

## Research Article

# Rating of the Level of Cooking Skills and Healthy Eating: Brazilian Questionnaire

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**Abstract**

**Background:** Cooking skills have been considered a strategic component for the healthy eating (HE) promotion around the world. In Brazil, the Brazilian Cooking Skills Questionnaire (BCSQ) was translated and validated with university students. However, there is not a validated classification for the Brazilian version that determines high or low levels of CS and healthy or unhealthy eating. Therefore, the aim of the present study was to establish and validate the rating of the levels of CS and HE of the BQCS' answers options.

**Methodology:** Content validation was used to rate 5 answer options as high level of CS (HCH) or low level (LCS) as well as HE or unhealthy eating for 17 items in an online form. Fourteen experts (nutrition and gastronomy fields) participated in content validation. The percentage of agreement with the expert panel was calculated based on the parameter  $\geq 90\%$  for HCS or HE.

**Results:** There was agreement  $\geq 90\%$  in 8 items for HCS (3 answers) and LCS (9 answers). The same degree of agreement was obtained in 11 items for HE (13 answers) and unhealthy eating (7 answers). These answers can serve as a reference to rate the level of CS and healthy eating in the BCSQ. Agreement between 70% and  $<90\%$  was found in 15 items for HCS (16 responses), LCS (22 responses), healthy eating (12 responses) and unhealthy eating (20 responses).

**Principal conclusions:** This study rated the level of CS and HE, supporting the establishment of BCSQ cutoff points. Further studies can use this approach.

**INTRODUCTION**

Cooking confidence, attitude, and knowledge are fundamental requirements for the development of individual cooking skills (CS). Cooking skills have been referred to as the ability to perform tasks related to the planning of menus, purchase of food, whether fresh, minimally processed, processed or ultra-processed, and preparation of food [1]. Based on this concept, there are controversies regarding the relationship of cooking skills and health eating practices. For example, cooking skills are defined as 'cooking from scratch' with 'basic ingredients' or 'unprocessed foods' by many authors [1-3,8,9], which is healthy, although, on the other hand, cooking skills can include the ability to cook processed and ultra-processed foods [1] as well as to use equipment's, such as a microwave oven to heat food, for example [2], practices considered unhealthy [1,2]. Since processed and ultra-processed food and heating pre-cooked food cannot be

healthy [1,2], there is a lack in the literature to characterize which cooking skills would be related to healthy eating.

Cooking skills have been considered a strategic component for the healthy eating (HE) promotion around the world [2-8]. Studies conducted by several researchers have shown that diet is influenced by different levels of cooking skills (CS) and healthier eating behaviors were observed in participants who had a high level of CS (HCS) [9-11]. In contrast, Clifford, Penney and Adams [12] evaluated the relationship between high and low consumption of home-cooked meals in a group of individuals with a high-quality diet. The authors found that home-cooked meals, which requires a certain level of CS, and food consumed outside the home (such as in restaurants) varied greatly in relation to their nutritional quality, thus suggesting that the levels of CS are not necessarily associated with HE.

Questionnaires have been developed to better assess

aspects related to CS [13,14]. Kennedy et al. [14], for example, established three levels for the classification of CS: basic level (following simple recipes, peeling, chopping, etc.), intermediate level (adjusting recipes, planning meals using food from home, etc.) and advanced level (creating new recipes, preserving food, etc.). Lavelle et al. [13], in turn, assessed the respondents' cooking skills confidence that included cooking methods, peeling, slicing, chopping, planning purchases, and preparing a healthy meal. They found that the scores on cooking skill confidence of individuals with prior knowledge of the subject were higher. On the other hand, the questionnaire scores of individuals with less knowledge were lower and it was possible to distinguish those with high or low abilities through the difference of points between the groups. Even though these questionnaires show options to classify the level of cooking skills to the respondents, they did not show the relationship of this level to health eating practices.

Then, there is the Brazilian Questionnaire on Cooking Skills and Healthy Eating (BQCS) [15,16] that identifies the barriers to cooking, use, and consumption of fruits and vegetables. It was adapted from the questionnaire for evaluating the program Cooking with Chef (CWC), developed and validated by researchers at Clemson University in the United States of America [17,18]. In Brazil, this questionnaire was translated and validated with university students [15,16,19]. The BQCS proposes to assess CS and HE on a 5-point scale for each item. In the original version of the questionnaire, it was established that the higher the mean obtained, the higher was the respondent's level of CS [17-19]. However, there is not a validated classification for the Brazilian version that determines high or low levels of CS and healthy (HE) or unhealthy eating [15,16]. In this sense, the analysis by experts is required to verify the rate of agreement on the relevance or representativeness of data or content validation related to the instrument [20-22]. Therefore, the aim of the present study was to establish and validate the rating of the levels of CS and HE of the BQCS' answers options.

## MATERIAL AND METHODS

### Study design

This is a methodological study to rate the level of cooking skills (CS) and healthy eating (HE) of the answer options of the Brazilian Questionnaire for assessing Cooking Skills and Healthy Eating (BQCS) [15] based on content validation.

### Brazilian Questionnaire on Cooking Skills (BQCS)

The BQCS was validated with students from a Brazilian university. It assesses the preparation practices of home-cooked meals related to HE. The BQCS consists of 64 closed, multiple-choice items, distributed into 8 scales, namely: 1. Availability of and accessibility to fruits and vegetables (8 items); 2. Cooking Attitude (7 items); 3. Cooking Behavior (12 items); 4. Cooking Self-Efficacy (6 items); 5. Self-efficacy Produce Consumption (6 items); 6. Self-efficacy for using Basic Cooking Techniques (11 items); 7. Self-efficacy for using Fruits, Vegetables and Seasonings (9 items); and 8. Evaluation of knowledge of Cooking Techniques (8 items) [15]. Among the eight scales, only two of them have a rating and evaluation level, being necessary to establish the other cutoff points for rating of the level of CS and the healthiness of

the food, and its validation. What the index measures; the types of items and assessments for each scale; and the cutoff points of the answer options have not yet established for CS and healthy eating.

Scale 1 - Availability and accessibility of fruits and vegetables - assesses the presence of these foods at home. The higher the average, the greater the availability of and accessibility to fruits and vegetables at home [17,18,23-25]. Scale 2 - Cooking Attitude - assesses the participants' interest in cooking at home. This scale has reverse items, which ensure that the higher the average, the greater the cooking attitude of the individuals [15,17,18]. Scale 3 - Cooking Behavior - assesses how often individuals prepare their meals. In this scale there are items related to meal preparation using both fresh and ready-to-eat ingredients, according to CS [15], as well as the use of leftovers, prepared at home or not. Scales 4, 5, 6 and 7 assess self-efficacy in carrying out cooking tasks and techniques (Self-efficacy for using Basic Cooking Techniques) and using and consuming fruits and vegetables (Self-efficacy Produce Consumption and Self-efficacy for using Fruits, Vegetables and Seasonings), respectively. Higher scores indicate greater cooking skills [15,17,18]. The last scale (8) assesses knowledge of cooking terms and techniques.

As for the types of items and evaluation of the scales, the rating in scale 1 (Availability of and accessibility to fruits and vegetables) is based on yes/no answers (1 point for yes and 0 points for no). Through the score results, this scale reveals the average of items available at home. The higher the average, the greater the availability of and accessibility to fruits and vegetables at home [17,18,23-25]. A 5-point Likert-type scale is used for scales 2, 3, 4, 5, 6 and 7, that is, there are 5 answer options, ranging from 1 to 5 points. They are also evaluated by the highest mean to claim the highest CS [15,17,18]. Scales 8 - Evaluation of Cooking Knowledge - consists of multiple-choice items with 4 answer options and each correct answer corresponds to 1 point. The scores of answers obtained in this scale have an established cutoff point. The percentage of correct answers  $\geq 75\%$  of the items ( $\geq 6$  items) indicates "high level of cooking knowledge" and  $\leq 60\%$  ( $\leq 5$  items) indicates "low level of cooking knowledge" [15,17]. Due to the importance of classifying the levels of CS and HE of all scales in the BQCS, this study aimed to establish and validate the cutoff points for items in scales 2 (Cooking Attitude), 3 (Cooking Behavior), 4 (Cooking Self-Efficacy), 5 (Self-efficacy Produce Consumption), 6 (Self-efficacy for using Basic Cooking Techniques) and 7 (Self-efficacy for using Fruits, Vegetables and Seasonings).

### Participants

For the analysis of content validity, 14 experts were recruited, which is higher than the minimum recommended of six experts [26,27]. The experts were professionals with an academic background in Nutrition or Gastronomy, and they all held a Master's degree. They were selected according to their level of expertise in cooking skills and/or healthy eating. The experts were selected based on their curriculum available on the Brazilian platforms: Lattes from CNPq (National Council for Scientific and Technological Development), Biodiversity for Food and Nutrition Project (BFN) and Collaboration Centers for School Food and Nutrition (CECANE - Centro Colaborador em Alimentação e

Nutrição do Escolar). The project was approved by the Research Ethics Committee of the Federal University of Rio Grande do Sul (UFRGS) under protocol number 09427219.5.1001.5347 and all participants signed an informed consent form.

### Data collection

A letter was sent to the experts describing the project and the steps, followed by a script with instructions for filling out the form. These documents, together with the complete BQCS [15], were sent by e-mail. The form contained pre-selected items that had previously been analyzed by other professionals who had different training and worked at institutional food services. The cooks assessed which items in the BQCS would determine HE and the individuals' cooking skills. The selected items referred to 5 scales in the BQCS on a 5-point Likert scale (Table 1).

The assessment of the items selected by the experts, who agreed to participate in the project, was carried out by content validity. The experts established the relevance and pertinence of the answer options of the items in the BQCS regarding their level of CS and healthy eating [20,27,28].

The form on Google Forms with the 17 items selected was sent to the participants. Each item and the answer options on a 5-point Likert scale in the form referred to one of the selected items in the BQCS. For each of these answer options, the expert was asked to classify them into high or low levels of CS (HCS or LCS, respectively) and whether each one represented health or unhealthy eating patterns. Additionally, experts could include comments in specific fields on the form for each item evaluated. The form was available online for 60 days. Notifications with

reminders about deadlines and any clarifications were sent to the experts by email.

### Data analysis

The answers were coded for rating between high and low CS and healthy and unhealthy eating patterns for data analysis. The answer options were named R1-R5, as shown in Table 2.

The calculation of the percentage of agreement between the experts for the rating of each answer option is shown in the formula in Figure 1. The cutoff point  $\geq 90\%$  was established for the agreement between the experts to establish which answer option would be related to HCS or LCS and healthy or unhealthy eating [20,21]. The experts' comments were qualitatively analyzed by the researchers, as suggested by Cunningham et al. [21].

## RESULTS

Of the 14 experts who participated in the present study, 7 rated all items and 7 partially rated the level of cooking skills (HC) and healthy or unhealthy eating. Ten experts made comments in the observation fields of the form.

Of the 17 items assessed for healthy eating (HE), the agreement parameter was  $\geq 90\%$  for 11 items. The answer options for 9 items were rated as HE and 5 items were rated as unhealthy eating, noting that an only question could contain both types of rating (Table 3). The remaining questions (six) did not obtain the agreement by the experts in their answers options regarding HE. In 8 items the rating of HE was  $\geq 90\%$ . The answer options in 3 items were rated as high level of cooking skills (HCS) and 6 items were rated as low level of cooking skills (LCS), considering an only question could contain both types of rating. For both the CS

**Table 1:** Selected questions from Brazilian Questionnaire on Cooking Skills (BCSQ) to content validity's assesment of their range of cooking skills and health eating' level.

Scales	Questions
Cooking Attitude	1. Meals made at home are affordable.
	2. I like testing new recipes.
Cooking Behavior	3. How often do you prepare meals with basic ingredients (e.g. whole lettuce, raw meat, etc)?
	4. How often do you reheat or use leftovers to eat in another meal?
	5. How often do you reheat leftovers from a home cooked lunch or dinner meal?
	6. How often do you reheat leftovers from a ready meal bought away from home to eat at lunch or dinner meal in home?
	7. How often do you use leftovers from a home cooked meal to make a new dish?
	8. How often do you use leftovers from a ready meal bought away from home to make a new dish?
Cooking Self-Efficacy	9. How confident do you feel about following a written recipe (ex: preparing vinagrete sauce with tomatoes, onion, bell pepper, vinars, olive oil, salt peppers)?
	10. How confident do you feel about preparing lunch with items you have in the moment in your home?
Self-Efficacy for Using Cooking Techniques	11. How confident do you feel about cooking in boiling water?
	12. How confident do you feel about poaching?
	13. How confident do you feel about frying with a large amount of oil?
	14. How confident do you feel about roasting?
	15. How confident do you feel about barbecuing?
	16. How confident do you feel about microwaving?
Self-Efficacy for Using Fruits, Vegetables and Seasonings	17. How confident did you feel about using hot sauces (e.g. pepper sauces, mustard sauce)?

**Table 2:** Encoding of Brazilian Questionnaire on Cooking Skills (BQCS)’s answer options.

Scale	Answer options				
	R1	R2	R3	R4	R5
Cooking Attitude	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Cooking Behavior	Never	Once a month	Once a week	Several times a week	Daily
Cooking Self-Efficacy	Not at all confident	Not very confident	Neither with confidence nor without confidence	Confident	Extremely confident
Self-Efficacy for Using Cooking Techniques					
Self-Efficacy for Using Fruits, Vegetables and Seasonings					

**Table 3:** Agreement among experts about the rating of the Cooking Skills (CS) and Healthy Eating (HE)’s levels of the answer options of Brazilian Questionnaire on Cooking Skills (BQCS) items.

	R1 (%) AGREEMENT	R2 (%) AGREEMENT	R3 (%) AGREEMENT	R4 (%) AGREEMENT	R5 (%) AGREEMENT
<b>HEALTHY EATING (HE)’S LEVEL</b>					
Meals made at home are affordable				90	100
I like testing new recipes					100
Reheat or use leftovers to eat in another meal			100		
Use leftovers from a home cooked meal to make a new dish			100		
Follow a written recipe					92
Prepare a meal with items you have in the moment in your home				90	100
Cook in boiling water					92
Poaching				90	100
Roasting				90	100
<b>UNHEALTHY EATING’S LEVEL</b>					
Meals made at home are affordable		100			
I like testing new recipes		100			
Reheat leftovers from a ready meal bought away from home to eat at lunch or dinner meal in home				100	100
Prepare a meal with items you have in the moment in your home	90	90			
Fry with a large amount of oil			90		
<b>HIGH COOKING SKILLS (HCS)’S LEVEL</b>					
Follow a written recipe				91	
Prepare a meal with items you have in the moment in your home				91	
Barbecuing				91	
<b>LOW COOKING SKILLS (LCS)’S LEVEL</b>					
Reheat leftovers from a ready meal bought away from home to eat at lunch or dinner meal in home				90	90
Use leftovers from a home cooked meal to make a new dish	91				
Follow a written recipe	91		91		
Cook in boiling water	91	91			
Poaching	91				
Roasting	91				

(HCS or LCS) and HE (healthy or unhealthy), a single item could contain both ratings.

For the Cooking Attitude scale (2), which includes items such as “Meals prepared at home are affordable” and “I like trying new recipes”, the answer option R5 (strongly agree) was rated as as HE and R2 (disagree) was rated as UHE. There was no agreement

for the answer options to the items in the Cooking Attitude regarding the level of cooking skills. However, the answer option R1 (strongly disagree) for the item “Meals prepared at home are affordable” reached 88% agreement for low cooking ability (LCS), which was close to the reference parameter ( $\geq 90\%$ ). Two experts did not consider the relation of these items to CS or HE.

$$\% \text{ agreement} = \frac{\text{number of participants that agreed}}{\text{total of participants}} \times 100$$

Adapted from Coluci, Alexandre; Milani (2015) <sup>(18)</sup>

**Figure 1** Calculation of the agreement's percentage.

For the rating of answer options to the items in the Cooking Behavior scale (3), it was verified pattern of responses by the experts. The greater the frequency of preparing meals using ready to be used/ready-to-eat foods and leftover reheating, the greater the agreement regarding unhealthy eating. Five experts reported doubts concerning the healthiness of the meal related to items 'frequency of leftover reheating', such as: reheating or using leftover food in other meals, reheating leftovers from homemade lunch/dinner, reheating leftovers of ready-to-use foods to be consumed at home for lunch/dinner. In addition, three experts pointed out that it is difficult to assess CS based on the frequency of leftover reheating, considering that individuals with HCS can reheat leftovers at a similar frequency as individuals with LCS. The experts' comments to the items on the 'frequency one reheats or uses leftovers to consume in other meals' and 'frequency one uses leftovers from a meal prepared at home to make a new dish' were related to the need to know if the reheated leftovers would be food prepared at home or ready-to-use foods, and only then could they rate them as healthy or unhealthy eating.

In the item about one's confidence in preparing lunch with items available at home at the time of preparation, in the Cooking Self-efficacy scale (4), an expert reported difficulty in rating its healthiness, particularly response R3 (neither with confidence nor without confidence). According to this expert, this item does not necessarily indicate healthy or unhealthy eating. So, for this item, he suggested rating the R3 answer option as an intermediate level for CS and HE.

A similar behavior observed for the answer options in the Cooking Self-efficacy scale (4) was found for the Self-efficacy in Using Cooking Techniques (6) and Self-efficacy in Using Fruits, Vegetables, and Seasonings (7) scales, in which the answer options with the lowest scores indicated LCS and unhealthy eating and the highest scores indicated HCS and HE. The answers R1 (not at all confident) for the items about cooking in boiling water and on low heat and R2 (not very confident) for the items about oven roasting in scale 6 (Self-efficacy in Using Cooking Techniques) reached 89% of agreement for unhealthy eating. This percentage was close to the cutoff point. One of the experts noted that there is no direct relationship between confidence in using these cooking techniques and HE, as one may be confident to use the microwave or cooking in boiling water to prepare instant noodles, which are considered unhealthy food.

## DISCUSSION

Seventeen items evaluated in this study, where 8 were validated for CS and 11 were validated for HE, considering the same questions could be rated as their CS's level and HE. Among the answer options, there was greater agreement for rating the answers as low CS (LCS = n 9) than as high CS (HCS = n 3). As for

the answers about healthiness, there was greater agreement for answers rated as HE (n 13) than for unhealthy eating (n 7). Thus, the present study contribute to show that the rating of CS's level and HE of answers options depends on which kind of foods and culinary techniques used to prepare foods, For exemplo, the use of processed and ultra-processed foods, microaving and frying are considered unhealthy cooking practices [4,18,29], although these practices require some CS to be performed [1,12,30].

Among the ratings in this study, the answer options with the highest degree of agreement for healthy eating were the items "I like trying new recipes" and "meals prepared at home are affordable". Although experts did not agree on the level of CS in the answer options for these questions, a more positive cooking attitude tends to be related to a healthier diet. This statement is linked to what the other studies report about the the positive relationship between cooking attitudes (individuals who like cooking and trying new recipes) and healthy diets [17,31-33].

Regarding the relationship between the frequency of leftovers'consumption, CS's level and HE, the present study found that the answer R3 (once a week) for the item 'reheating leftovers prepared at home or using them to make a new dish' was classified as HE by the experts. LCS was related to the higher frequency of 'reheating leftovers of take away food' and lower frequency of 'using leftovers to make a new dish'. These data suggest that reheating leftovers from ready-to-eat food requires low CS but using leftovers to make a new dish requires a higher level of CS.

Despite this, some experts have pointed out that both a person with HCS and LCS can frequently reheat leftovers, which does not indicate the level of CS. In this sense, the culinary intervention program ran by Garcia et al. [6], showed the increased frequency of leftover consumption among participants (88% to 94%), although it was not statistically significant. The consumption of leftovers increased from once a week to once a day in the post-intervention group that indicated the participants' increased confidence in cooking skills and knowledge about nutrition, which was positive for increasing the consumption of leftovers. The reason for the greater use of leftovers, according to the participants, was to avoid waste and save money. The level of CS when using leftover food, in accordance with the experts in this study, refers take-away food, which is considered unhealthy eating and LCS. Along the same lines, other studies have shown that the best diet quality is directly related to the preparation of food at home, which requires higher levels of CS when compared to ready-to-eat food [10,13,14]. These studies reinforce the idea that homemade meals require higher levels of CS (HCS) and it is related to HE. On the other hand, homemade food will not always be prepared with healthy ingredients, and it may not necessarily mean HE [8,12]. It is important to note that there are other aspects to be considered regarding the low frequency of home cooking as well as of the leftovers' consumption, such as living arrangement and time lacking to cook [9,11,13], for example, and not necessarily the level of CS is the main reason to these practices.

Knol et al. [34] investigated food safety and cooking self-efficacy with food preparation behavior at home with students aged 19 years and over, who lived off the campus of the University

of Alabama, US. The results showed that the greater the students' confidence in food preparation, the greater their level of CS and food safety. The examples they cited were as follows: cooking a nutritious meal on a limited budget, cooking in a short time and being able to execute a recipe. Kennedy et al. [14] investigated the validity and reliability of a questionnaire that measured basic to intermediate skills' level. Among these skills, the authors mentioned the cooking skills for preparing meals. The authors found that individuals who had cooking confidence to prepare new foods and recipes were more likely to prepare a wider variety of foods, which positively influence the quality of the diet. In vulnerable groups living in areas of low socioeconomic status in Scotland, Garcia et al. [6] identified that the greater the individual's confidence in cooking, the healthier were their food consumption patterns. These findings are compatible with the assessment carried out by the experts in this study when they rated the answer options in the Cooking Self-efficacy scale as HCS and HE according to the highest degrees of confidence.

Several studies describe that familiarity with cooking techniques is a motivating factor for food preparation and practicing them can promote a healthier diet [3-5,14,29,30,35-39]. In the present study, the rating for HE was observed in the answer option R4 (confident) and for LCS in R1 (not at all confident) option to the item "cooking in boiling water" or "simmering" or "baking in the oven", for example. That is, the greater the individual's self-confidence in the use of different techniques, the greater the level of CS (HCS), so that can reflect in a tendency towards HE. However, not every culinary technique, which requires CS, means health eating habits. When reviewing healthy eating behaviors, Raber et al. [29] rated some cooking techniques as healthy. The authors concluded that cooking or processing techniques that require high temperatures such as roasting in an oven or on a barbecue grill, particularly meat, and frying were rated as unhealthy [24,29]. Other techniques were considered more appropriate for preparing healthy meals, such as boiling, simmering, steaming, scalding, and grilling [24,29].

As for confidence in using equipment, one of the experts commented that the microwave can be used by people with both LCS and HCS. Although this item did not reach agreement ( $\geq 90\%$ ) among experts when rating HE and CS, a pattern was observed: the greater the confidence in using the microwave, the higher the percentages for HCS. This may differ between CS questionnaires. Lavelle et al. [13] argued that using a microwave is a cooking technique, and it could even be the only CS of the study participants. Jomori et al. [1] pointed out that using microwaves can be considered a cooking technique because its use requires a certain cooking skill. This also reveals a change in the pattern of food preparation and consumption in recent decades.

The parameter  $\geq 90\%$  adopted and the participation of 14 experts to the content validity in the present study allowed to ensure more quality and reliability of obtained data [21,26,27], although some studies have suggested a parameter of  $\geq 78\%$  for agreement among experts [26,28,40,41]. The agreement among experts is not related to the relevance of the item [20,21], as recommended by some authors to content validity studies [26,28,40,41]. To improve the analysis, the experts' rating on each answer option were considered in the present study, and

not the analysis of the relevance of each item [21,26,27], which reinforced and justified the numeric analysis.

In general, validation by experts is in accordance with the recommendation in the literature on the highest level for the rating of CS. The greater the degree of agreement between cooking attitudes, frequency of cooking practices, and degree of cooking confidence, the greater the level of CS in using cooking techniques as well as fruits, vegetables, and seasonings [6,10,13,14,17,18]. The exception in this evaluation was observed for the evaluation of answers on: attitudes related to the perception of financial issues, cooking at home, and behavior concerning the use of leftovers.

Thus, the present study identified parameters for the rating of the level of cooking skills (HC) for answer options to items in the Cooking Behavior and Self-Efficacy in using Cooking Techniques scales. In further studies, cutoff points may be established for this rating, as it was applied by the studies of Jomori et al. [16] and Dezanetti et al. [11].

For the rating of healthy eating (HE) and Cooking Attitude, the pattern for the cutoff parameters identified in the present study was: if there was greater degree of agreement of the answer options (from strongly disagree to strongly agree), the rating referred to HE. For the scale Cooking Behavior, there was divergences and lack of linearity to rating some of answer options of their items as healthy and unhealthy eating. In the Cooking Self-Efficacy and Self-Efficacy in using cooking techniques scales, answer options for healthy eating were also rated, following the pattern: the greater the cooking confidence, the greater the relation to HE. However, some ratings of the items diverged regarding the pattern of HE.

In the present study, the rating of the levels of cooking skills (CS) and healthy eating (HE) was established for the answer options of the Brazilian Questionnaire on Cooking Skills (BQCS), which allowed to support some parameters to score respondents [11,16]. The adequacy of content validation to rate the level of CS and HE for the answer options of the items in the BQCS was a challenge as this method is generally used to develop a new instrument. However, it was adequate for the present study, as it was possible to make the adaptation to verify the percentage of agreement among experts to rate the answer options between LCS, HCS, healthy or unhealthy eating for the BQCS items.

Not all the answer options of the items assessed were validated for the rating of the level of CS and HE. This might have occurred due to the high parameter established for agreement among experts ( $\geq 90\%$ ). The experts might have not understood that the rating had to be related to the answer options and not to the items since items are normally validated during content validity [26-28,40,41]. However, the number of experts in the study was above the minimum recommended for content validation [26,27], which made the assessment valid. Although the rating cannot be extrapolated to the scoring of any assessment questionnaires of cooking skills, it may serve as a model for other instruments that require ratings.

As far as we know, this is the first validation study to rate the level of cooking skills and healthy eating using this methodology. So far, there is few studies in the literature on the rating of level of

CS and HE based on the analysis of a questionnaire, which has also been pointed by Kennedy et al. [14]. Thus, the rating can assist in the analysis of the results obtained with the administration of the BQCS that will promote specific educational policies and actions and improve the level of CS and HE of individuals assessed by the BQCS.

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