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Translation and Validation of the Food Neophobia Scale (FNS) to the Brazilian Portuguese

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Abstract

Introduction: The Food Neophobia Scale (FNS), originally developed in English, has been widely used in different studies to assess the individual's willingness to try new foods. However, a process of translation and cultural adaptation is required to enable the use of FNS in other countries.

Objective: to translate and to validate the FNS into Brazilian Portuguese.

Methods: the FNS was translated into Brazilian Portuguese by three English teachers independently and back-translated into English by other three professionals. After that, both the English and Brazilian Portuguese FNS versions were administered to a sample of 40 graduate students of the University of Campinas, São Paulo, Brazil, between September and October 2014. The reproducibility between the instruments was assessed by the intra-class correlation coefficient (ICC). The internal reliability of the scale was evaluated by Cronbach's Alpha coefficient. The FNS total score ranged from 10-70 and the respondents were classified as food neophilic (≤ 16.4), neutral (16.5-38.5) and food neophobic (≥ 38.6).

Results: the ICC between the items of the original FNS and the Brazilian FNS ranged between 0.266 and 0.815 (P<0.05). The total score of the FNS was 0.903 (p<0.001). Cronbach's alpha coefficient was 0.916. Most respondents were classified as neutral (72.5%), other 10% as neophilics, and only 17.5% as neophobics.

Conclusion: the Brazilian version of the FNS proved to be an adequate and reliable tool to measure food neophobia. Yet, further research is required to investigate the presence of food neophobia in Brazilian population and to analyse its impact on food behavior.

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TRADUCCIÓN Y VALIDACIÓN DE LA ESCALA DE NEOFOBIA ALIMENTARIA (ENA) PARA EL PORTUGUÉS DE BRASIL

Resumen

Introducción: La Escala de Neofobia Alimentaria (ENA), desarrollada originalmente en lengua inglesa, ha sido ampliamente utilizada en diferentes estudios para evaluar el deseo individual de probar nuevos alimentos. Sin embargo, es necesario un proceso de traducción y adaptación cultural para permitir su uso en otros países.

Objetivo: traducir y validar la ENA en portugués brasileño.

Métodos: la escala fue traducida al portugués, de forma independiente, por tres profesores de inglés, siendo traducido al revés al inglés por otros tres profesionales del sector. Se entregaron estas traducciones a una muestra de 40 estudiantes de posgrado de la Universidad de Campinas, São Paulo (Brasil), entre septiembre y octubre de 2014. La reproducibilidad entre los instrumentos se evaluó por medio del coeficiente de correlación intraclase (CCI). La confiabilidad interna de la escala se evaluó por medio del coeficiente alfa de Cronbach. La puntuación total de la ENA varió 10-70 y los individuos fueron clasificados con neofilia alimentaria (≤ 16,4), neutralidad (16,5-38,5) y neofobia alimentaria (≥ 38,6).

Resultados: el CCI entre los ítems de la versión original y traducida se situó entre 0,266 y 0,815 (p<0,05) y la puntuación total de la ENA fue 0,903 (p<0,001). El coeficiente alfa de Cronbach fue 0,916. La mayoría de los encuestados fueron clasificados como neutrales (72,5%), el otro 10% como neofilia y solo el 17,5% con neofobia alimentaria.

Conclusiones: la versión brasileña de la ENA resultó ser una herramienta adecuada y confiable para medir la neofobia alimentaria. No obstante, se necesitan investigaciones futuras para evaluar la presencia de neofobia alimentaria en la población brasileña y para analizar su impacto en la conducta alimentaria.

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Abreviations

ICC: Intraclass Correlation Coefficient
FNS: Food Neophobia Scale

Introduction

Food neophobia is the fear of novel or unfamiliar foods[1]. Particularly common among toddlers and young children, it is most related to the bitter and sour tastes and considered and evolutionary reminiscence, since it would be advantageous to avoid eating potentially poisonous (bitter) or decayed (sour) foods[2].

Different factors seem to play a role in food neophobia. Alley and Potter[3] estimate that about two-thirds of the variation in food neophobia is due to genetics, but, in spite of being a typical children's behavioral trait, neophobia may prevail until adulthood as a result of environmental factors such as cultural food practices, socio-demographic characteristics, lifestyle, education and ageing[4,5,6,2]. According to Pliner and Hobden[1] knowledge and personal experience influence interest in trying new foods, so subjects exposed to diverse cultures might be less food neophobic[5].

In the last years, the neophobic behavior has been investigated because it can impact food preferences[7,4], affecting the quality and variety of the diet[8,9,10]. Thus, understanding the factors influencing food choices, and particularly, food neophobia, is important for education programs intended to promote healthier eating habits[4].

Food neophobia is assessed by the Food Neophobia Scale (FNS), primarily developed in English by Pliner and Hobden[1] for the purpose of measuring food behaviors (Table I). This is a self-administered, 10-item questionnaire in which a high mean score, obtained by summing the individual item scores measured on a Likert scale (ranging from strongly disagree to strongly agree), represents less willingness to try new or unfamiliar foods (neophobia), while a lower mean score indicates more willingness to try novel foods (neophilia)[1].

Table I
Food Neophobia Scale (FNS)

1. I am constantly sampling new and different foods.*
2. I don't trust new foods.
3. If I don't know what is in a food, I won't try it.
4. I like foods from different countries.*
5. Ethnic food looks too weird to eat.
6. At dinner parties, I will try a new food.*
7. I am afraid to eat things I have never had before.
8. I am very particular about the foods I will eat.
9. I will eat almost anything.*
10. I like to try new ethnic restaurant.*

*Reversed item.

The FNS was originally developed and validated using a sample of Canadian graduate students[1] and to be used in cross-cultural studies, its psychometric properties need to be tested in different languages[11], which, in turn, will reflect cultural differences.

Translations of the FNS have been reported in the literature, such as in Swedish[12], Finnish[13], Spanish[8], European Portuguese[11], German and French[9]. Validation studies needed to be performed to assess the properties of the translated FNS before the scale could be considered an appropriate instrument for food neophobia measurement. Moreover, in all these translations, some words or questions were changed or even deleted to make the scale comprehensive and then applicable to the other cultural contexts[4,14,5,9].

In spite of the recent translation made in Portugal[11], the FNS deserves a Brazilian version, since lexical, semantical and syntactical differences of the Portuguese language come up in the lusophone countries, especially considering Brazilian Portuguese, which, besides its Indo-European root, bears the marks of indigenous people, Africans and immigrants of various origins[15,16,17]. In this sense, it is necessary a process of translation and validation followed by a cultural adaptation of a Brazilian Portuguese version for the FNS, which will enable the use of the scale with Brazilian people.

This work aimed to translate and validate the Food Neophobia Scale into Brazilian Portuguese. The Brazilian version of the FNS will contribute not only in studies on local eating preferences, but it will also help researchers in cross-cultural studies or in the development of educational strategies to motivate consumers to modify food choices and try unfamiliar or novel foods.

Material and Methods

FNS translation into Brazilian Portuguese

The translation of the FNS into Brazilian Portuguese was performed independently by three English teachers fluent both in Portuguese and English. Subsequently, the Portuguese versions were translated back into English by other three English teachers, in a process called back-translation[18] aimed to verify the congruence of the translation, that is, conceptual and linguistic equivalence of the original instrument[19]. Final, minor adjustments were made in order to obtain the Brazilian version.

To assess the equivalence of the translated version to the original scale, a group of 40 graduate students, fluent both in English and Portuguese, answered the scales with a one-week interval between them[18]. The sample size was based on the recommendations of Ohrbach et al.[20]. The study was conducted at the University of Campinas (UNICAMP), Campinas, São Paulo, Brazil, between September and October 2014. Respondents were randomly assigned to two groups with 20 subjects

each, according to the recommendations of Prieto[18]. The first group received the Portuguese version firstly and then the original English scale, while the second group received at first the English followed by the translated version.

The original and translated FNS consisted of 10 items that were measured using a 7-point Likert scale (1=strongly disagree, 2=moderately disagree, 3=slightly disagree, 4=neither agree, nor disagree, 5=slightly agree, 6=moderately agree, 7=strongly agree).

Statistical Analysis

The reproducibility between the measurements of the two scales was assessed by the intraclass correlation coefficient (ICC), which is an assessment of consistency of the measurements made by the different respondents[21]. Cutoff points were established as perfect agreement (0.8-1.0), substantial agreement (0.61-0.80), moderate agreement (0.41-0.60), fair agreement (0.21-0.40), discrete agreement (0-0.20) and poor agreement (<0.001).

Cronbach's Alpha (α) was calculated as an internal consistency estimate of reliability the FNS, being it considered: great (>0.80), good (>0.70) and acceptable (0.60-0.70) [22].

Individual total scores were obtained by summing the values of each scale item, corresponding to the values 1-7 and totaling 10-70 points. The scores for items 1, 4, 6, 9 and 10 (Table II) were reversed since these items correspond to neophilia rather than neophobia. Thus, the higher the total individual score, the greater the level of food neophobia[1] and according to Olabi et al.[23], taking into account the mean value in the FNS of 27.5 and its related standard deviation (± 11.1), individuals showing scores ≤ 16.4 were classified as neophilic; those between 16.5-38.5 were considered neutral and those above 38.6, neophobic.

Statistical analyzes were performed using the Predictive Analytics Software (PASW) Statistics GradPack version 12.0 [24].

Ethical Aspects

The study was conducted according to the principles of the Declaration of Helsinki and Resolution 466/2012 of the National Health Council[25]. All respondents signed a consent form to participate in the study

Table II

Statistical comparison between the items of the original Food Neophobia Scale (FNS) and the Brazilian Portuguese FNS (N = 40 respondents)

Pair	Language	Scale items	Mean Scores ±SD	Wilcoxon Test P	ICC
1	E	I am constantly sampling new and different foods.*	2.7±1.6	0.209	0.753
	P	Eu estou constantemente experimentando alimentos novos e diferentes.*	2.9±1.8		
2	E	I don't trust new foods.	2.5±1.4	0.887	0.525
	P	Eu não confio em novos alimentos.	2.4±1.5		
3	E	If I don't know what is in a food, I won't try it.	3.3±1.9	0.987	0.729
	P	Se eu não sei o que contém um alimento, eu não experimento.	3.2±1.9		
4	E	I like foods from different countries.*	2.0±1.2	0.625	0.677
	P	Eu gosto de comidas de diferentes países.*	2.1±1.3		
5	E	Ethnic food looks too weird to eat.	2.9±1.5	0.109	0.266
	P	Comidas de outros países parecem muito estranhas para serem consumidas.	2.4±1.4		
6	E	At dinner parties, I will try a new food.*	2.6±1.6	0.087	0.612
	P	Em eventos sociais, eu experimento novos alimentos.*	2.3±1.6		
7	E	I am afraid to eat things I have never had before.	2.5±1.5	0.085	0.526
	P	Eu tenho receio de comer alimentos que eu nunca experimentei antes.	2.9±1.9		
8	E	I am very particular about the foods I will eat.	3.8±1.9	**0.039****	0.564
	P	Eu sou muito exigente em relação aos alimentos que eu escolho para comer.	2.1±1.4		
9	E	I will eat almost anything.*	2.8±1.9	0.098	0.691
	P	Eu como praticamente de tudo.*	2.4±1.7		
10	E	I like to try new ethnic restaurant.*	2.4±1.5	0.132	0.815
	P	Eu gosto de experimentar novos restaurantes de comidas de outros países.*	2.2±1.5		

FNS: Food Neophobia Scale; SD: standard deviation; ICC: intraclass correlation coefficient; E: English; P: Portuguese; *Reversed Item; **statistically significant difference (P<0.05). Each scale item has a seven-point Likert response set: (1=strongly disagree; 4=neither agree, nor disagree; 7=strongly agree).

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and the research protocol was approved by the Ethics Committee of the University of Campinas (CAAE 30884314.6.0000.5404).

Results

Thirty female and ten male subjects (N=40) participated in the study. Age varied from 21 to 51 years (mean=29.6±6.9 YO), within the mean age range of the Brazilian population according to the last census[26].

Table II shows that regarding of the reproducibility of the 10 scale items the Wilcoxon test revealed that only item 8 (*I am very particular about the foods I will eat / Eu sou muito exigente em relação aos alimentos que eu escolho para comer*) showed a significant difference (P=0.039) between the responses of the original scale in English and the translated version into Portuguese. However, a careful look at the individual responses showed that 15 out of the 40 participants (37.5%) gave the same scores to item 8 in two versions of the FNS. As stated in the work of Vidigal et al.[19], a limitation of the Wilcoxon test is that, when the difference between the scores is zero, they are not used in the statistical calculation, and this may have contributed to the non-reproducibility of data related to item 8.

The analysis of the ICC, considering the 10 items of the English and the Portuguese scales, showed that all correlations were significantly higher than zero, ranging from 0.266 and 0.815 (P<0.05). Despite the significant difference in item 8 responses, according the Wilcoxon test (P=0.039), the ICC showed a moderate agreement between the two scales (ICC=0.564, P<0.05) for this item.

Therefore, these data demonstrated that the translated version was conceptually equivalent to the original FNS, since there was no significant difference between the two versions total score (P>0.05). Moreover, the intraclass correlation coefficient between the total sum of the two scales showed almost perfect agreement (ICC=0.903; P<0.001).

Regarding the reliability of the translated version, considering the responses of 40 participants of this study, the calculated Cronbach's alpha coefficient reached 0.916, which demonstrates high reliability of the scale to measure food neophobia.

The mean neophobia score measured by the Brazilian FNS was 27.5 (±11.1) and respondents were classified as neophilics (10.0%), neutral (72.5%) and neophobics (17.5%).

Discussion

The translated version of the FNS proved to be a reliable psychometric instrument to assess food neophobia in Brazil, since the ICC between the total sum of the items of the scale was very high, 0.903 (P<0.001) confirming the reliability of the scale. In the translation of FNS into Spanish, the ICC found was 0.84, confirming stability and internal reliability of the translated scale[8].

Many studies have analyzed the internal consistency of the FNS adapted to other languages. In this study, the Cronbach's alpha for FNS translated into Brazilian Portuguese was 0.916. Similar results were found by Siegrist et al.[9] in the validation of FNS for the German (α=0.79) and French (α=0.82). The same was showed at the adaptation of FNS into Spanish (α=0.82)[8]. Cronbach's alpha coefficient is the most widely used test to measure the reliability of the instrument translated[19]. Therefore, it is possible to affirm that all items can be included in the final Brazilian Portuguese version of the Food Neophobia Scale, whose translation into Portuguese was considered reliable and reproducible, allowing its use in research with Brazilian individuals.

Table III shows the Portuguese versions of the FNS. Although they are grammatically quite similar, the Brazilian FNS substituted the word *ethnic* by an equivalent expression, that is, *comida de outros países* (food from other countries). The European Portuguese version also made this change, but maintained the expression *ethnic restaurants*[11].

In the study of Ritchey et al.[14], the word *ethnic* was replaced with *foreign*. At the Finnish version of the FNS, validated by Tuorila et al.[4], the term *ethnic foods/restaurants* was translated to *foods/restaurants from other countries*, similar to the Brazilian FNS. In Switzerland, the expression *ethnic restaurants* was changed to *places, where foods from other cultures are served*[9]. Finally, in Australia, the term *ethnic* was removed from the FNS items because it is not widely used in this country[5]. Thus, the word *ethnic* must be used in different contexts by various cultures, since food habits reflect the beliefs, attitudes and views on life of each population[27].

Brazil is a multicultural nation characterized by gastronomic diversity due the mix of Indigenous, African and Portuguese culinary habits incorporated by the local populations since the colony period started in the 16th century. From the 19th century on, as a result of the independence from Portugal and the territorial expansion, immigrants from Europe and Asia brought new and different food practices, which end up being adopted in the local habits, particularly in the major urban areas[28,6,29]. Therefore, the concept of ethnic has been diluted in the society as there was a great ethnic mix and diffusion of different cultural habits, including food. Brazil is famous for a great gastronomic variety indeed[6].

Regarding the expression *particular about* in item 8 (Table III), it was translated into *exigente (demanding)* in both Portuguese versions of the FNS. Tuorila et al.[4] and Ritchey et al.[14] interpreted *particular about* as *finicky,* which describes a person who likes things only when they know it in every detail. Independently from any translation, individual agreement with item 8 demonstrates an avoidant behavior towards food.

Tuorila et al.[4] reported that item 8 may reflect some interest caused by dietary restrictions rather than to food neophobia. For Ritchey et al.[14], item 8 relates more to some type of health concern, while Koivisto and Sjödén[12] reported that it may not clearly express food neophobia. Therefore, the isolated evaluation of item 8 is not an adequate parameter to measure food neophobia, but it is better used to assess aspects related to health care.

Despite the FNS have already been translated into European Portuguese[11], it was possible to observe that the Brazilian version differs from the version of Portugal in some words, phrases and verb tense. This must be taken into consideration because apparently subtle changes can influence the interpretation and questionnaire response and consequently the food neophobia analysis. Moreover, the scale validation with brazilian postgraduate students was a differential of this study and although the subjects showed lower food neophobia, the scale can be used in other studies in Brazil in order to assess the food neophobia.

Although food neophobia is a personal trait, cultural and socio-economic factors influence the willingness to consume novel or unfamiliar foods[4]. People living in rural areas would have lower food neophobia in comparison to urban people[5]. Besides, high educational status contributes to food neophilia, since greater knowledge of cultural cuisines and the possibility of eating in restaurants provide less aversion to unfamiliar food[6]. Therefore the experience with different foods decrease neophobia[1]. This was evidenced in this study, once the respondents – university students – live in one of the largest Brazilian cities and have high educational background, which helps to explain their low level of food neophobia. Another study conducted in Brazil with graduate students living mainly in urban areas showed that only 11.5% of the respondents presented food neophobia[6].

Finally the Brazilian version of the Food Neophobia Scale add a new dimension to studies on eating habits of the population, since the concept of food neophobia is virtually unknown among local professionals in the fields of nutrition and food science and technology. Neophobia is a personality trait that manifests itself differently depending on people's age, socioeconomic and educational level and degree of urbanization. Although Brazil is imminently an urban country - 80% of the population living in urban areas - and still young, the great regional heterogeneity must be taking into account and it is manifested not only in the availability of food, but also in cultural aspects of the society. Thus, assessment of food neophobia, combined with other measures on food preferences will help health professionals, food authorities and companies to develop public policies and educational strategies aimed at specific groups like children, youngsters, adults and seniors.

Future studies should focus on different aspects of food neophobia, for example neophobia in relation to different classes of animal products, vegetable and produced by microbiological processes. As FNS addresses general neophobia, which is a weakness in the method, other important issues related to food choices must now be addressed, such as the consumer search

for convenience, which favors processed and ready-to-eat products, and, on the other hand, food technology neophobia, since it is notorious the rejection of modern technologies like genetic engineering and food irradiation.

So there is a research horizon on eating habits in Brazil and Latin America and the FNS translated into Brazilian Portuguese will improve the quality of national as well as cross-cultural studies about food behavior.

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