An empirical evaluation of the translation to Brazilian Portuguese of the Loss of Control over Eating Scale (LOCES)

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Abstract

Background: Loss of control over eating is a key feature of the most prevalent eating disorders. The Loss of Control over Eating Scale (LOCES) enables a thorough assessment of loss of control over eating. **Objective:** This study empirically evaluated the translation of the LOCES from English to Brazilian Portuguese. **Methods:** The scale was translated to Brazilian Portuguese and back translated to English in order to check accuracy of the translation. Two hundred and ninety-three medicine and nursing students, 60 males and 233 females, 18-55 years old, with mean body mass index (BMI) 23.2 kg/m² (SD 4.1), recruited between August and December 2014, answered the Brazilian Portuguese LOCES. An exploratory factor analysis was performed. **Results:** Exploratory factor analysis of the Brazilian Portuguese LOCES showed three distinct factors of the loss of control over eating (disgust/negative sensations, cognitive experiences/dissociation, and "positive" effects) as well as moderate consistency with previous reports of exploratory factor analysis of the English version. **Discussion:** This study showed satisfactory translation of the LOCES from English to Brazilian Portuguese, which is now ready for further validation.

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Introduction

Loss of control over eating is an essential feature of eating disorders involving binge eating, namely binge eating disorder, bulimia nervosa and anorexia nervosa of the binge-eating type[1]. A binge eating episode is defined as consumption of an unusually large amount of food, combined with the experience of loss of control over eating[1]. However, experiencing a loss of control over eating may be clinically significant in and of itself, regardless of whether or not the amount of food consumed is unusually large[2]. Indeed, the experience of a loss of control over eating has been suggested to have a more negative emotional and psychological effect than the amount of food consumed in a binge[3], and may thus be a more important defining feature of binge eating than the actual amount of food consumed.

Whilst the assessment of loss of control over eating is clinically relevant, current methods of assessment do not explore this feature of binge eating in any depth. The "gold standard" tool to assess the psychopathology of eating disorders is the Eating Disorders Examination[4]. This tool evaluates loss of control over eating in a dichotomous "yes or no" manner, which may lead to inaccurate assessments. Two questionnaires have since been developed to assess loss of control over eating[5,6]. The Eating Loss of Control Scale (ELOCS) has been validated in a clinical sample of individuals with obesity and binge eating disorder[6]. In contrast, the Loss of Control over Eating Scale (LOCES) was developed through studies with experts in the field of eating disorders, and has been validated in clinical as well as in nonclinical samples[5]. The LOCES[5] also has the advantage of being available in a long and short English-language version (24 and 7 items, respectively), both of which showed robust psychometric properties and which can be used to assess loss of control over eating in clinical and non-clinical samples[5]. Exploratory factor analysis of the LOCES

demonstrated three factors related to different aspects of the loss of control over eating: behavioral (seven items), cognitive/dissociative (four items), and positive/euphoric (two items). The other 11 items of the 24-item scale loaded on more than one factor. The LOCES showed convergent validity with measures of functional impairment related to eating disorders, as well as with general self-control and body mass index (BMI)[5], further attesting to its validity. Higher mean scores on this scale indicate greater loss of control over eating.

Eating disorders are a common health problem in Brazil[7,8]. They occur throughout diverse regions, namely the southeast[9], south[10] and northeast of the country[11], in diverse age groups, such as in 16-19 year-olds[10] and in people over 35 years of age[12], as well as in individuals of high[13] or low[14] socioeconomic status. Additionally, studies have found that individuals with binge eating disorder in Brazil have similarly high levels of psychiatric comorbidity to those with binge eating disorder in developed countries[15,16], demonstrating the importance of this clinical problem in Brazil and the need for accurate and efficient diagnosis and treatment.

Because of the high rate of occurrence of eating disorders in Brazil, there is a need for instruments that accurately assess the key features of eating disorders. Some instruments to assess features of eating disorders have been translated into Portuguese and validated for use in Brazil, namely the Questionnaire on Eating and Weight Patterns-Revised, the Bulimic Investigatory Test of Edinburgh, and the Binge Eating Scale[17-20]. Nevertheless, none of these tools thoroughly examine loss of control over eating. Comprehensive measures of loss of control over eating are needed to assess this important eating-related construct within the Brazilian population. Therefore, the aim of this study was to translate the LOCES into Brazilian Portuguese and to explore the factor structure of the Brazilian Portuguese version in a sample of people in Brazil.

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Methods

Sample and procedures

Participants were 293 students recruited from a group of approximately 600 students (with 15-20% absence rates typical on any given day) enrolled in undergraduate and graduate programs of medicine and nursing at the Federal University of São Paulo (Unifesp), Brazil. They were recruited between August and December 2014. Inclusion criteria were males and females who were at least 18 years of age, interested in participating in the study and able to give written informed consent. As well as completing the Brazilian Portuguese LOCES, participants also completed self-report questions about their sex, age, ethnicity, height and weight.

Ethics

The Research Committee Review Board at Unifesp approved the study (CACE 31703214.4.0000.5505). Compensation was not provided to study participants.

Translation process

Two authors that are Native Brazilian Portuguese speakers and fluent in English (FQL, MP) independently translated the LOCES from its original English version into Brazilian Portuguese and then produced one forward translation by consensus. An additional bilingual author (NME), unfamiliar with the original questionnaire, subsequently back translated the newly translated version of LOCES from Brazilian Portuguese into English. All translators were psychologists that work in the eating disorders field. Next, the three translators discussed and identified differences between the original and back-translated versions of the English LOCES. The Brazilian Portuguese LOCES was then adjusted and revised, in consultation with psychiatrists with expertise in eating disorders (AC and PH). In addition, the native English-speaking author who developed the original scale (JL) revised the back-translation and requested minor alterations for the purposes of alignment with the intent of the original English LOCES. These changes were then incorporated into the final Brazilian Portuguese version of the LOCES, which was used in this study.

Statistical methods

Data were inspected for normal distribution. Descriptive statistics were used to describe the participant sample. For the interpretation of the factors, we considered factor loadings statistically significant when they had a p-value lower than 0.05 (as indicated by *), as well as when the factor loading was equal to or higher than 0.4 (as then its communality is at least some 16% of observed variance).

Exploratory factor analysis

To determine the number of continuous latent variables that are needed to explain the correlation among the 24 Likert scale items of the Brazilian Portuguese LOCES, an exploratory factor analysis was conducted. One to five factors were extracted, using the entire sample. The optimal estimator for such analysis was the weighted least square using a diagonal weight matrix with standard errors and mean- and variance-adjusted chi-square test statistics that use a full weight matrix[21,22]. Also, we used oblique rotation (geomin, default in Mplus), allowing the factors to be correlated. Factor loadings larger than 0.40 were considered prominent, as mentioned above. Two criteria were used to determine the best factorial solution: a) statistical parameters (i.e. model fit indices, magnitude and significance of factor loading across the number of the factor solutions) and b) clinical and theoretical background regarding the interpretability of the factors that emerged.

To statistically determine the goodness of fit of the best solution, the following fit indices were used: chi-square, weighted root mean square residual (WRMR)[23], comparative fit index (CFI)[24], Tucker-Lewis Index (TLI)[25], and root mean square error of approximation (RMSEA). The following cut-off criteria were used to determine a good model fit: chi-square not statistically significant (p > 0.05), WRMR near or below 0.95, an RMSEA near or below 0.06, and CFI and TLI near or above 0.95. An overall conclusion about the fit of each model can be obtained by considering these indices simultaneously[26,27].

IBM SPSS Statistics for Windows, version 22 (IBM corp., Armonk, USA) was used for all statistical analyses, except for the factor analysis, for which we used MPlus (Los Angeles, USA)[21].

Results

Study sample

The sample of 293 individuals included 60 males and 233 females, aged from 18-55 years (mean 22.0 years, SD 5.1 years). The mean BMI of the sample was 23.2 kg/m^2 (SD 4.1 kg/m^2). The mean (SD) of the LOCES scale scores in this sample was 1.90 (0.56). Ethnicity of the sample was categorized by self-report of the following categories: White (76.4%), Brown ("mixture of black and white") (12.1%), Asian (8.8%) and Black – African (2.7%).

Exploratory factor analysis

Table 1 shows the exploratory factor analysis for the best achieved solution: a three-factor model using GEOMIN oblique rotation. The fit indices are described as follows: $\chi^2_{(207)}$ = 460.128 (p < 0.001), RMSEA = 0.065 (95% confidence interval = 0.057 to 0.073), CFI = 0.957, TLI = 0.942, and SRMR = 0.052. The percentage of variance explained by the three factor solution is 61.73%, and the eigenvalue for each of factors 1, 2 and 3 are 11.185, 2.064 and 1.567, respectively.

Consensus in regard to recommended fit index is unusual[28]. The major explanations for our decision to use a three-factor solution are that chi-square is appropriate to the model's complexity and here we have a model with at least 252 degree of freedom (one-dimensional solution) for the 24 items. Under the three factor solution, there is a reduction in the degrees of freedom, but it is still a complex model (degrees of freedom = 207). Regarding RMSEA and CFI, there is no consensus about the cut-off for a good model. For example, a sample size higher than 250 and number of items oscillating between 12 to 30 values < 0.07 with CFI of 0.92 or higher would indicate a good model[29]. Maroco considered between 0.05 to 0.1 a good model and CFI and TLI from 0.9 to 0.95 as indicators of good model[30]. Lastly, SRMR (Standardized root Mean Square residual); here it is as 0.062, indicating a good model (values less than 0.08). It is well known that the fact that higher amount of factors, the better the fit indices. However, the four factor solution is not clinically interpretable.

Factor 1 comprised items 1-8, 10 and 15 in the current Brazilian population in the Brazilian Portuguese LOCES. These items assess compulsivity over eating and associated negative emotions, namely disgust and negative physical sensations such as feeling uncomfortably full. Factor 2 comprised items 13-24 in the Brazilian Portuguese LOCES. These items involve cognitive experiences related to the loss of control over eating (namely poor concentration and preoccupation with eating), as well as dissociation. In Factor 3, which comprised items 2-4, 11 and 12 of the Brazilian Portuguese LOCES, loadings were higher on items assessing compulsivity over eating associated with "positive" effects, such as an experience of relief or a physical "rush" or "high". It is noteworthy that item 9 did not load ≥ 0.40 on any one factor; however, it did have moderately high loadings (0.37) in Factors 1 and 3.

Table 1. Factor loadings of exploratory factor analysis using GEOMIN oblique rotation

LOCES items		Factor		
		1	2	3
1	I felt I had lost control over eating	**0.62***	0.15	0
2	I continued to eat past the point when I wanted to stop	**0.58***	-0.01	**0.47***
3	I ate until I was uncomfortably full	**0.40***	0.01	**0.61***
4	I kept eating even though I was no longer hungry	**0.46***	0.01	**0.53***
5	I felt like I had "blown it" and might as well keep eating	**0.80***	-0.02	0.07
6	I found myself eating despite negative consequences	**0.80***	-0.02	0.18*
7	I felt helpless about controlling my eating	**0.61***	0.25*	0.12
8	While eating, I had feelings of shame	**0.62***	0.33*	-0.17*
9	While eating, I felt I was stuffing myself	0.37*	0.10	0.37*
10	While eating, I felt disgusted	**0.48***	0.35*	-0.19*
11	While eating, I felt a sense of relief or release	-0.02	0.31*	**0.57***
12	While eating, I felt a physical rush or high	0.11	0.31*	**0.52***
13	While eating, I felt like I was watching or looking at myself from "outside"	0.26*	**0.61***	-0.04
14	I felt like the craving to eat overpowered me	0.23*	**0.49***	0.20*
15	My eating felt like a ball rolling down a hill that just kept going and going	**0.51***	**0.51***	0.01
16	I lost track of what and how much I was eating	0.39*	**0.53***	0.02
17	While eating, I felt like I was not paying attention to what I was eating	0.22*	**0.54***	-0.05
18	While eating, I felt like I was in my own little world	-0.01	**0.77***	0.10
19	I could not concentrate on anything other than eating	-0.09	**0.88***	0.09
20	I felt like I could not do anything other than eat	-0.19*	**0.95***	0.02
21	I finished eating only to discover I had eaten more than I thought	0.19*	**0.64***	-0.12
22	I felt I was eating faster than normal	0.00	**0.45***	0.06
23	Eating as quickly as possible seemed to be the only thing that mattered	0	**0.73***	-0.23*
24	While eating, it did not seem real	0.01	**0.85***	-0.14

* Significant factor loading (at 0.05). Numbers in emboldened text have factor loadings equal to or greater than 0.4.

Discussion

This study evaluated the translation of the LOCES to Brazilian Portuguese. An exploratory factor analysis was performed and generated three distinct factors: (1) compulsivity over eating associated with disgust and negative physical sensations, (2) cognitive experiences related to loss of control over eating/dissociation, and (3) compulsivity over eating associated with "positive" effects on mood (such as relief or a physical "rush" or "high"). Additionally, the mean (SD) score of 1.90 (0.56) for this sample of people in Brazil was comparable to that of the English LOCES in a sample of people in the United States, which was 1.70 (5.72)[5].

The factor analysis of the LOCES in Brazilian Portuguese showed moderate consistency with the English version. Factors 2 and 3 showed similar features of loss of control over eating (cognitive/dissociative and positive/euphoric aspects) in the Brazilian Portuguese and English versions[5]. Factor 1 showed some different content in the two versions. Whilst the Factor 1 loading of the Brazilian version relates to compulsivity over eating and associated disgust and uncomfortable sensations, the Factor 1 loadings of the English version relate to behavioral aspects of loss of control over eating[5]. The incomplete consistency in factor analytic results may partly relate to differences in item presentation, because in the study that led to initial development of the English LOCES[5], the 24 scale items were presented along with additional items from an original larger pool of items, some of which were not retained for the final scale.

Four items loaded highly on more than one factor: item 2 "I continued to eat past the point when I wanted to stop", item 3 "I ate until I was uncomfortably full", item 4 "I kept eating even though I was no longer hungry" and item 15 "my eating felt like a ball rolling down the hill that just kept going on and on". Items 2, 3 and 4, all of which loaded on both factors 1 and 3, can be understood clinically as scoring highly on more than one factor, because people can have ambivalence about the negative emotion arising from a loss of control over eating – wanting to stop – as well as the reduction in negative affect that comes from continuing to eat. Such ambivalence and the holding of negative as well as positive emotions and beliefs about binge eating and other eating disorder symptoms is well recognized and applied in some therapeutic approaches, such as dialectical behavior therapy for bulimia nervosa and binge eating[31]. For example, a patient with bulimia nervosa can simultaneously find her symptom of vomiting repulsive, yet also experience relief from it. This dialectical frame of vomiting can help a patient to see that the truth can only evolve from the synthesis of each side: she may both hate the vomiting *and* get something positive from it. This dichotomy lends itself to understanding why at times, the patient may want to stop the behavior, while at other times she may feel that they cannot resist the behavior. Item 15, which scored highly on both of factors 1 and 2, may be understandable as it describes both an emotion as well as an image of eating as "a ball rolling down a hill", which is a cognitive concept.

Notwithstanding that a consensus on methods of instrument translation has been challenging[32], this study was limited in that all of the translators had a clinical background and that there was only one back translation[33]. Another limitation of this study was the lack of use of another scale or questionnaire to assess symptoms of eating disorders such as EAT-26[34], or even other screening instruments for common mental disorders to exclude potential individuals at risk for eating disorders. Such use of another instrument could have enabled further convergent and divergent validation of the Brazilian Portuguese version of the LOCES. In addition, a convenience sample of University students from São Paulo was used, and detailed characterization of the sample (sociodemographic features) were not available, thus the responses and scoring may not be generalizable to the general population. Also, European Portuguese and Brazilian Portuguese differ, and thus the translation may need to be further refined for use of the LOCES in other Portuguese-speaking countries. Suggestions for future research are the validation of the newly translated LOCES in Brazil in comparison with other validated

instruments that measure loss of control and related features of eating disorders, possible development of sub-scales, and validation in clinical and other samples. In addition, future research can also employ further exploratory and confirmatory factor analytic studies, and measurement invariance analyses in order to understand the validity of group comparisons and cross-national comparisons.

This study has provided empirical evaluation of the translation of the LOCES to Brazilian Portuguese. Future research is needed on large samples to confirm the results of this exploratory factor analysis. In addition, it is important that the Brazilian Portuguese version of the LOCES is tested on community and clinical samples to determine the normative distribution of scores and scores that indicate psychopathology. While future research on the Brazilian translation of this scale is necessary, the current work shows that the Brazilian Portuguese LOCES may be a valuable scale to improve the assessment of eating disorder symptoms in Brazil.

Acknowledgements

Conflicts of interest

AS has received payment from Eli Lilly, the Pharmacy Guild of Australia, Novo Nordisk and the Dietitians Association of Australia for seminar presentation at conferences. She is also the author of *The Don't go Hungry Diet* (Bantam, Australia and New Zealand, 2007) and *Don't go Hungry for Life* (Bantam, Australia and New Zealand, 2011). SWT receives royalties from Hogrefe and Huber and McGraw-Hill Publishers, and has also been the recipient of an honorarium from Shire Pharmaceuticals. PH receives royalties from Hogrefe and Huber and McGraw-Hill Publishers. AC received reimbursement from Eli Lilly for travel expenses to attend a conference and won a price from her work from Lundbeck (pharmaceutical industry) that provided funding to attend another conference.

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Appendix. Brazilian Portuguese translation of the Loss of Control over Eating Scale (LOCES)

Escala de Perda de Controle Sobre a Alimentação (EPCSA – 24 itens)

Em relação às últimas quatro semanas (28 dias), com que frequência você teve as seguintes experiências enquanto estava comendo? Por favor, responda cada item usando a escala abaixo.

	1 Nunca	2 Raramente	3 Ocasionalmente	4 Frequentemente	5 Sempre
1. Eu senti que tinha perdido o controle sobre a minha alimentação.					
2. Eu continuei a comer apesar de ter passado do ponto em que eu queria parar.					
3. Eu comi até me sentir desconfortavelmente cheio(a).					
4. Eu continuei comendo apesar de não estar mais com fome.					
5. Eu senti que, já que eu tinha "estragado tudo" (comendo algo "inadequado"), eu poderia me permitir continuar comendo.					
6. Eu percebi que eu continuava comendo apesar das consequências negativas.					
7. Eu senti que não havia nada que eu pudesse fazer para controlar a minha alimentação.					
8. Eu senti vergonha enquanto comia.					
9. Eu me senti estufado(a) enquanto comia.					
10. Eu senti desgosto enquanto comia.					
11. Eu tive uma sensação de alívio ou liberdade enquanto comia.					
12. Eu me senti eufórico(a) enquanto comia.					
13. Eu senti como se estivesse, me visse ou me observasse "de fora" enquanto comia.					
14. Eu senti que um desejo intenso por comida me dominou.					
15. Minha alimentação parecia uma bola descendo ladeira abaixo, que continuava descendo e descendo.					
16. Eu perdi a noção sobre o que e o quanto eu comia.					
17. Eu senti como se não prestasse atenção ao que eu estava comendo enquanto eu comia.					
18. Eu senti como se estivesse no meu pequeno mundo enquanto comia.					
19. Eu não podia me concentrar em nada além de comer.					
20. Eu senti que não podia fazer nenhuma outra coisa além de comer.					
21. Eu terminei de comer apenas para descobrir que tinha comido mais do que pensei.					
22. Eu senti que estava comendo mais rápido do que o normal.					
23. Comer o mais rápido possível parecia ser a única coisa que importava.					
24. Enquanto eu comia não parecia real.					