazing subscale	2.02	1.49	0	.83	1.67	2.92	6	.75	−.24
Female sample ($n = 620$)									
Total score	2.00	1.51	0	.83	1.67	3.00	6	.79	−.17
Repetitive eating subscale	2.16	1.68	0	.83	1.83	3.33	6	.66	−.57
Compulsive grazing subscale	2.08	1.52	0	.92	1.75	2.94	6	.72	−.31
Male sample ($n = 98$)									
Total score	1.73	1.34	0	.71	1.42	2.62	5	.85	−.01
Repetitive eating subscale	1.52	1.42	0	.33	1.17	2.29	5.67	1.07	.41
Compulsive grazing subscale	1.62	1.28	0	.67	1.33	2.40	5.33	.87	.02

Abbreviations: ku, kurtosis; M, mean; Mdn, median; Min, minimum value; Max, maximum value; P_{25}, percentile 25; P_{75}, percentile 75; SD, standard deviation; sk, skewness.

(Marôco, 2021). As such, scalar invariance allows the instrument scores to be compared among males and females.

3.6 | Descriptive statistics and differences between sexes

Table 3 presents the descriptive statistics of the Rep(eat)-Q scale for the entire sample ($n = 718$) and sex differences. Women scored significantly higher than men in the Rep(eat)-Q total score ($t_{(143.59)} = 3.19$, $p < .01$, $g = .32$; 95% CI [.12; .53]) and in the CG subscale ($t_{(143.74)} = 4.09$, $p < .01$, $g = .41$; 95% CI [.21; .62]), but not in the repetitive eating subscale ($t_{(139.13)} = 1.80$, $p = .07$, $g = .19$; 95% CI [−.02; .39]).

3.7 | Validity evidence based on the relations to other variables

Table 4 shows the descriptive statistics of the participants eligible for the analysis of validity evidence based on the relations to other variables ($n = 542$). Table 5 shows the correlations between the Rep(eat)-Q and socio-demographic variables, BMI, and psychological variables. Correlation between the Rep(eat)-Q and variables of interest by sex are presented in Appendix S3, showing an overall similar correlation pattern as those observed for the total sample.

The correlation with other psychological variables suggests good convergent evidence of the Rep(eat)-Q total score and subscales. As expected, the total score and subscales showed strong correlations with binge eating (BES), and significant, but weak to moderate correlation coefficient with depression, anxiety, and stress (Table 5). There were no significant correlations between the Rep(eat)-Q total score and the CG subscale and age, education level, and monthly income. Noteworthy, small but significant correlations were found between the repetitive eating subscale and education level, and monthly income.

4 | DISCUSSION

The Brazilian version of the Rep(eat)-Q questionnaire showed to be a good adaptation of the original measure without linguistic misunderstandings or biases considering the origin language (European Portuguese) and seems to appropriately capture the original construct. This measure presented good psychometric properties in our Brazilian nonclinical sample, showing good validity evidence based on the internal structure and based on the association with other variables (American Educational Research Association and American Psychological Association, & National Council

TABLE 4 Descriptive statistics of participants eligible for validity evidence based on relations to other variables.

	Mean (SD; min–max), (n = 542)
Age	37.1 (12.1; 18–71)
BMI	26 (5.26; 12.9–53.5)
Rep(eat)-Q Total Score	1.97 (1.47; 0–6)
Repetitive Eating	1.91 (1.47; 0–6)
Compulsive Grazing	1.03 (1.64; 0–6)
Binge Eating Scale	9.91 (9.61; 0–38)
Depression scale	10 (9.68; 0–42)
Anxiety scale	7.24 (8.19; 0–42)
Stress scale	15.6 (9.91; 0–42)

	N (%) (n = 542)
Sex	
Female	473 (87.3)
Male	68 (12.5)
Not declared	1 (0.2)
Education level	
Incomplete elementary school	0 (0.0)
Incomplete High School	0 (0.0)
Completed High School	12 (2.2)
Incomplete undergraduate	80 (14.8)
Completed undergraduate	95 (17.5)
Completed or incomplete graduate degrees	355 (65.5)
Monthly salary income	
Up to 2 minimum wages	56 (10.3)
2 to 4 minimum wages	147 (27.1)
4 to 10 minimum wages	210 (38.7)
10 to 20 minimum wages	87 (16.1)
Above 20 minimum wages	42 (7.7)
BMI	
Underweight (BMI ≤ 18.5)	15 (3)
Normal (18.5 ≤ BMI ≤ 24.9)	244 (45)
Pre-Obesity (25.0 ≤ BMI ≤ 29.9)	179 (33)
Obesity Class I (30.0 ≤ BMI ≤ 34.9)	75 (14)
Obesity Class II (35.0 ≤ BMI ≤ 39.9)	17 (3)
Obesity Class III (BMI ≥ 40)	11 (2)
Depression	
Normal	314 (57.9)
Mild	63 (11.6)
Moderate	86 (15.8)
Severe	39 (7.1)
Extremely severe	40 (7.3)
Anxiety	
Normal	340 (62.7)
Mild	44 (8.11)
Moderate	78 (14.3)

(Continues)

TABLE 4 (Continued)

	N (%) (n = 542)
Severe	80 (14.7)
Extremely severe	0 (0)
Stress	
Normal	287 (52.9)
Mild	77 (14.2)
Moderate	80 (14.7)
Severe	65 (11.9)
Extremely severe	33 (6.0)
BES	
Normal	450 (83.02)
Moderate	74 (13.65)
Severe	18 (3.32)

Abbreviations: BES, Binge Eating Scale; BMI, body mass index.

on Measurement in Education, 2014). In terms of internal structure, this adapted version of the Rep(eat)-Q supported a two-factor structure proposed by the original authors. However, the original dimensionality had one modification suggesting a second-order latent factor—grazing. The original items were kept in their original latent factor. The internal consistency estimates (both first- and second-order) presented good values. The measurement invariance was found across sex, allowing the establishment of direct comparisons of the scores between males and females. The validity evidence based on the relations to other variables presented good convergent evidence. Overall, the Rep(eat)-Q presented good psychometric properties in this Brazilian nonclinical sample.

Past research reported an association between CG, BMI, and psychopathology (Conceição, Mitchell, et al., 2017; Heriseanu et al., 2019). Accordingly, our study found significant correlations between Rep(eat)-Q and binge-eating scores, with stronger correlations for the CG subscale than for the repetitive eating subscale. As suggested by other authors, the compulsive scale captures the experience of loss of control eating which is the strongest predictor of psychopathology (Conceição et al., 2018). Conceição et al. (2014) argued that the unplanned nature of grazing behavior is associated, at some level, with a lack of loss of control over eating, and conceptualized grazing on a continuous scale of loss of control eating. Along these lines, there is increasing evidence to support NCG in association with low levels of loss of control, and CG associated with higher levels (Conceição et al., 2018; Heriseanu et al., 2017). Our results bring further support for this association between grazing and loss of control and eating disorder psychopathology as proposed by Conceição et al. (2014).

Contrary to the original study (Conceição, Mitchell, et al., 2017) but following findings from the Norwegian adaptation (Reas et al., 2019), our study also found no significant correlations between the Rep(eat)-Q scores and age. We note that Conceição, Mitchell, et al. (2017) reported weak, although significant, correlations between grazing and age for the community sample. Future research should

	Rep(eat)-Q total	Rep(eat)-Q CG	Rep(eat)-Q RE
Age	−.08	−.08	−.07
Monthly Income	−.07	−.04	−.09*
Education level	−.08	−.04	−.10*
BMI	.29***	.32***	.25***
DASS_Depression	**.41***	**.42***	.36***
DASS_Anxiety	.30***	.32***	.25***
DASS_Stress	**.43***	**.44***	.37***
BES	**.72***	**.78***	**.58***

TABLE 5 Spearman's Correlations between the Rep(eat)-Q and sociodemographic variables, BMI, and psychological variables.

Note: Spearman's rho correlations *p < .05; **p < .01; ***p < .001. Bold highlights variables with correlation coefficients >.4.
Abbreviations: BMI: body mass index; BES, binge eating scale; DASS, depression, anxiety and stress scales; Rep(eat)-Q CG, repetitive compulsive grazing subscale; Rep(eat)-Q RE, repetitive eating subscale.

explore if the correlations between age and grazing found in previous studies are sustained in other populations. Moreover, considering that the Rep(eat)-Q has been used and validated across different countries, languages, and cultures, future studies should establish the transcultural invariance of the model.

Our findings should be contextualized in the context of the COVID-19 epidemic. The mean scores on the psychological variables (specifically depression, anxiety, stress) and BMI found in our study were generally higher compared to the scores described in the original study (Conceição, Mitchell, et al., 2017). Our depression scores were also higher than those reported in a recent study with a similar sample before the pandemic (Moutinho et al., 2017). Accordingly, a recent study assessing a community sample in Portugal suggested that the changes in a variety of life domains imposed by COVID-19 restrictions may lead to increased psychological distress, which results in more disordered eating behaviors (Ramalho et al., 2022). In Brazil, the literature suggests that the restrictions caused by social isolation had a direct impact on eating habits through an increase in the consumption of ultraprocessed foods and snacks, and a decrease in the consumption of natural foods, with consequent weight gain, intermediated by reduced physical activity (da Leão & de Ferreira, 2021; Malta et al., 2020). Similarly, studies worldwide point to an increase in disordered eating and binge-eating behaviors during the period of isolation, as well as the use of food as a strategy to regulate anxiety (Brown et al., 2021; Phillipou et al., 2020). Altogether, these data support the hypothesis that higher mean scores on problematic eating and psychopathology in our study may be related to the period of data collection.

The clinical implications of our findings go beyond the utility of this self-report measure to assess for grazing. Past research with the bariatric population identifies grazing as a risk factor for weight gain and as a behavior associated with binge eating (Teodoro et al., 2021). However, the literature is scarce regarding the role of grazing as a precursor for weight gain and obesity or the onset of binge-eating-related disorders. Hence, the Rep(eat)-Q is a brief measure available free of charge, that can be useful as a screening tool for grazing in populations at risk for overweight or binge-eating. This study brings

novelty in terms of dimensionality, suggesting a second-order latent factor, grazing, which explains the first-order factors. Additionally, we bring further support for a two-factor structure of the Rep(eat)-Q with one factor (CG subscale) capturing the compulsive subjective experience of grazing, and the other factor (repetitive eating subscale) capturing the repetitiveness of this eating behavior. While the repetitive eating subscale should be high for individuals presenting with both CG and NCG, as defined by Conceição et al. (2014), the CG subscale should be higher only for those reporting CG. This subscale also seems to be the one most associated with psychopathology. Finally, it is important to add that the diagnosis of CG or NCG is established through the application of the Rep(eat) interview (Conceição et al., 2014) which is a semi-structured interview centered on the interviewer, who rates the presence of the behavior.

Some limitations regarding our sample can compromise the generalization of our results. First, our sample was predominantly composed of female participants limiting the generalization of results to male participants or to other genders. Second, the entire recruitment was carried out during the COVID-19 pandemic and the implementation of restrictions. In this sense, our results must be interpreted cautiously considering this context. Third, this study included a convenience sample that was composed of highly educated individuals, and more than half the sample presented a BMI within the overweight/obese range. For this reason, the descriptives presented should be considered carefully when analyzing norms for the general Brazilian population. Fourth, anthropometric data were collected via self-report and no verification process was conducted to check the validity of the information provided by the participant. This may result in a biased distribution of participants across the WHO (WHO, 2010) BMI categories. Finally, this study does not present test–retest reliability preventing interpretations regarding the temporal stability of the measure. Notwithstanding, the instrument is originally developed (with test–retest reliability) in European Portuguese, very similar to Brazilian Portuguese. With this work, we hope to provide an adaptation rather than a translation of the instrument as well as an increased knowledge of grazing behaviors in the Brazilian population.

5 | CONCLUSION

This study brought good validity evidence for the Rep(eat)-Q in a Brazilian sample, supporting its utility as an instrument of easy administration to assess grazing eating behavior. The Rep(eat)-Q showed good psychometric properties and our data supported the proposed second-order model with two first-factors. This short self-report measure can aid the field in understanding problematic eating behaviors, besides binge-eating, associated with weight gain and eating disorders. Grazing has received increased attention in the field over the past years, but its potential role as a predictor of weight gain and eating disorders is still understudied. The use of the Rep(eat)-Q can open new ways for studying the mechanism underlying the onset of eating disorders and overweight/obesity.

AUTHOR CONTRIBUTIONS

Marília Consolini Teodoro: Conceptualization; investigation; methodology; project administration; validation; visualization; writing – original draft. **Eva Martins Conceição:** Conceptualization; formal analysis; validation; visualization; writing – original draft. **Jorge Sinval:** Formal analysis; writing – review and editing. **Marta de Lourdes:** Validation; visualization; writing – review and editing. **Carmem Beatriz Neufeld:** Conceptualization; methodology; resources; supervision; validation; visualization; writing – review and editing.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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REFERENCES

American Educational Research Association, American Psychological Association, & National Council on Measurement in Education. (2014). *Standards for educational and psychological testing*. American Psychological Association.

Ben-Shachar, M., Lüdecke, D., & Makowski, D. (2020). Effect size: Estimation of effect size indices and standardized parameters. *Journal of Open Source Software*, 5(56), 1–7. https://doi.org/10.21105/joss.02815

Bonder, R., Davis, C., Kuk, J. L., & Loxton, N. J. (2018). Compulsive "grazing" and addictive tendencies towards food. *European Eating Disorders Review*, 26(6), 569–573. doi:10.1002/erv.2642

Boomsma, A. (2000). Reporting analyses of covariance structures. *Structural Equation Modeling: A Multidisciplinary Journal*, 7(3), 461–483. https://doi.org/10.1207/S15328007SEM0703_6

Brown, S., Opitz, M. C., Peebles, A. I., Sharpe, H., Duffy, F., & Newman, E. (2021). A qualitative exploration of the impact of COVID-19 on individuals with eating disorders in the UK. *Appetite*, 156, 104977. https://doi.org/10.1016/j.appet.2020.104977

Byrne, B. M. (2010). *Structural equation modeling with AMOS* (3rd ed.). Routledge. https://doi.org/10.4324/9781410600219

Chen, F. F., Sousa, K. H., & West, S. G. (2005). Teacher's corner: Testing measurement invariance of second-order factor models. *Structural Equation Modeling: A Multidisciplinary Journal*, 12(3), 471–492. https://doi.org/10.1207/s15328007sem1203_7

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9(2), 233–255. https://doi.org/10.1207/S15328007SEM0902_5

Chin, W. W., & Todd, P. A. (1995). On the use, usefulness, and ease or use of structural equation modeling in MIS research: A note of caution. *MIS Quarterly*, 19(2), 237–246.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum.

Conceição, E., de Lourdes, M., & Neufeld, C. B. (2023). Assessment of grazing. In A. Meule (Ed.), *Assessment of eating behavior* (p. 9780889376168). Hogrefe Publishing.

Conceição, E. M., de Lourdes, M., Pinto-Bastos, A., Vaz, A. R., Brandão, I., & Ramalho, S. (2018). Problematic eating behaviors and psychopathology in patients undergoing bariatric surgery: The mediating role of loss of control eating. *International Journal of Eating Disorders*, 51(6), 507–517. https://doi.org/10.1002/eat.22862

Conceição, E. M., Gomes, F. V., Vaz, A. R., Pinto-Bastos, A., & Machado, P. P. (2017). Prevalence of eating disorders and picking/nibbling in elderly women. *International Journal of Eating Disorders*, 50(7), 793–800. https://doi.org/10.1002/eat.22700

Conceição, E. M., Mitchell, J. E., Engle, S., Machado, P. P. P., Lancaster, K., & Wonderlich, S. (2014). What is "grazing"? Reviewing its definition, frequency, clinical characteristics and impact on bariatric surgery outcomes, and proposing a standardized definition. *Surgery for Obesity and Related Diseases*, 10(5), 973–982. https://doi.org/10.1016/j.soard.2014.05.002

Conceição, E. M., Mitchell, J. E., Machado, P. P. P., Vaz, A. R., Pinto-Bastos, A., Ramalho, S., & Freitas, A. C. (2017). Repetitive eating questionnaire (Rep(eat)-Q): Enlightening the concept of grazing and psychometric properties in a Portuguese sample. *Appetite*, 117, 351–358. https://doi.org/10.1016/j.appet.2017.07.012

Leão, G. d. C., & Ferreira, J. C. d. S. (2021). Nutrition and food changes in the middle of the pandemic COVID-19. *Research, Society and Development*, *10*(7), e11610716602. https://doi.org/10.33448/rsd-v10i7.16602

Delacre, M., Lakens, D., & Leys, C. (2017). Why psychologists should by default use Welch's *t*-test instead of Student's *t*-test. *International Review of Social Psychology*, *30*(1), 92–101. https://doi.org/10.5334/irsp.82

Finney, S. J., & DiStefano, C. (2013). Non-normal and categorical data in structural equation modeling. In G. R. Hancock & R. O. Mueller (Eds.), *Structural equation modeling: A second course* (2nd ed., pp. 439–492). Information Age Publishing.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*, 39–50. https://doi.org/10.2307/3151312

Freitas, S., Lopes, C. S., Coutinho, W., & Appolinario, J. C. (2001). Tradução e adaptação para o português da Escala de Compulsão Alimentar Periódica. *Brazilian Journal of Psychiatry*, *23*, 215–220. doi:10.1590/S1516-44462001000400008

Goodpaster, K. P., Marek, R. J., Lavery, M. E., Ashton, K., Rish, J. M., & Heinberg, L. J. (2016). Graze eating among bariatric surgery candidates: Prevalence and psychosocial correlates. *Surgery for Obesity and Related Diseases*, *12*(5), 1091–1097. doi:10.1016/j.soard.2016.01.006

Gormally, J. I. M., Black, S., Daston, S., & Rardin, D. (1982). The assessment of binge eating severity among obese persons. *Addictive Behaviors*, *7*(1), 47–55. doi:10.1016/0306-4603(82)90024-7

Hair, J. F., Babin, B. J., Anderson, R. E., & Black, W. C. (2019). *Multivariate data analysis* (8th ed.). Cengage Learning https://cengage.com.au/product/title/multivariate-data-analysis/isbn/9781473756540

Hedges, L. V. (1981). Distribution theory for Glass's estimator of effect size and related estimators. *Journal of Educational and Behavioral Statistics*, *6*(2), 107–128. https://doi.org/10.3102/10769986006002107

Heriseanu, A. I., Hay, P., Corbit, L., & Touyz, S. (2017). Grazing in adults with obesity and eating disorders: A systematic review of associated clinical features and meta-analysis of prevalence. *Clinical Psychology Review*, *58*, 16–32. doi:10.1016/j.cpr.2017.09.004

Heriseanu, A. I., Hay, P., & Touyz, S. (2019). The short inventory of grazing (SIG): Development and validation of a new brief measure of a common eating behaviour with a compulsive dimension. *Journal of Eating Disorders*, *7*(1), 4. doi:10.1186/s40337-019-0234-6

Højsgaard, S., & Halekoh, U. (2018). *doBy: Groupwise statistics, LSmeans, linear contrasts, utilities* (R package version 4.6-2) [Computer software] (4.6-2). https://cran.r-project.org/package=doBy

Hoyle, R. H. (Ed.). (1995). *Structural equation modeling: Concepts, issues and applications*. SAGE Publications.

. (2019). VIGITEL Brasil 2018: vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico: estimativas sobre frequência e distribuição sociodemográfica de fatores de risco e proteção para doenças crônicas nas capitais dos 26 estados brasileiros e no Distrito Federal em 2018 / Ministério da Saúde, Secretaria de Vigilância em Saúde, Departamento de Análise em Saúde e Vigilância de Doenças não Transmissíveis.—Brasília: Ministério da Saúde, 132.132.: il. https://doi.org/10.5123/S1679-49742017000400003

International Test Commission. (2018). ITC guidelines for translating and adapting tests (second edition). *International Journal of Testing*, *18*(2), 101–134. https://doi.org/10.1080/15305058.2017.1398166

Jorgensen, T. D., Pornprasertmanit, S., Schoemann, A. M., & Rosseel, Y. (2021). *semTools: Useful tools for structural equation modeling* (R package version 0.5-5) [computer software] (0.5-5). https://cran.r-project.org/web/packages/semTools/index.html

Kass, A. E., Accurso, E. C., Goldschmidt, A. B., Anam, S., Byrne, C. E., Kinasz, K., Goodyear, A., O'Brien, S., & le Grange, D. (2015). Picking and nibbling in children and adolescents with eating disorders. *International Journal of Eating Disorders*, *48*(8), 1102–1105. https://doi.org/10.1002/eat.22444

Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). The Guilford Press.

Lane, B., & Szabó, M. (2013). Uncontrolled, repetitive eating of small amounts of food or 'grazing': Development and evaluation of a new measure of atypical eating. *Behaviour Change*, *30*(2), 57–73. doi:10.1017/bec.2013.6

Lemon, J. (2006). Plotrix: A package in the red light district of R. *R-News*, *6*(4), 8–12 https://www.r-project.org/doc/Rnews/Rnews_2006-4.pdf

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the depression anxiety stress scales (DASS) with the Beck depression and anxiety inventories. *Behaviour Research and Therapy*, *33*(3), 335–343. https://doi.org/10.1016/j.rbp.2012.05.003

Lüdecke, D. (2021). *Sjstats: Statistical functions for regression models* (R package version 0.18.1) [Computer software] (0.18.1). https://doi.org/10.5281/zenodo.1284472

Malta, D. C., Szwarcwald, C. L., Barros, M. B. A., Gomes, C. S., Machado, Í. E., Souza Júnior, P. R. B., Romero, D. E., Lima, M. G., Damacena, G. N., Pina, M. F., Freitas, M. I. F., Werneck, A. O., Silva, D. R. P. D., Azevedo, L. O., & Gracie, R. (2020). The COVID-19 pandemic and changes in adult Brazilian lifestyles: A cross-sectional study. *Epidemiologia e Serviços de Saúde*, *29*(4), e2020407. https://doi.org/10.1590/S1679-49742020000400026

Marôco, J. (2021). *Análise de equações estruturais: Fundamentos teóricos, software & aplicações* (3rd ed.) ReportNumber.

McDonald, R. P., & Ho, M.-H. R. (2002). Principles and practice in reporting structural equation analyses. *Psychological Methods*, *7*(1), 64–82. https://doi.org/10.1037/1082-989X.7.1.64

McNamara, A., Arino de la Rubia, E., Zhu, H., Ellis, S., & Quinn, M. (2021). *skimr: Compact and flexible summaries of data* (R package version 2.1.3) [Computer software] (2.1.3). https://cran.r-project.org/web/packages/skimr/index.html

Moutinho, I. L. D., Moutinho, N. d. C. P., Roland, R. K., Lucchetti, A. L. G., TibiriçÁ, S. H. C., Ezequiel, O. D. S., & Lucchetti, G. (2017). Depression, stress and anxiety in medical students: A cross-sectional comparison between students from different semesters. *Revista Da Associacao Medica Brasileira*, *63*(1), 21–28. https://doi.org/10.1590/1806-9282.63.01.21

Muthén, B. O. (1983). Latent variable structural equation modeling with categorical data. *Journal of Econometrics*, *22*(1–2), 43–65. https://doi.org/10.1016/0304-4076(83)90093-3

Oliden, P. E., & Zumbo, B. D. (2008). Reliability coefficients for ordinal response scales. *Psicothema*, *20*(4), 896–901.

Papenberg, M. (2018). *minDiff: Minimize differences between groups* (R package version 0.01-3) [Computer software] (0.01-3). https://github.com/m-Py/minDiff

Peterson, B. G., & Carl, P. (2020). *PerformanceAnalytics: Econometric tools for performance and risk analysis* (R package version 2.0.4) [Computer software] (2.0.4). https://cran.r-project.org/web/packages/PerformanceAnalytics/index.html

Phillipou, A., Meyer, D., Neill, E., Tan, E. J., Toh, W. L., Van Rheenen, T. E., & Rossell, S. L. (2020). Eating and exercise behaviors in eating disorders and the general population during the COVID-19 pandemic in Australia: Initial results from the COLLATE project. *The International Journal of Eating Disorders*, *53*(7), 1158–1165. https://doi.org/10.1002/eat.23317

Pizato, N., Botelho, P. B., Goncalves, V. S., Dutra, E. S., & De Carvalho, K. (2017). Effect of grazing behavior on weight regain post-bariatric surgery: A systematic review. *Nutrients*, *9*(12), 13–22. https://doi.org/10.3390/nu9121322

R Core Team. (2022). *R: A language and environment for statistical computing* (version 4.2.0) [Computer software] (4.2.0). R Foundation for Statistical Computing. https://www.r-project.org/

Ramalho, S. M., Trovisqueira, A., de Lourdes, M., Gonçalves, S., Ribeiro, I., Vaz, A. R., Machado, P. P. P., & Conceição, E. (2022). The impact of

COVID-19 lockdown on disordered eating behaviors: The mediation role of psychological distress. *Eating and Weight Disorders*, *27*(1), 179–188. https://doi.org/10.1007/s40519-021-01128-1

Raykov, T. (2001). Estimation of congeneric scale reliability using covariance structure analysis with nonlinear constraints. *The British Journal of Mathematical and Statistical Psychology*, *54*, 315–323. https://doi.org/10.1348/000711001159582

Reas, D. L., Lindvall Dahlgren, C., Wonderlich, J., Syversen, G., & Lundin Kvalem, I. (2019). Confirmatory factor analysis and psychometric properties of the Norwegian version of the repetitive eating questionnaire: Further evidence for two distinct subtypes of grazing behaviour. *European Eating Disorders Review*, *27*(2), 205–211. https://doi.org/10.1002/erv.2631

Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, *48*(2), 1–21. https://doi.org/10.18637/jss.v048.i02

RStudio Team. (2022). *RStudio: Integrated development for R* (*version 2022.2.2.485*) [*Computer software*] (2022.2.2.485). RStudio, Inc. http://www.rstudio.com/

Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika*, *66*(4), 507–514. https://doi.org/10.1007/BF02296192

Savalei, V. (2020). Improving fit indices in structural equation modeling with categorical data. *Multivariate Behavioral Research*, *56*(3), 390–407. https://doi.org/10.1080/00273171.2020.1717922

Signorell, A., Aho, K., Alfons, A., Anderegg, N., Aragon, T., Arppe, A., Baddeley, A., Barton, K., Bolker, B., Borchers, H. W., Caeiro, F., Champely, S., Chessel, D., Chhay, L., Cummins, C., Dewey, M., Doran, H. C., Dray, S., Dupont, C., & Zeileis, A. (2022). *DescTools: Tools for descriptive statistics* (*R package version 0.99.45*) [*Computer software*] (0.99.45). https://cran.r-project.org/package=DescTools

Sinval, J., Queirós, C., Pasian, S., & Marôco, J. (2019). Transcultural adaptation of the Oldenburg burnout inventory (OLBI) for Brazil and Portugal. *Frontiers in Psychology*, *10*, 338. https://doi.org/10.3389/fpsyg.2019.00338

Spirou, D., Heriseanu, A. I., Sichieri, R., Hay, P., Moraes, C. E., & Appolinari, J. C. (2023). Grazing prevalence and associations with eating and general psychopathology, body mass index, and quality of life in a middle-income country. *Nutrients*, *15*(3), 57. https://doi.org/10.3390/nu15030557

Teodoro, M. C., da Conceição, E. M., de Lourdes, M., Alves, J. R., & Neufeld, C. B. (2021). Grazing's frequency and associations with obesity, psychopathology, and loss of control eating in clinical and community contexts: A systematic review. *Appetite*, *167*, 105620.

Vignola, R. C. B., & Tucci, A. M. (2014). Adaptation and validation of the depression, anxiety and stress scale (DASS) to Brazilian Portuguese. *Journal of Affective Disorders*, *155*, 104–109. https://doi.org/10.1016/j.jad.2013.10.031

World Health Organization (WHO). (2010). *A healthy lifestyle—WHO recommendations*. Word Health Organization. https://www.who.int/europe/news-room/fact-sheets/item/a-healthy-lifestyle.

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