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Cross-cultural adaptation of the Brazilian-Portuguese version of the Perceived Nutrition Environment Measures Survey

Adaptação transcultural da versão brasileira do Perceived Nutrition Environment Measures Survey

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ABSTRACT

Objective

The objective of this study was to cross-culturally adapt the Perceived Nutrition Environment Measures Survey for use in the Brazilian context.

Methods

Independent translations into Portuguese of the original version and respective back-translations into English were performed. The steps were evaluated by an expert committee and the translated version was applied in a group of both genders, of different ages and education.

Results

After suggested modifications in the translation processes, the expert committee considered that the translated and adapted version presented conceptual and semantic equivalence. The translated version was applied to a sample of twenty people and only one question related to the amount of fat in the food required a new round to obtain understanding and clarity.

Conclusion

We present an adapted version of Perceived Nutrition Environment Measures Survey for the Brazilian context, which has adequate conceptual, cultural, and semantic equivalence, being objective and comparable to the original version. Future studies should confirm clarity, reliability, and validity.

Keywords: Environment design. Feeding behavior. Surveys and questionnaires. Translating.

RESUMO

Objetivo

O objetivo deste estudo foi adaptar transculturalmente o Perceived Nutrition Environment Measures Survey para uso no contexto brasileiro.

Métodos

Foram realizadas traduções independentes da versão original para o português e respectivas retrotraduções para o inglês. As etapas foram avaliadas por um comitê de especialistas e a versão traduzida foi aplicada em um grupo com pacientes de ambos os sexos, de diferentes idades e níveis de escolaridade.

Resultados

Após modificações sugeridas nos processos de tradução, o comitê de especialistas considerou que a versão traduzida e adaptada apresentou equivalência conceitual e semântica. A versão traduzida foi aplicada a uma amostra de 20 pessoas e apenas uma questão, relacionada à quantidade de gordura no alimento, requereu nova rodada para obter compreensão e clareza.

Conclusão

Uma versão do Perceived Nutrition Environment Measures Survey adaptada ao contexto brasileiro, a qual possui equivalências conceitual, cultural e semântica adequadas, sendo objetiva e comparável à versão original, é apresentada. Futuros estudos devem confirmar a clareza, confiabilidade e validade.

Palavras-chave: Planejamento ambiental. Comportamento alimentar. Inquéritos e questionários. Tradução.

INTRODUCTION

The food environment is often defined as the physical, sociocultural, economic and political environment where one lives, studies and works, and plays an important role in food choices, food availability and, consequently, consumption [1-8].

Given its importance, several measures and instruments related to the food environment have been developed, with the aim of better representing and operationalizing its conceptual aspects [9]. However, despite the progress observed in recent years, the lack of standardization between measures makes it difficult to compare studies and analyze the consistency of associations between the dietary environment and different health outcomes [9-13].

The food environment can be assessed using objective measures, such as systematic observation of the environment or Geographic Information Systems, [2,14] or subjective measures based on people's perception of the surrounding environment [15-19]. In some studies, in order to improve the complementarity and complexity of the methods, objective measures are used combined with subjective ones [9]. Objective measurements, while reflecting what actually exists, require that data be available, updated, and reflect the food environment. If they are not available, it requires investment in financial terms, human resources and time for data collection, storage, processing and availability [14].

On the other hand, subjective measures, for the most part, are low-cost, and easy to apply and analyze [20]. In addition, perception is an important component of the environment-behavior relationship [21]. How people perceive the environment in which they are inserted seems to be more important than the environment that actually exists [21]. In this sense, understanding this

interaction will allow changes to promote improvement in food and food consumption, as well as in people's health [22,23].

Despite the usefulness and relevance of subjective measures, the use of different instruments, with different characteristics and coming from diverse sociocultural and economic contexts, has considerably limited the comparability between studies [2,9]. Research carried out in Brazil with perceived measures of the food environment used instruments to assess characteristics, such as home, work, school, food store, etc. environments. In general, they are generalist instruments and have not indicated evidence of validity, restricted to a small number of questions that, for the most part, refer to different response scales, which makes comparability between studies impossible [16,18,20,22].

Thus, translating and culturally adapting an instrument for the Brazilian context will expand the availability of instruments for assessing the country's food environment, stimulating research that uses measures of the perceived environment. This could improve the understanding of how the perception of the environment affects food consumption choices, in addition to allowing the comparison between the results of national and international studies. The aim of this study, therefore, was to cross-culturally adapt the Perceived Nutrition Environment Measures Survey – NEMS-P instrument to assess the food environment perceived in the Brazilian context.

METHODS

The initial stage of the study aimed to identify instruments for assessing the food environment available in the literature. In view of the volume of research that used measures of food environment; initially, the search for systematic review articles was defined to contemplate original studies with measures of food environment, considering that these reviews should aim for the most relevant studies in terms of using measures of the food environment. To this end, a search was carried out in the Bireme, PubMed and Science Direct databases using the descriptors in English: food environment and review, combined with the Boolean operator "and". The survey was performed from June to August 2020 and reviews that included studies evaluating the food environment were incorporated, either by qualitative or quantitative measures, and that had been published in the last 10 years. Ten eligible systematic reviews, published between 2011 and 2019, were identified [2,9-12,14,22,24-26].

Then, the original articles included in the eligible reviews were identified. In all, 404 original articles were identified, 344 of which remained on the list after excluding duplicate articles. After reading the titles and abstracts, a total of 311 articles were excluded because they did not include specific studies that used and had instruments for assessing the food environment through perceived measures. Altogether, 33 articles were selected for a full reading. After reading them in full, 24 studies were excluded for not having one or more inclusion criteria (evaluation of the food environment, and/or use of a questionnaire as an evaluation instrument).

Studies retained in the final analysis of findings included self-reported measures of access, availability, variety, and price of food in the neighborhood/local stores and in the household. Eight studies used general measures of the food environment in the form of broad, non-specific questions, and without information about the quality of the measure. The only instrument reported in the studies with information on the quality of the measure was the Perceived Nutrition Environment Measures Survey (NEMS-P). The instrument was previously evaluated in terms of feasibility, internal consistency and test-retest reproducibility [21], in addition to having been used in food consumption surveys in the United States and Spain [27-31]. The NEMS-P consists of 49 questions, mostly objective, divided into six sections: Home Food Environment, Questions about Food Purchase, Questions about Restaurants/Out-of-Home Meals, Your Habits and Thoughts about Food, General Questions

About the House and General Questions [21] and has been used to assess the perception of the food environment in different countries such as the United States [29,32] and Mexico [33]. Therefore, NEMS-P was selected to carry out the translation and cultural adaptation for the Brazilian context.

After selecting the instrument, contact was made with the authors of the NEMS-P to obtain authorization for use and translation, which was obtained by email. The translation and cross-cultural adaptation process followed the procedures described in the national and international literature [34,35] and comprised six steps (Figure 1): (I) translation, (II) synthesis, (III) back-translation, (IV) experts committee review, (V) pre-testing the instrument and (VI) obtaining the final version. The translation stage of the original English version into Portuguese began in October 2020 and was

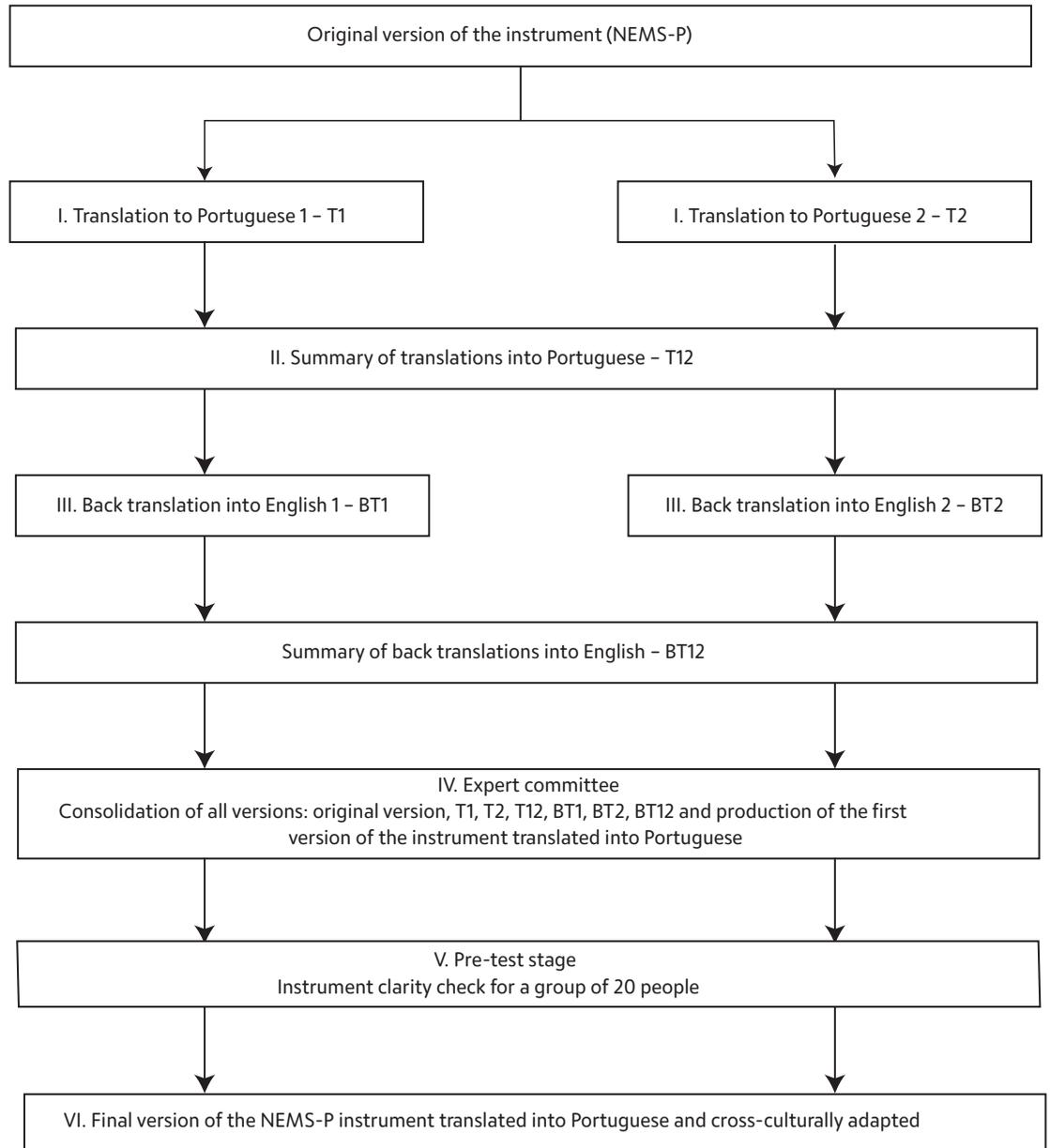


Figure 1 – Flowchart of the steps taken for the process of translation and cross-cultural adaptation of the Perceived Nutrition Environment Measures Survey instrument. Curitiba (PR), Brazil, 2021.

Note: T1: First Portuguese-English translation; T2: Second Portuguese-English translation; T12: Summary of translations in Portuguese; BT1: first Portuguese-English back translation; BT2: Second Portuguese-English back-translation; BT12: Summary of back-translations in English; NEMS-P: Perceived Nutrition Environment Measures Survey.

carried out independently by two bilingual translators whose native language is Portuguese (T1 & T2). One translator had prior knowledge of the instrument's objectives, while the other did not. After the translation from English into Portuguese, the translators, together with the researchers, discussed the discrepancies between the two versions (T1 & T2), standardized divergent terms and defined the final version in Portuguese in consent (T12). This (T12) was retranslated independently by bilingual translators; however, their mother tongue was English, following the same procedures as in the translation process. The two back-translated versions (BT1 & BT2) were synthesized into the final back-translated version (BT12) after a meeting with the responsible translators and researchers, in order to standardize divergent terms and define the most relevant translations by consent.

In stage IV, a committee of experts was organized with the purpose of evaluating the translation/back-translation process, and the semantic, linguistic, experimental and conceptual equivalence of the versions, as well as their clarity and objectivity. For the composition of the expert committee, we aimed to obtain a group of 8 to 10 members. In this way, 15 professionals with experience in studies on the food environment and assessment of the environment related to health were invited, all with fluency in English and Portuguese, as indicated in the literature [36]. In possession of the three versions of the instrument: the original version, the final version in Portuguese (T12) and the final back-translated version (BT12), and conceptual information provided by the authors of the instrument, as well as the NEMS-P article, [21] the expert committee, for each question, answered the following questions: (a) "compared to the original version in English, did the question translated into Portuguese maintain conceptual, cultural and semantic equivalence?"; (b) "Is the version translated into Portuguese objective and understandable?"; (c) "compared to the original version in English, is the question back-translated into English altered?"; (d) "What is the relevance of this question in the instrument?". The answers were presented on a Likert scale adapted for concordance with the questions, according to four possible categories: "no", "a little", "quite" and "completely". The experts also evaluated the relevance of each question, considering the response categories "not relevant", "a little relevant", "quite relevant" and "highly relevant". At the end of each question, a space was made available for possible suggestions and/or questions. The evaluation was conducted remotely using the Qualtrics digital platform. The agreement of the evaluation carried out by the committee of experts was through the answers on Likert scale and a degree of agreement of 70% was determined.

After the changes suggested by the committee, with the intention of evaluating the clarity of the first version of the NEMS-P translated instrument, the pre-test stage V was conducted with a group of 20 people in March 2021. Participants were selected for convenience, and contacted through the researchers' contact network, considering sufficient distribution for the variables: sex (female vs. male), age/age group (18 to 40, 40 to 59 and ≥ 60), educational level (elementary/middle and high school vs. undergraduate and graduate), nutritional status, by calculating the body mass index, according to reported weight and height (weight divided by height squared) (eutrophic: 18.5 to 24.9 kg/m², overweight: 25 to 29.9 kg/m² and obesity equal to or greater than 30 kg/m²) [37]. Participation occurred remotely and participants indicated in each item of the questionnaire their answer to the question "how clear is the question?" (Answer options being "not clear", "somewhat clear", "fairly clear" and "completely clear"). Eventual comprehension difficulties were indicated, as well as suggestions to improve the clarity of the questions. The suggestions were discussed among the researchers and incorporated or not into the final Portuguese version of the NEMS-P. All steps taken in the survey are illustrated in the flowchart in Figure 1.

All steps and procedures adopted were approved by the Research Ethics Committee of the *Pontifícia Universidade Católica do Paraná* (Pontifical Catholic University of Paraná (Approval n^o 4,458,247/12/11/2020) and all participants signed the Informed Consent Form.

RESULTS

In the first stages, after the two translations were carried out, the translators and researchers met to check for discrepancies in terms and consolidate the words for the synthesis, such as “refrigerator” and “fridge”, “neighborhood where you live” and “neighborhood where you reside”, “if you walk” and “if you go on foot”. The synthesis document was structured with the consent of all.

In the subsequent step, back-translation, the same dynamics occurred for the consolidation of the two versions. In the expert committee stage, among 15 invited researchers, 10 responded to the invitation and agreed to participate. The researchers who accepted had training in the areas of physical education, nursing, physiotherapy, medicine and nutrition. Among the 29 questions evaluated by the expert committee, 22 (76%) were classified as “quite” or “completely” equivalent in conceptual, cultural and semantic terms, and another five questions (17%) were classified as “somewhat” equivalent. Regarding the assessment of objectivity and understanding, 18 questions (62%) were classified as “quite” or “completely” and nine (31%) as “somewhat” adequate. As for the evaluation of changes between the back-translation versions (BT12) and the original, 28 questions were classified as “no” and “a little”, 35% and 62%, respectively. Finally, the majority of the expert committee (66%) considered the questions “quite” or “totally” relevant to the assessment of the food environment in the Brazilian context (Table 1).

Table 1 – Evaluation by the expert committee of the translated version of the Perceived Nutrition Environment Measures Survey compared to the original version.

Questions	Translated version into Portuguese kept conceptual, cultural and semantic equivalence		Translated version into Portuguese is objective and understandable		Relevance of the question		Change in the back-translated version compared to the original English version	
	“Quite” or “Completely”		“Quite” or “Completely”		“Quite” or “Completely”		“No” or “A little”	
	n	%	n	%	n	%	n	%
1	10	100	9	90	8	80	8	80
2	9	90	10	100	10	100	9	90
3	10	100	10	100	10	100	8	80
4	10	100	9	90	10	100	7	70
5	9	90	10	100	10	100	8	80
6	10	100	9	90	9	90	8	80
7	10	100	9	90	10	100	8	80
8	10	100	10	100	9	90	8	80
9	10	100	10	100	8	80	8	80
10	10	100	10	100	10	100	6	60
11	10	100	10	100	10	100	8	80
12	10	100	9	90	10	100	7	70
13	10	100	9	90	10	100	8	80
14	9	90	8	80	10	100	8	80
15	10	100	9	90	10	100	9	90
16	10	100	9	90	9	90	9	90
17	7	70	8	80	10	100	7	70
18	10	100	8	80	9	90	7	70
19	10	100	10	100	10	100	8	80
20	10	100	10	100	10	100	8	80
21	10	100	10	100	10	100	8	80
22	10	100	10	100	10	100	9	90
23	10	100	10	100	10	100	9	90
24	9	90	10	100	9	90	8	80
25	10	100	10	100	10	100	7	70
26	10	100	10	100	8	80	8	80
27	9	90	10	100	10	100	8	80
28	10	100	10	100	9	90	9	90
29	9	90	10	100	9	90	9	90

Table 1 indicates the result of steps I to IV. The first column displays the items from the original English version, the second the summary of the translations into Portuguese, and the third the summary of the back-translations in English. The last column is the pre-test version in Portuguese after the modifications made by the expert committee.

Some suggestions were made by the committee. In the first question, for example, utensils used by some Brazilian families were added, such as the electric single burner, and cabinet and/or shelf, used for food storage. In the second question, some highly consumed fruits in Brazil were added, such as papaya and orange. In some questions, adaptations were necessary, as in question 4, in which the word “neighborhood”, originally translated as “*bairro*”, was replaced by “*vizinhança*”, upon suggestions from the committee. In question 6, at the suggestion of the expert committee, the word “*loja*”, which is the first translation of “store”, was replaced by “*locais*”, which means “places”. The changes made to the instrument occurred through discussion between the responsible researchers, maintaining the equivalence of the original instrument, aiming at cross-cultural adaptation to Portuguese and to the reality of Brazil. All modifications suggested by the expert committee are shown in bold.

In stage V of the clarity assessment, most of the participants were women (55%) under 40 years of age (40%), having an undergraduate degree (40%) and without any chronic disease (60%) (Table 2).

Table 2 – Characteristics of the participants in stage V of the clarity assessment (n=20).

Characteristics	n	%
Sex		
Female	11	55.0
Male	9	45.0
Age group		
18 to 39 years of age	8	40.0
40 to 59 years of age	7	35.0
60 or more years of age	5	25.0
Schooling		
Elementary school	6	30.0
High school	3	15.0
Undergraduate	8	40.0
Graduate	3	15.0
BMI classification		
Eutrophic	7	35.0
Overweight	3	15.0
Obesity	10	50.0
Chronic diseases		
Hypertension	4	20.0
Diabetes	3	15.0
Hypercholesterolemia	5	25.0
No medical diagnosis	12	60.0

Note: BMI: Body Mass Index (kg/m²).

The 20 participants rated the 29 questions for clarity and understanding. Only one question (question 4) was evaluated by 80% of the participants as “quite” or “totally” clear and understandable, the other questions having a value equal to or greater than 90%.

DISCUSSION

This work carried out the cross-cultural adaptation to Portuguese of the NEMS-P instrument, designed to assess the perceived food environment in Brazil. All steps followed methods and

Chart 1 – Original version, synthesis of translations, summary of back-translations and pre-test version of the translation and adaptation process of the Perceived Nutrition Environment Measures Survey instrument.

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Original version	Summary of translations T12 (stage I and II)	Summary of back translations BT12 (stage III)	Pre-test version (stage IV e V)
A. Home Food Environment	A. Ambiente Alimentar Domiciliar	A. Household Food Environment	A. Ambiente Alimentar Domiciliar
1. Which of these appliances do you have in your home to cook or store food? (check all that apply)	1. <i>Quais desses aparelhos você tem na sua casa para cozinhar ou armazenar alimentos? (marque todas as opções que se aplicam)</i>	1. Which of these appliances do you have at home to cook or store food? (please, mark all the applicable choices)	1. <i>Quais desses aparelhos você tem na sua casa para cozinhar ou armazenar alimentos? (marque todas as opções que se aplicam)</i>
a. Refrigerator	a. <i>Geladeira</i>	a. Refrigerator	a. <i>Geladeira</i>
b. Freezer (attached to refrigerator or stand-alone)	b. <i>Freezer (acoplado ao refrigerador ou avulso)</i>	b. Freezer (connected to the refrigerator or separate)	b. Freezer (junto ou separado da geladeira)
c. Microwave oven	c. <i>Micro-ondas</i>	c. Microwave oven	c. <i>Micro-ondas</i>
d. Stove	d. <i>Fogão</i>	d. Stove	d. <i>Fogão (gás ou elétrico) ou fogareiro elétrico</i>
e. Oven	e. <i>Forno</i>	e. Oven	e. <i>Forno (junto ou separado do fogão) ou forno elétrico</i>
f. Other countertop cooking appliance (toaster oven, slow cooker, or electric grill)	f. <i>Outro aparelho de cozimento (como torradeira, panela elétrica ou grill elétrico)</i>	f. Another cooking appliance (toaster, electric hotplate or electric grill)	f. <i>Outro aparelho de cozimento (como torradeira, panela elétrica ou grill elétrico)</i>
			g. Armário e/ou prateleira
2. Please indicate whether each of these food items were available in your home in the past week:	2. <i>Por favor, indique se cada um desses alimentos estava disponível na sua casa na última semana:</i>	2. Please, indicate which of these foods were available in your home last week:	2. <i>Por favor, indique se cada um desses alimentos estava disponível na sua casa na última semana:</i>
a. Bananas	a. <i>Bananas</i>	a. Bananas	a. <i>Banana</i>
b. Apples	b. <i>Maças</i>	b. Apples	b. <i>Maça</i>
c. Grapes	c. <i>Uvas</i>	c. Grapes	c. <i>Uva</i>
d. Candy or cookies	d. <i>Doces ou biscoito</i>	d. Sweets or cookies	d. Mamão
e. Snack chips (potato chips, corn chips, tortilla chips, etc.)	e. <i>Salgadinhos de pacote (Batata chips, salgadinho de milho, tortilhas, etc.)</i>	e. Packed snacks (potato chips, corn snacks, tortillas, etc.)	e. Laranja
f. Regular whole milk	f. <i>Leite integral</i>	f. Whole milk	f. <i>Biscoito ou bolacha recheada</i>
g. Low-fat milk	g. <i>Leite com baixo teor de gordura (semidesnatado e desnatado)</i>	g. Low fat milk (semi-skimmed milk or skimmed milk)	g. <i>Salgadinhos de pacote (batata chips, salgadinho de milho, tortilhas, etc.)</i>
h. Regular (non-diet) soda	h. <i>Refrigerante comum (não diet)</i>	h. Regular soft drink (non-diet)	h. <i>Leite (integral, semidesnatado ou desnatado)</i>
i. Diet soda	i. <i>Refrigerante diet</i>	i. Diet soft drink	i. Refrigerante
j. Carrots	j. <i>Cenouras</i>	j. Carrots	j. Sucos prontos (pó, concentrado, caixinha)
k. Tomatoes	k. <i>Tomates</i>	k. Tomatoes	k. <i>Cenoura</i>
l. Dark leafy greens (spinach, collards, kale, etc.)	l. <i>Vegetais de folhas verde escuras (espinafre, couve, etc.)</i>	l. Dark green leafy vegetables (spinach, kale, etc.)	l. <i>Tomate</i>
m. Regular hot dogs	m. <i>Salsichas comuns</i>	m. Regular hot dogs	m. <i>Vegetais de folhas verde escuras (espinafre, couve, etc.)</i>
n. Reduced-fat hot dogs	n. <i>Salsichas light</i>	n. Light hot dogs	n. Pão de forma
o. White bread	o. <i>Pão branco</i>	o. White bread	o. <i>Salsicha, presunto, mortadela ou salame</i>
p. Whole grain bread	p. <i>Pão integral</i>	p. Whole wheat bread	p. <i>Arroz branco, integral ou parboilizado</i>
q. White rice	q. <i>Arroz branco</i>	q. White rice	q. Bombons, balas e pirulitos
r. Brown rice	r. <i>Arroz integral</i>	r. Whole rice	
3. In your home, how often do you...?	3. <i>Na sua casa, com que frequência você...?</i>	3. In your home, how often do you...?	3. <i>Na sua casa, com que frequência você...?</i>
a. Have fruits and vegetables in the refrigerator	a. <i>Tem frutas e verduras na geladeira</i>	a. Have fruits and vegetables in the refrigerator	a. <i>Tem frutas e verduras na geladeira</i>
b. Have candy or chips available to eat	b. <i>Tem doces ou salgadinhos</i>	b. Have sweets or salty snacks	b. <i>Tem doces ou salgadinhos de pacote disponíveis</i>
c. Have fruit available in a bowl or on the counter	c. <i>Tem frutas disponíveis em uma fruteira ou em um balcão</i>	c. Have fruit available in a fruit holder basket or on the counter	c. <i>Tem frutas disponíveis em uma fruteira ou em um balcão</i>
d. Have ice cream, cake, pastries, or ready-to-eat sweet baked goods (cookies, brownies, etc.)	d. <i>Tem sorvete, bolo, outros doces de padaria, ou doces assados (como bolachas, biscoitos, cookies, brownies, etc.)</i>	d. Have ice cream, cake, other bakery sweets (cookies, brownies, etc.)	d. <i>Tem sorvete, bolo, outros doces de padaria, ou doces de pacote (como bolachas, biscoitos, cookies, brownies, etc.)</i>
B. Food Shopping Questions	B. Perguntas sobre Compra de Alimentos	B. Questions about Buying Food	B. Perguntas sobre Compra de Alimentos
Please answer these questions thinking about the food stores in the neighborhood near where you live. Think of your neighborhood as the area within about a 20-minute walk or 10 to 15 minutes' drive from your home	<i>Por favor, responda a essas perguntas pensando nas lojas que vendem alimentos no bairro onde você mora. Considere seu bairro como uma distância de aproximadamente 20 minutos andando ou de 10 a 15 minutos de carro da sua casa</i>	Please answer these questions by thinking about the stores that sell food in the neighborhood where you live. Consider your neighborhood a distance of approximately 20 minutes walking or 10 to 15 minutes by car from your home	<i>Por favor, responda a essas perguntas pensando nas lojas que vendem alimentos na vizinhança onde você mora. Considere seu bairro como uma distância de aproximadamente 20 minutos ou 2 km andando ou de 10 a 15 minutos ou 7,5 km de carro da sua casa</i>

Chart 1 - Original version, synthesis of translations, summary of back-translations and pre-test version of the translation and adaptation process of the Perceived Nutrition Environment Measures Survey instrument.

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Original version	Summary of translations T12 (stage I and II)	Summary of back translations BT12 (stage III)	Pre-test version (stage IV e V)
B. Food Shopping Questions	B. Perguntas sobre Compra de Alimentos	B. Questions about Buying Food	B. Perguntas sobre Compra de Alimentos
4. Please mark whether you agree or disagree with the following statements: a. It is easy to buy fresh fruits and vegetables in my neighborhood b. The fresh produce in my neighborhood is of high quality. c. There is a large selection of fresh fruits and vegetables in my neighborhood d. It is easy to buy low-fat products, such as low-fat milk or lean meats, in my neighborhood e. The low-fat products in my neighborhood are of high quality f. There is a large selection of low-fat products available in my neighborhood	4. <i>Favor marcar se você concorda ou discorda das seguintes afirmativas:</i> a. <i>É fácil comprar frutas e verduras frescas no meu bairro</i> b. <i>Os legumes, verduras e frutas frescos no meu bairro são de alta qualidade</i> c. <i>Há muitas opções de frutas e verduras frescas no meu bairro.</i> d. <i>É fácil comprar produtos com baixo teor de gordura, como leite semidesnatado, desnatado e carnes magras no meu bairro.</i> e. <i>Os produtos com baixo teor de gordura no meu bairro são de alta qualidade</i> f. <i>Há muitas opções de produtos com baixo teor de gordura no meu bairro</i>	4. Please indicate if you agree or disagree with the following statements: a. It is easy to buy fresh fruits and vegetables in my neighborhood b. The fresh vegetables and greens in my neighborhood are of the highest quality c. There are many options for fresh fruits and vegetables in my neighborhood d. It's easy to buy low-fat products like partially skimmed and skim milk, and lean meats in my neighborhood e. The low-fat products in my neighborhood are high quality f. There are many options for low-fat products in my neighborhood	4. <i>Favor marcar se você concorda ou discorda das seguintes afirmativas:</i> a. <i>É fácil comprar frutas e verduras frescas na minha vizinhança</i> b. <i>Os legumes, verduras e frutas frescas na minha vizinhança são de boa qualidade</i> c. <i>Há muitas opções de frutas e verduras frescas na minha vizinhança</i> d. <i>É fácil comprar produtos com baixo teor de gordura, como leite semidesnatado, desnatado e carnes magras na minha vizinhança</i> e. <i>Os produtos com baixo teor de gordura na minha vizinhança são de alta qualidade</i> f. <i>Há muitas opções de produtos com baixo teor de gordura na minha vizinhança</i>
5. How often do you usually shop for food? More than once a week Once a week Once every 1-2 weeks Once a month Other (please specify)	5. <i>Com que frequência você costuma comprar alimentos?</i> <i>Mais de uma vez por semana</i> <i>Uma vez por semana</i> <i>Uma vez a cada uma ou duas semanas</i> <i>Uma vez por mês</i> <i>Outra (favor especificar)</i>	5. How often do you usually buy food? More than once a week Once a week Once every one or two weeks Once a month Other (specify)	5. <i>Com que frequência você costuma comprar alimentos?</i> <i>Mais de uma vez por semana</i> <i>Uma vez por semana</i> <i>Uma vez a cada duas semanas</i> <i>Uma vez por mês</i> <i>Outra (favor especificar)</i>
6. Is there one store or more than one store where you do most of your food shopping? One store Two stores More than two stores	6. <i>Existe uma loja, ou mais de uma, onde você faz a maior parte de suas compras de alimentos?</i> <i>Uma loja</i> <i>Duas lojas</i> <i>Mais de duas lojas</i>	6. Is there one or more stores where you do most of your food shopping? One store Two stores More than two stores	6. Em quantos locais você faz a maior parte das suas compras de alimentos? Um local Dois locais Mais de dois locais
7. What type of store is the store where you buy most of your food? (Choose the best answer) Supermarket Small grocery store Corner store or convenience store Supercenter (like WalMart or Costco) Other (please specify)	7. <i>Qual é o tipo de estabelecimento onde você compra a maior parte dos seus alimentos? (Escolha a melhor resposta)</i> <i>Supermercado</i> <i>Mercearia</i> <i>Loja de conveniência</i> <i>Hipermercado (redes como Walmart, Carrefour, Condor ou Angeloni)</i> <i>Outro (favor especificar)</i>	7. In what kind of store do you do most of your food shopping? (Choose the best answer) Supermarket Grocery store Convenience store Superstore (chains like Walmart, Carrefour, Condor or Angeloni) Other (specify)	7. <i>Qual é o tipo de estabelecimento onde você compra a maior parte dos seus alimentos? (Escolha a melhor resposta)</i> <i>Supermercado</i> <i>Mercearia, armazém ou mercados de bairro</i> Feira ou sacolão Açougue <i>Hipermercado (redes como: Walmart, Carrefour, Pão de Açúcar, Condor ou Angeloni).</i> Padaria <i>Outro (favor especificar)</i>
8. Thinking about the store where you buy most of your food, how do you usually travel to this store? (check all that apply) Walk Bicycle Bus or other public transportation Drive your own car Get a ride Other (please specify)	8. <i>Pensando em onde você compra a maior parte dos seus alimentos, como você geralmente vai até este estabelecimento? (marque todas que se aplicam)</i> <i>A pé</i> <i>Bicicleta</i> <i>Ônibus ou outro transporte público</i> <i>No seu carro</i> <i>De carona (de carro)</i> <i>Outro (favor especificar)</i>	8. Regarding where you buy most of your food, how do you usually get there? (mark all the applicable choices) Walking Bicycle Bus or other public transportation Driving my own car Get a ride (car) Other (specify)	8. <i>Pensando em onde você compra a maior parte dos seus alimentos, como você geralmente vai até este estabelecimento? (marque todas que se aplicam)</i> Caminhando <i>De bicicleta</i> <i>De ônibus ou outro transporte público</i> De carro (próprio) De carro (carona) De carro de aplicativo ou taxi Peço por entrega (delivery) <i>Outro (favor especificar)</i>
9. About how long would it take to get from your home to the store where you buy most of your food, if you walked there? 10 minutes or less 11 to 20 minutes 21 to 30 minutes More than 30 minutes	9. <i>Quanto tempo você levaria para ir da sua casa até o estabelecimento, onde você compra a maior parte dos seus alimentos, se você fosse caminhando?</i> <i>10 minutos ou menos</i> <i>21 a 30 minutos</i> <i>11 a 20 minutos</i> <i>Mais de 30 minutos</i>	9. How long would it take you to go from your home to the food store where you buy most of your food, if you went walking? 10 minutes or less 11 to 20 minutes 21 to 30 minutes More than 30 minutes	9. <i>Quanto tempo você levaria para ir da sua casa até o estabelecimento, onde você compra a maior parte dos seus alimentos, se você fosse caminhando?</i> <i>10 minutos ou menos</i> <i>21 a 30 minutos</i> <i>11 a 20 minutos</i> <i>Mais de 30 minutos</i>

Chart 1 – Original version, synthesis of translations, summary of back-translations and pre-test version of the translation and adaptation process of the Perceived Nutrition Environment Measures Survey instrument.

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Original version	Summary of translations T12 (stage I and II)	Summary of back translations BT12 (stage III)	Pre-test version (stage IV e V)
B. Food Shopping Questions	B. <i>Perguntas sobre Compra de Alimentos</i>	B. Questions about Buying Food	B. <i>Perguntas sobre Compra de Alimentos</i>
10. How important are each of the following factors in your decision to shop at the store where you buy most of your food? a. Near your home b. Near or on the way to other places where you spend time c. Your friend/ relatives shop at this store d. Selection of foods e. Quality of foods f. Prices of foods g. Access to public transportation	10. <i>O quão importante é cada um dos seguintes fatores na sua decisão para comprar no estabelecimento que você mais compra alimentos?</i> a. <i>É perto da sua casa</i> b. <i>É perto ou no caminho de outros lugares que você frequenta</i> c. <i>Seus amigos/familiares compram neste estabelecimento</i> d. <i>Opções de alimentos</i> e. <i>Qualidade dos alimentos</i> f. <i>Preços dos alimentos</i> g. <i>É acessível pelo transporte público</i>	10. How important is each of the following items in your decision to buy food at the food store where you usually buy food? a. It is near your home. b. It is near or on the way to other places you go c. Your friends/ relatives buy at this store d. Choices of food e. Quality of the available foods f. Prices of the foods are affordable g. It can be reached by a public means of transportation	10. <i>O quão importante é cada um dos seguintes itens na sua decisão de ir ao estabelecimento em que você compra a maioria dos alimentos?</i> a. <i>É perto da sua casa</i> b. <i>É perto ou no caminho de outros lugares que você frequenta</i> c. <i>Seus amigos/familiares compram neste estabelecimento</i> d. Variedade de opções de alimentos e. <i>Qualidade dos alimentos</i> f. <i>Preços dos alimentos</i> g. <i>É acessível pelo transporte público</i>
11. At the store where you buy most of your food, how hard or easy is it to get each of these types of foods? a. Fresh fruits and vegetables b. Canned or frozen fruits and vegetables c. Lean meats d. Candy and snack chips e. Low fat products f. Regular soda or other sugary drinks (sports drinks, juice drinks, etc.)	11. <i>No estabelecimento onde você compra a maior parte dos seus alimentos, o quão fácil ou difícil é encontrar esses tipos de alimentos?</i> a. <i>Frutas e vegetais frescos</i> b. <i>Frutas e vegetais enlatados ou congelados</i> c. <i>Carnes magras</i> d. <i>Doces e salgadinhos</i> e. <i>Produtos com baixo teor de gordura</i> f. <i>Refrigerante comum ou outras bebidas açucaradas (isotônicos, sucos, etc.)</i>	11. In the food store where you buy most of your food, how easy or difficult is it to find these types of food? a. Fruit and fresh vegetables b. Canned or frozen fruits and vegetables c. Lean meat d. Sweets and snacks e. Low fat products f. Soft drinks or other drinks with added sugar (isotonic drinks, juices, etc.)	11. <i>No estabelecimento onde você compra a maior parte dos seus alimentos, o quão fácil ou difícil é encontrar esses tipos de alimentos?</i> a. <i>Frutas e vegetais frescos</i> b. <i>Frutas e vegetais enlatados ou congelados</i> c. <i>Carnes magras (sem gordura)</i> d. <i>Doces e salgadinhos de pacote</i> e. <i>Produtos com baixo teor de gordura (light e diet)</i> f. <i>Refrigerantes, sucos prontos (pó, concentrado, caixinha), outras bebidas adoçadas</i>
12. At the store where you buy most of your food, how would you rate the price of fresh fruits and vegetables? Very inexpensive Not expensive Somewhat expensive Very expensive	12. <i>No estabelecimento onde você compra a maior parte dos seus alimentos, como você avalia os preços de frutas e vegetais frescos?</i> <i>Muito baratos</i> <i>Baratos</i> <i>Um pouco caros</i> <i>Muito caros</i>	12. In the food store where you buy most of your food, how would you evaluate the fruit and vegetable prices? Very cheap Cheap A little expensive Very expensive	12. <i>No estabelecimento onde você compra a maior parte dos seus alimentos, como você avalia os preços de frutas e vegetais frescos?</i> <i>Muito baratos</i> <i>Baratos</i> <i>Um pouco caros</i> <i>Muito caros</i> Não tem frutas e vegetais disponíveis Não sei responder
13. Where do you usually purchase fruits and vegetables? Please select all that apply. Supermarket Small grocery store Corner store or convenience store Farmer's market Fruit and vegetable truck Other (please specify) I don't buy fresh fruit and vegetables	13. <i>Onde você geralmente compra frutas e verduras vegetais? Marque todas que se aplicam</i> <i>Supermercado</i> <i>Mercearia</i> <i>Loja de conveniência</i> <i>Feira ou sacolão</i> <i>Caminhão de frutas e vegetais</i> <i>Outro (favor especificar)</i> <i>Eu não compro frutas ou vegetais</i>	13. Where do you usually buy fruits and vegetables? Mark all that apply Supermarket Grocery store Convenience store Farmer's market Fruit and vegetables truck Other (specify) I don't buy fruits or vegetables	13. <i>Onde você geralmente compra frutas, legumes e verduras? Marque todas que se aplicam</i> <i>Supermercado</i> <i>Mercearia, armazém ou mercados de bairro</i> <i>Feira ou sacolão</i> <i>Caminhão de frutas</i> <i>Outro (favor especificar)</i> <i>Eu não compro frutas ou vegetais</i>
14. Please mark whether you agree or disagree with the following statements for the store where you buy most of your food and your shopping habits at that store. Questions about unhealthy foods mean those foods often considered to be high in sugar, salt, fat and calories, such as candy, chips, regular soda, sugary cereals, bakery desserts, and so on a. I notice signs that encourage me to purchase healthy foods b. I often buy food items that are located near the cash register c. The unhealthy foods are usually located near the end of the aisles	14. <i>Por favor, assinale se você concorda ou discorda com as seguintes afirmações em relação ao estabelecimento onde você compra a maior parte dos seus alimentos e seus hábitos de compra lá. Alimentos não saudáveis são aqueles que costumam ter muito açúcar, sal, gordura e calorias, como doces, salgadinhos, refrigerantes comuns, cereais açucarados, doces de padaria e assim por diante</i> a. <i>Vejo placas me encorajando a comprar alimentos saudáveis</i> b. <i>Frequentemente compro alimentos próximos ao caixa.</i> c. <i>Os alimentos não saudáveis costumam estar próximos do fim dos corredores.</i>	14. Mark if you agree or disagree with the following statements regarding the food store where you buy most of your food and your spending habits there. Unhealthy foods are those that usually contain large amounts sugar, salt, fat and calories such as sweets, salty snacks, soft drinks, sweetened cereal, bakery sweets and similar types a. I see signs that encourage me to buy healthy foods b. I often buy food near the cash register c. Unhealthy foods are usually placed by the end of each aisle	14. <i>Por favor, assinale se você concorda ou discorda com as seguintes afirmações em relação ao estabelecimento onde você compra a maior parte dos seus alimentos e seus hábitos de compra lá. Questões relacionadas a alimentos não saudáveis são aqueles que costumam ter muito açúcar, sal, gordura e calorias, como doces, salgadinhos, refrigerantes, cereais açucarados, sobremesas e outros</i> a. Percebo placas me encorajando a comprar alimentos saudáveis b. <i>Frequentemente compro alimentos próximos ao caixa.</i> c. <i>Os alimentos não saudáveis costumam estar próximos do fim dos corredores</i>

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Original version	Summary of translations T12 (stage I and II)	Summary of back translations BT12 (stage III)	Pre-test version (stage IV e V)
B. Food Shopping Questions	B. Perguntas sobre Compra de Alimentos	B. Questions about Buying Food	B. Perguntas sobre Compra de Alimentos
d. I often buy items that are eye-level on the shelves e. There are a lot of signs and displays encouraging me to buy unhealthy foods f. I see nutrition labels or nutrition information for most packaged foods at the store g. The foods near the cash register are mostly unhealthy choices	d. <i>Frequentemente eu compro os itens que estão na altura dos olhos nas prateleiras</i> e. <i>Há muitos ou placas me encorajando a comprar alimentos não saudáveis.</i> f. <i>Eu olho as tabelas e informações nutricionais da maioria das embalagens de alimentos</i> g. <i>Os alimentos próximos ao caixa geralmente são escolhas não saudáveis</i>	d. I often buy the items that are at eye level on the shelves e. There are many or signs encouraging me to buy unhealthy foods f. I look at the nutritional tables and information on most food packaging g. Foods near the cash register are usually unhealthy choices	d. <i>Frequentemente eu compro os itens que estão na altura dos olhos nas prateleiras</i> e. Existem muitos sinais ou placas me encorajando a comprar alimentos não saudáveis f. <i>Eu olho as tabelas e informações nutricionais da maioria das embalagens de alimentos no estabelecimento</i> g. <i>Os alimentos próximos ao caixa geralmente são escolhas não saudáveis</i>
C. Restaurant/ Eating Out Questions	C. Perguntas sobre Restaurantes / Refeições Fora de Casa	C. Questions about Restaurants / Eating Out	C. Perguntas sobre Restaurantes / Refeições Fora de Casa
15. In an average week, how many times do you eat a meal away from home, or get take-out food, at a... a. Fast-food restaurant: __times a week b. Sit-down restaurant: times a week c. Other type of “restaurant” (e.g., food truck, cafeteria, etc): __times a week Please specify type	15. <i>Em uma semana comum, quantas vezes você faz uma refeição fora de casa, ou pega comida para viagem, em um...</i> a. <i>Restaurante fast-food: __vezes por semana</i> b. <i>Restaurante: __vezes por semana</i> c. <i>Outro tipo de “restaurante” (como food truck, cantina, etc): __vezes por semana</i> <i>Por favor especificar o tipo</i>	15. On a regular week, how many times do you eat out or pick a takeout meal at a... a. Fast-food restaurant: __times a week b. Restaurant: __times a week c. Another type of “restaurant” (food truck, cafeteria, etc.): __times per week Specify the type	15. <i>Em uma semana comum, quantas vezes você faz uma refeição fora de casa, ou pega comida para viagem, em...</i> a. Lanchonetes ou redes de fast-food (Mc Donald’s, Burger King, Subway, entre outros): __vezes por semana b. Restaurante comum (por quilo, self service, à la carte): __vezes por semana c. Outro tipo de “restaurante” (como food truck, cantina, etc): __vezes por semana <i>Por favor especificar o tipo</i>
16. About how long would it take to get from your home to the fast-food restaurant where you go most often, if you walked there? 10 minutes or less 11 to 20 minutes 21 to 30 minutes More than 30 minutes I do not eat at fast-food restaurants	16. <i>Quanto tempo você levaria da sua casa até o restaurante de fast-food que você mais frequenta, se você fosse andando?</i> <i>10 minutos ou menos</i> <i>11 a 20 minutos</i> <i>21 a 30 minutos</i> <i>mais de 30 minutos</i> <i>Eu não como em restaurantes de fast-food</i>	16. How long would it take from your house until the fast-food restaurant that you go to the most, if you walked? 10 minutes or less 11 to 20 minutes 21 to 30 minutes more than 30 minutes I do not eat at fast-food restaurants	16. <i>Quanto tempo você levaria da sua casa até lanchonetes ou redes de fast-food que você mais frequenta, se você fosse andando?</i> <i>10 minutos ou menos</i> <i>11 a 20 minutos</i> <i>21 a 30 minutos</i> <i>mais de 30 minutos</i> <i>Eu não como em lanchonetes ou em redes de fast-food</i>
17. About how long would it take to get from your home to the sit-down restaurant where you go most often, if you walked there? 10 minutes or less 11 to 20 minutes 21 to 30 minutes More than 30 minutes I do not eat at sit-down restaurants	17. <i>Quanto tempo você levaria da sua casa até o restaurante comum que você mais frequenta, se você fosse andando?</i> <i>10 minutos ou menos</i> <i>de 11 a 20 minutos</i> <i>10 minutos ou menos</i> <i>de 11 a 20 minutos</i> <i>Eu não como em restaurantes comuns</i>	17. How long would it take from your house until the regular restaurant that you go the most, if you walked? 10 minutes or less 11 to 20 minutes 21 to 30 minutes more than 30 minutes I do not eat at restaurants	17. <i>Quanto tempo você levaria da sua casa até o restaurante comum (por quilo, self service, à la carte) que você mais frequenta, se você fosse andando?</i> <i>10 minutos ou menos</i> <i>de 11 a 20 minutos</i> <i>10 minutos ou menos</i> <i>de 11 a 20 minutos</i> <i>Eu não como em restaurantes comuns</i>
Please check the answer that best describes the restaurant where you go most often (including getting take-out if that applies to you) and your opinion about that restaurant • Questions about healthy options mean choices that are low-fat, “heart healthy”, small portions, fruits and vegetables, and so on • Questions about unhealthy foods mean those foods that are high in fat, sugar, salt and calories, such as “super-sized” items, foods that are deep-fried, sweet desserts, and so on	<i>Por favor, marque a resposta com a melhor descrição do restaurante que você mais frequenta (incluindo aqueles onde você pega comida para viagem, se for o caso) e a sua opinião sobre esse restaurante</i> • <i>As opções saudáveis são consideradas aquelas com baixo teor de gordura, “boas para o coração”, porções pequenas, frutas, verduras e vegetais, e assim por diante</i> • <i>As opções não saudáveis são consideradas aquelas com muita gordura, açúcar, sal e calorias, como porções extragrandes, frituras, sobremesas açucaradas, e assim por diante</i>	Please, check the answer that best describes the kind of restaurant you frequently go to (including those where you pick take-out food, if applicable) and your opinion about that restaurant • Healthy options are considered those with low fat, “good for the heart”, small portions, fruits, vegetables, and those with similar characteristics • Unhealthy options are those considered as having too much fat, sugar, salt and calories, such as extra-large portions, such as fried foods, desserts, sweetened foods and those with similar characteristics	<i>Por favor, marque a resposta com a melhor descrição do restaurante que você mais frequenta (incluindo aqueles onde você pega comida para viagem, se for o caso) e a sua opinião sobre esse restaurante</i> • <i>As opções saudáveis são consideradas aquelas com baixo teor de gordura, “boas para o coração”, porções pequenas, frutas, legumes e verduras, e assim por diante.</i> • <i>As opções não saudáveis são consideradas aquelas com muita gordura, açúcar, sal e calorias, como porções extragrandes, frituras, sobremesas açucaradas, e assim por diante</i>

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Original version	Summary of translations T12 (stage I and II)	Summary of back translations BT12 (stage III)	Pre-test version (stage IV e V)
C. Restaurant/ Eating Out Questions	C. <i>Perguntas sobre Restaurantes / Refeições Fora de Casa</i>	C. Questions about Restaurants / Eating Out	C. <i>Perguntas sobre Restaurantes / Refeições Fora de Casa</i>
18. Is the restaurant where you go most often a... Fast-food restaurant Sit-down restaurant Other (please specify)	18. <i>O restaurante que você mais frequenta é um... Restaurante fast-food Restaurante Outro (favor especificar)</i>	18. The restaurant you usually go to is a ... Fast-food restaurant Restaurant Other (please specify)	18. O estabelecimento em que você mais frequenta é um... Lanchonetes ou em redes fast-food Restaurantes comuns (por quilo, self service, à la carte) Outro (favor especificar)
19. Please mark whether you agree or disagree with the following statements about the restaurant where you go most often: a. There are many healthy menu options at the restaurant. b. It is hard to find a healthy option when eating out at the restaurant. c. It is easy to find healthy fruit and vegetable choices at the restaurant. d. It is important to me to be able to make a healthy food choice when eating out. e. The restaurant provides nutrition information (such as calorie content) on a menu board or on the menu. f. Signs and displays encourage overeating or choosing unhealthy foods from the menu. g. It costs more to buy the healthy options. h. The menu or menu board highlights and promotes the healthy options at the restaurant.	19. <i>Por favor assinale se você concorda ou discorda com as seguintes afirmações sobre o restaurante que você mais frequenta: a. Há muitas opções saudáveis no menu do restaurante b. É difícil encontrar uma opção saudável quando como neste restaurante c. É fácil encontrar opções saudáveis como frutas e vegetais neste restaurante d. É importante para mim poder escolher alimentos saudáveis quando como fora de casa e. O restaurante disponibiliza informações nutricionais (como quantidade de caloria) no menu ou na placa de menu do dia f. Pôsteres e cartazes encorajam a comer exageradamente ou escolher as opções não saudáveis do menu g. As opções saudáveis são mais caras h. O menu, ou a placa de menu do dia, destaca e promove as opções saudáveis do restaurante</i>	19. Please indicate if you agree or disagree with the following statements about the restaurant you usually go to: a. There are many healthy options on the restaurant menu b. It is difficult to find a healthy option when at this restaurant c. It is easy to find healthy options like fruits and vegetables in this restaurant d. It is important for me to be able to choose healthy foods when I eat out e. The restaurant provides nutritional information (such as amount of calories) on the daily menu or menu board f. Posters and banners encourage me to eat too much or choose unhealthy menu options. g. Healthy options are more expensive h. The daily menu or menu board highlights and promotes the restaurant's healthy options	19. <i>Por favor assinale se você concorda ou discorda com as seguintes afirmações sobre o restaurante que você mais frequenta: a. Há muitas opções saudáveis no cardápio do restaurante b. É difícil encontrar uma opção saudável quando como neste restaurante c. É fácil encontrar opções saudáveis como frutas e vegetais neste restaurante d. É importante escolher alimentos saudáveis quando faço refeições fora de casa e. O restaurante disponibiliza informações nutricionais (como quantidade de caloria) no menu ou na placa de menu do dia f. Pôsteres e cartazes encorajam a comer exageradamente ou escolher as opções não saudáveis do menu g. As opções saudáveis são mais caras h. O menu, ou a placa de menu do dia, destaca e promove as opções saudáveis do restaurante</i>
D. Your Thoughts and Habits about Food	D. <i>Seus Hábitos e Pensamentos sobre Alimentos</i>	D. Your Habits and Thoughts about Food	D. <i>Seus Hábitos e Pensamentos sobre Alimentos</i>
20. In the last 12 months, how often were you concerned about having enough money to eat nutritious meals? Never A few times Frequently Almost all the time	20. <i>Nos últimos 12 meses, com que frequência você se preocupou com ter dinheiro suficiente para comer alimentos nutritivos? Nunca Algumas vezes Frequentemente Quase o tempo todo</i>	20. In the past 12 months, how often have you worried about having enough money to buy nourishing foods? Never A few times Frequently Almost all the time	20. <i>Nos últimos 12 meses, com que frequência você se preocupou em ter dinheiro suficiente para comer alimentos saudáveis? Nunca Algumas vezes Frequentemente Quase o tempo todo</i>
21. How concerned are you about the nutritional content of the foods you eat? Not at all concerned Not too concerned Somewhat concerned Very concerned	21. <i>O quão preocupado (a) você é com o conteúdo nutricional dos alimentos que você consome? Nada preocupado(a) Um pouco preocupado(a) Mais ou menos preocupado(a) Muito preocupado(a)</i>	21. How concerned are you about the nutritional content of the foods you eat? Not at all concerned Not too concerned Somewhat concerned Very concerned	21. Quanto preocupado (a) você é com o conteúdo nutricional dos alimentos que você consome? <i>Nada preocupado(a) Um pouco preocupado(a) Mais ou menos preocupado(a) Muito preocupado(a)</i>
22. When you shop for food, how important to you is...? a. Taste b. Nutrition c. Cost d. Convenience e. Weight control	22. <i>Quando você compra alimentos, o quão importante é para você...? a. Sabor b. O valor nutricional c. O custo d. A conveniência e. Controle de peso</i>	22. When you buy food, how important are the following to you...? a. Taste b. Nutritional value c. Cost d. Convenience e. Weight control	22. <i>Quando você compra alimentos, o quão importante é para você...? a. O sabor b. O valor nutricional c. O custo d. A facilidade e. O controle de peso corporal</i>
23. When you eat out at a restaurant or get take-out food, how important to you is...? a. Taste b. Nutrition c. Cost d. Convenience e. Weight control	23. <i>Quando você pede comida ou come fora de casa, o quão importante é para você...? a. Sabor b. O valor nutricional c. O custo d. A conveniência e. Controle de peso</i>	23. When you eat out at a restaurant or get take-out food, how important are the following to you...? a. Taste b. Nutritional value c. Cost d. Convenience e. Weight control	23. <i>Quando você come fora em um restaurante ou pede comida, o quão importante é para você...? a. O sabor b. O valor nutricional c. O custo d. A facilidade e. Controle de peso corporal</i>

Chart 1 – Original version, synthesis of translations, summary of back-translations and pre-test version of the translation and adaptation process of the Perceived Nutrition Environment Measures Survey instrument.

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Original version	Summary of translations T12 (stage I and II)	Summary of back translations BT12 (stage III)	Pre-test version (stage IV e V)
D. Your Thoughts and Habits about Food	D. <i>Seus Hábitos e Pensamentos sobre Alimentos</i>	D. Your Habits and Thoughts about Food	D. <i>Seus Hábitos e Pensamentos sobre Alimentos</i>
24. Have you ever tried to lose 10 pounds or more? Yes No → If no, go to question #26	24. <i>Você já tentou perder 5kg ou mais?</i> <i>Sim</i> <i>Não → Se a resposta for não, pule para a pergunta 26</i>	24. Have you ever tried to lose 5 kilos or more? Yes No → If no, please go straight to question #26	24. <i>Você já tentou perder 5kg ou mais?</i> <i>Sim</i> <i>Não → Se a resposta for não, pule para a pergunta 26</i>
25. If yes, think about your most recent effort to lose weight. How would you describe the results? Lost all I wanted to lose and kept it off Lost part of the weight I wanted to lose and kept it off Lost weight, but gained some of it back Lost weight, but gained all of it back Didn't lose any weight Still on a diet now	25. <i>Se sim, pense na sua última tentativa de perder peso. Como você descreveria os resultados?</i> <i>Perdi todo o peso que gostaria e consegui manter</i> <i>Perdi parte do peso que gostaria e consegui manter</i> <i>Perdi peso, mas ganhei um pouco de volta</i> <i>Perdi peso, mas ganhei tudo de volta</i> <i>Não perdi peso</i> <i>Ainda estou de dieta no momento</i>	25. If yes, think of your latest attempt to lose weight. How would describe the results achieved? I lost all the weight I wanted and kept it off I lost some of the weight I wanted and kept it off I lost weight but gained some of it back I lost weight but gained it all back I didn't lose weight I'm still on a diet	25. <i>Se sim, pense na sua última tentativa de perder peso. Como você descreveria os resultados?</i> <i>Perdi todo o peso que queria e consegui manter</i> <i>Perdi parte do peso que queria e consegui manter</i> <i>Perdi peso, mas ganhei um pouco de volta</i> <i>Perdi peso, mas ganhei tudo de volta</i> <i>Não perdi peso</i> <i>Ainda estou de dieta no momento</i>
26. When you shop for groceries, how often do you use a list? Never Occasionally Sometimes Usually or always	26. <i>Quando compra alimentos, com que frequência você utiliza uma lista de compras?</i> <i>Nunca</i> <i>Ocasionalmente</i> <i>Às vezes</i> <i>Geralmente ou sempre</i>	26. When you buy food, how often do you follow a shopping list? Never Occasionally Sometimes Usually or always	26. <i>Quando compra alimentos, com que frequência você utiliza uma lista de compras?</i> <i>Nunca</i> <i>Ocasionalmente</i> <i>Às vezes</i> <i>Geralmente ou sempre</i>
27. How often does your family eat evening meals together? Never Occasionally Sometimes Usually or always	27. <i>Com que frequência sua família janta reunida?</i> <i>Nunca</i> <i>Ocasionalmente</i> <i>Às vezes</i> <i>Geralmente ou sempre</i>	27. How often does your family eat dinner together? Never Occasionally Sometimes Usually or always	27. <i>Com que frequência sua família almoça ou janta juntos?</i> <i>Nunca</i> <i>Ocasionalmente</i> <i>Às vezes</i> <i>Geralmente ou sempre</i>
28. How often does your family eat meals in front of the TV, with the TV turned on? Never Occasionally Sometimes Usually or always	28. <i>Com que frequência sua família faz refeições em frente à TV ou com a TV ligada?</i> <i>Nunca</i> <i>Ocasionalmente</i> <i>Às vezes</i> <i>Geralmente ou sempre</i>	28. How often does your family eat meals in front of the TV or with it turned on? Never Occasionally Sometimes Usually or always	28. <i>Com que frequência sua família faz refeições em frente à TV, com a TV ligada?</i> <i>Nunca</i> <i>Ocasionalmente</i> <i>Às vezes</i> <i>Geralmente ou sempre</i>
The next question asks about how often you eat certain foods. Think about what you usually eat, including all meals, snacks, and eating out	<i>A próxima pergunta é sobre com que frequência você come certos alimentos. Pense sobre o que você come geralmente, incluindo todas as refeições, lanches e quando come fora de casa</i>	The next question is about how often you eat certain foods. Think about what you usually eat, including all the meals, snacks and what you consume when eating out	<i>A próxima pergunta é sobre com que frequência você come certos alimentos. Pense sobre o que você come geralmente, incluindo todas as refeições, lanches e quando come fora de casa</i>
29. About how often do you usually eat or drink each of the following items? a. Fruit, not counting juice b. Fruit juice, such as orange, grapefruit, or tomato c. Green salad d. Vegetables, not counting potatoes or salad	29. <i>Com que frequência você costuma comer ou beber cada um dos seguintes itens?</i> <i>a. Fruta, sem contar suco</i> <i>b. Suco de frutas natural, como laranja ou uva</i> <i>c. Salada de folhas</i> <i>d. Vegetais, sem contar batata ou salada</i>	29. How often do you usually eat or drink each of the following items? a. Fruit, not counting juice b. Natural fruit juice, such as orange or grape c. Green salad d. Vegetables, not counting potatoes or salad	29. <i>Com que frequência você costuma comer ou beber cada um dos seguintes itens?</i> <i>a. Fruta, sem contar suco</i> <i>b. Suco de frutas natural, como laranja ou uva</i> <i>c. Salada de folhas</i> <i>d. Legumes, sem contar batata ou salada</i>

Note: The words in bold were suggestions and alterations made by the committee of experts.

procedures recommended, accepted and used in the literature [38,39]. The results indicate that the Brazilian Portuguese version of the NEMS-P has conceptual, cultural and semantic equivalence, understandable for interviewees and comparable to the original English version.

In terms of conceptual, cultural and semantic equivalence, with the exception of the question referring to “time from home to the restaurant you most frequent” (Q-17), whose equivalence was indicated as “quite” or “total” by 70% of the members of the experts’ committee, all other questions

obtained values of 90% or 100%. These values are close to those observed in the adaptation of the Caregiver's Feeding Styles Questionnaire to Portuguese [38]. The evaluation by the committee obtained results with 90% to 100% referring to equivalence. It is likely that the term "sit-down restaurant", when translated into Portuguese to ensure understanding in the Brazilian context, made the process more difficult. In part, it is possible that this is due to the greater variety of types of restaurants existing in Brazil, such as "a la carte", "self-service", "buffet/pay-by-weight", "all-you-can-eat", etc., which can lead to confusion about the most appropriate translation of the term. However, for all other questions, the Portuguese version complies with the existing suggestion in the literature, which indicates a minimum 80% positive assessment regarding conceptual, cultural and semantic equivalence [38,39].

With regard to changes in the instrument, in the study that carried out the translation and adaptation of the NEMS-P into Spanish, [40] some types of food were included and excluded and the types of food stores and restaurants were changed, for the instrument to maintain the local reality. Store options were added to the instrument, such as food markets and small specialized stores (fruit and vegetable stores, butchers, bakeries or fish markets). Restaurants include "tapa bars", which are common in Spain. The adaptation process was conducted by two specialists and subsequently evaluated by a committee composed of four professionals. A pilot test was run with a group of 10 people. The instrument had a content validity index of 0.729 which, according to the authors, is acceptable as it is close to 1 [40]. The name of the instrument was also changed to NEMS-P-MED due to its application being carried out in the context of the Mediterranean.

More than 80% of the experts consulted considered the questions quite or completely objective, understandable and relevant after the translation and cross-cultural adaptation process. In this sense, considering the researchers' point of view, these data indicate that the Portuguese version of the NEMS-P can be applied in the Brazilian context, ensuring adequate understanding, with questions of relevance to the area of the food environment. This result was confirmed by the participants in the question clarity assessment. Only the question referring to statements related to access, quality and diversity of healthy foods such as fruits, vegetables and dairy products (Q4) was indicated by less than 90% of the participants as a question endowed with enough or total clarity, a value suggested by some authors [41]. According to one of the reports presented, it is possible that some technical terms used in the instrument are due to the subjectivity of each participant; terms such as "easy", "high quality" and "low fat" may diminish the understanding or clarity of the question. Thus, in general, the results demonstrate that the translated version is sufficiently clear and understandable to be applied in the Brazilian context. However, it is important to highlight that a larger and more diverse sample of respondents may be necessary to identify limitations in terms of clarity and understanding of the questions for some population subgroups, especially considering the continental dimensions of Brazil and its sociocultural variety.

The clarity assessment stage is very important, especially for instruments that can be completed by the respondent alone since the participant will respond to the questionnaire without the assistance of an interviewer. If, when conducting this step, the researcher observes that the participants are having difficulties and/or the evaluation of the items is of low understanding, the method in which several rounds of evaluation are carried out can be used until a consensus is reached that all the words and terms are understandable [42,43].

The study that adapted measures to assess children's movement behaviors and parenting practices performed the same procedures described in the literature [34,35]. In the clarity assessment stage, applied to parents, some measures were changed and replaced, such as "events" with "activities",

and “sedentary” was replaced with examples of behavior such as “not active” or “sitting for a long time” [44]. This step allows the researchers to identify the interviewees’ difficulties in reading and understanding the questions, and make the changes without compromising the intention and meaning of the original questions, providing the instrument is comprehensible.

As important as the conceptual, cultural and semantic equivalence, in addition to the clarity and comprehensibility of the instrument, is its comparability with the original version. Thus, the expert committee confirmed that the translated and adapted version for Brazil had little change in relation to the original version of the NEMS-P. However, some issues should be analyzed more carefully. In particular, five questions regarding food availability, variety and quality (Q4); price of fruits and vegetables (Q12); distance (Q17) and consumption in restaurants and fast-foods (Q18) and perception of weight loss (Q25) had an evaluation of 70% regarding the changes made in the translation and adaptation process, and the question referring to important factors in the choice of where to buy food (Q10), 60%, indicating no or little change in relation to the original version. These results are close to those of the National College Health Assessment II translation and adaptation study, in which the expert committee evaluated the versions of the steps in the translation process, considering 80% of the questions as unchanged, and the rest as little changed [45]. Despite these values, such changes tend to be more grammatical and interfere little with the meaning and understanding of the question as a whole. Also, to ensure comparability, the final Portuguese version underwent some adjustments, following the suggestions of the expert committee to minimize any impossibility of comparison with the original version, without losing application in the Brazilian context.

It is important to emphasize that the NEMS-P was elaborated following the conceptual model proposed by Glanz et al. [1] and Green and Glanz [21] which addresses individual characteristics, including sociodemographic factors, health status, health behaviors and psychosocial factors. Since the food environment is composed of numerous variables, the instrument is not capable of contemplating the assessment of the food and nutritional environment in its entirety. On the other hand, the instrument allows the evaluation of the food environment through the individual’s perception of the community, consumer and domestic domains [21]. The study of these domains will contribute to a better understanding of the relationship between environment, community and consumption, allowing comparability between different cities, regions and even countries.

On the other hand, it is possible that additional questions will be created and incorporated into the version adapted for the Brazilian context. Different socioeconomic and cultural characteristics lead to very specific aspects in terms of food environment and, consequently, consumption. Thus, although this study presents a standardized evaluation option that is comparable with other studies that have used the NEMS-P it may not be sufficient to capture more or only relevant characteristics for the Brazilian context [29,46,47]. For example, in some Brazilian towns, there are markets, grocery stores and greengrocers with a subsidy for the low-income population or, often, for the entire population [48]. Among these, the administration of Curitiba has 35 units of the *Armazém da Família* (“Family Grocers”) where the low-income population has access to staple food items at prices on average 30% lower than those found in the region. In this sense, with the aim of better understanding the impact of these policies on eating habits, it is possible that specific questions will have to be incorporated – in particular, given that social media relations, cultural aspects, government policies, and infrastructure, between the country of origin of the instrument and Brazil, are different.

Several studies carried out in Brazil and Latin America have tested associations between food availability in the food environment, accessibility and food consumption in all age groups [18,49,50]. The research results corroborate with each other and with the findings in literature,

suggesting that the greater the availability, the greater its consumption [23,51]. However, there is still little evidence regarding the perception of the food environment. Thus, the use of the Brazilian version of the NEMS-P will help and complement these studies with the aim of better understanding these associations.

Although the present study carried out the translation and cross-cultural adaptation of the NEMS-P, the reliability and validity of this version when applied in Brazil are still unknown. Therefore, we recommend that future studies test the reliability of this tool and its validity when compared to other more accurate methods, since it is the first tool to be translated and adapted to assess the perception of the food environment in the Brazilian context.

Some limitations must be considered when interpreting our results. Firstly, the evaluation stage by the expert committee was performed out individually, not allowing feedback on ideas that could emerge, such as what happens during focus groups and group interviews. In addition, during the evaluation by the committee, the relevance of the questions was examined, and not specifically the relevance of the Brazilian context. On the other hand, the remote assessment by experts provided the participation of experts with a good representation of different areas of knowledge and different positions of expertise. Also, since the assessment of clarity in the pre-test stage took place at the time of the SARS-CoV-2 pandemic, this stage could not be carried out in person. Therefore, we were unable to reach the number of evaluators suggested by the literature – from 30 to 40 [39] –, nor the diversity in sociodemographic characteristics that could help to better understand the clarity of the NEMS-P. Since we conducted this step digitally, people with lower education levels and older age, who generally have difficulties accessing and browsing websites and the like, ended up not composing the sample. Thus, there is a certain limitation regarding the number of volunteers who participated, as well as the diversity of their sociodemographic characteristics.

CONCLUSION

We present a version of the NEMS-P adapted for the Brazilian context, which has adequate conceptual, cultural and semantic equivalence, being objective and comparable to the original version. Future studies should confirm its clarity, reliability and validity.

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LDP PIRES contributed to the design of the study, participated in the design of objectives, and carried out data collection and writing of the article. DA HÖFELMANN contributed to the writing and critical review of the article. RS REIS contributed to the writing and critical review of the article. AAF HINO contributed to the design of the study and participated in the design of objectives, writing and critical review of the article.