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Translation and Cross-Cultural Adaptation of a Validated Questionnaire to Assess Cooking and Food Skills Among the Italian Population

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To investigate the shift away from Mediterranean Diet model, based on the consumption of minimally processed foods, validated and tailored instruments are needed. In this study, we translated and cross-culturally adapted a validated questionnaire for the assessment of cooking and food skills (CS and FS). The process followed a 6 steps standardized protocol, supervised by a group of language, health, and statistics experts. A pilot test of the pre-final version was conducted among 40 volunteers (20 females, 20 males, aged 46.43 ± 19.21). Six experts in the field of nutrition performed the content validity study of the final version. The Scale-level Content Validity Indexes based on average (S-CVI/Ave) and Universal Agreement (S-CVI/UA) were calculated (cutoff = 0.83). A preliminary descriptive analysis on the pilot group answers was provided. Content validity coefficients S-CVI/Ave and S-CVI/UA were 0.98 ± 0.07 and 0.91 ± 0.29, respectively, and the internal consistency reliability was maintained in comparison to the original English version. The qualitative analysis of the pilot group responses showed an average CS of 60.53 ± 26.68 (out of possible 98) and FS of 74.35 ± 3.35 (out of possible 133). Overall, values recorded by males were significantly lower than those of females. Consumption of ready-to-eat ultra-processed foods is increasing, and culinary heritage of Mediterranean countries may be at risk. The translation and cross-cultural adaptation of a validated questionnaire to assess CS and FS, provided us with a tool suitable for the Italian population, essential to design observational and intervention studies.

INTRODUCTION

The Mediterranean basin gave birth to the globally recognized healthy lifestyle model, the Mediterranean Diet (MD). Greece, Turkey, Egypt, Morocco, Spain, Portugal, France, and Italy share a dietary pattern based on high consumption of fresh vegetables and fruit, wholegrain products, nuts and seeds, legumes, extra virgin olive oil as the main fat source, and moderate consumption of dairy products and animal sources of proteins. Ultra-processed foods, high-fat meats, sweets and drinks should be consumed in small amounts and occasionally.[1]

At the base of the recently updated Mediterranean diet pyramid[2] additional lifestyle aspects of the MD are provided: regular physical activity, mainly outdoors, restorative night sleep, as well as resting during the day, and culinary activities combined with conviviality. Cooking from simple, fresh, and raw ingredients, mostly according to seasons, is typical of MD, and sharing culinary activity allows the trans-generational transmission of the heritage of recipes and culinary traditions, providing a cultural value which transcends their nutritional function.[3]

Despite the widely documented health benefits of the MD model, not only in terms of primary and secondary

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S.M. and B.Z.: conceptualization. S.M., R.B.D., and A.S.: methodology. G.G. and E.R.: software. G.G., E.R., M.M., A.V., and G.M.: validation. S.M. and A.S.: formal analysis. E.R., M.M., and G.M.: investigation. S.M., B.Z., and A.S.: data curation. S.M.: writing—original draft preparation. G.G., R.B.D., A.S., A.V., and B.Z.: writing—review and editing. M.C. and B.Z.: supervision. S.M. and B.Z.: project administration.

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prevention of cardiovascular diseases, but also in terms of noncommunicable diseases, during the last decades a quick and profound modification of these dietary habits has been observed in the Mediterranean countries, including Italy, experiencing a progressive shift away from this dietary and lifestyle model.[2–5] Alongside with a process of "westernization" of habits, there has been an increase in the consumption of ultra-processed foods and beverages that are ready to heat and serve.[4–6] Several factors characterize these changes, such as an increase in the consumption of products of animal origin, especially meat and its derived products, an excessive intake of refined sugars and saturated fats, as well as less time and attention devoted to food purchase and preparation.[7] The profound changes in the society, with an increase in eating out, a reduction in the time spent preparing and sharing meals with family, along with the globalization of the availability and aggressive marketing of ultra-processed foods, and their very low cost, are just some of the several factors recognized as responsible for this estrangement.[8,9] Moreover, women seem more likely than man to be involved and to feel confident in cooking,[3,10] but their increased engagement with work and career progressively weakens their cooking attitude and the generational transmission process of culinary skills.

This progressive transition away from MD model is associated with an increase of overweight and obesity conditions among all age groups, in both Europe and Italy.[4,11,12] The significant decline in dietary quality, and the consequent increase of obesity and diet-related noncommunicable diseases, draw attention also to the issue of home cooking: preparing meals at home, based on improved skills, leads to higher diet quality, better weight control and general improvement in overall health.[8,13,14]

Cooking Skills and Food Skills (CS and FS) not only refer to a series of mechanical actions such as chopping, mixing or heating foods, but are a group of abilities involving food selection, ingredients combination, the use of cooking tools, meal planning and preparation of dishes from scratch, emphasizing fresh and minimally processed ingredients.[15,16]

Among the factors involved in the nutritional and lifestyle transition, cooking and food skills are some of the least thoroughly studied by the scientific community, and, to accurately assess these aspects and design targeted interventions, we need precise instruments tailored to the population under study.[3]

The CS and FS confidence measure survey is a validated and user-friendly questionnaire developed by Professors M. Dean, F. Lavelle and collaborators, suitable for self-compilation and for cross-sectional, longitudinal and intervention studies.[16] This instrument was developed in English-speaking country and, to assess CS and FS among Italian population, a translation and cross-cultural adaptation are mandatory. Indeed, there are currently no validated tools suitable for the Italian population available. To achieve the equivalence between the original validated source and the target version of the questionnaire, a standardized method is needed to maintain the content validity.[17]

The aim of this work was to translate from English to Italian, to culturally adapt and validate the content of the questionnaire by Lavelle et al,[16] to obtain a scientifically solid instrument for observational and intervention studies, suitable for self-completion by the Italian population.

EXPERIMENTAL METHODS

Translation and Cross-Cultural Adaptation Process

Before beginning the translation and cross-cultural adaptation, we contacted Professor Dean, the head of the research team responsible for developing of the

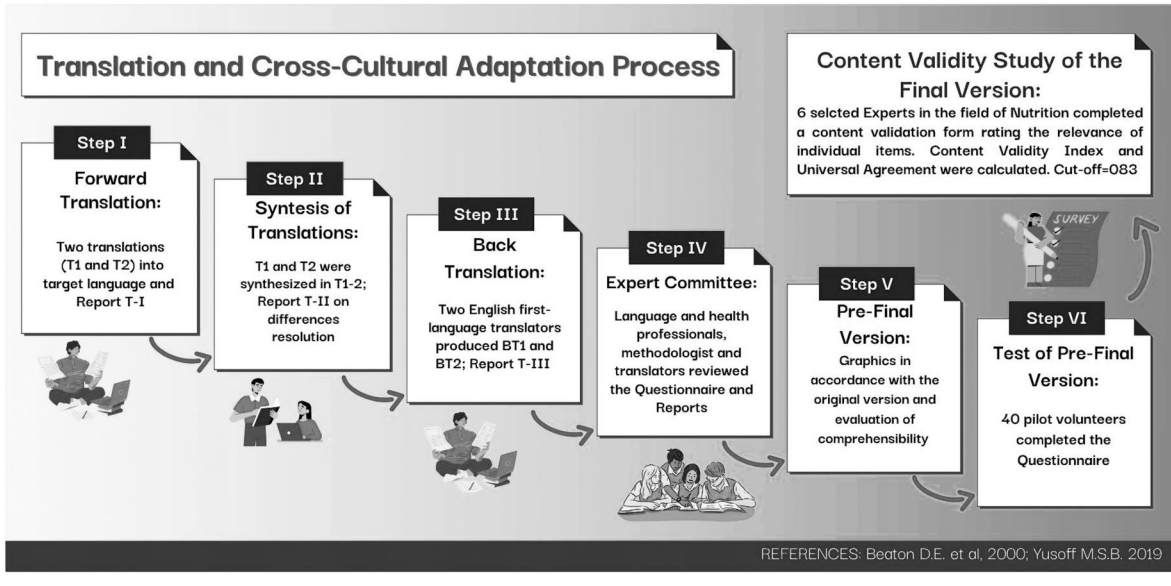

FIGURE 1. Translation and cross-cultural adaptation process. Description of the different 6 steps (I to VI) that characterize the translation and cross-cultural adaptation process, according to the protocols described by Beaton et al[17] and Yousuff.[18]

questionnaire, who granted permission for its use for the present study. Figure 1 outlines the 6 steps involved the translation and cross-cultural adaptation process.

The original version of the questionnaire consists in a short introductory text explaining the scoring procedure to the participant. According to the 7-point Likert scale, a score of 1 corresponds to a "very poor ability", whereas the score 7 corresponds to a "very good ability". In the event that a skill is not used, an option of "never/rarely do it" is available. The questionnaire is organized in 2 sections: the cooking skills confidence measure, consisting in 14 items, and the food skills confidence measure, consisting in 19 items.[16] In the process of translation and cross-cultural adaptation, the structure of the original questionnaire was faithfully respected. The graphical abstract outlines the process, which is also described below:

Step I. Forward translation: The initial step in the process of adaptation, which involved translating the questionnaire from the source language (English) into Italian, was the "forward translation". This was carried out in February 2024 by 2 independent bilingual translators, both native speakers of the target language (translator 1-S.M.: aware of the concepts examined in the questionnaire; translator 2-S. C.: neither aware nor informed of the concepts examined in the questionnaire). Translators produced 2 independent translations (T1 and T2) and 2 written reports of the translation, with additional comments highlighting challenging phrases or uncertainties (Reports T-I; February 10, 2024).

Step II. Synthesis of the translations: Translator 1 and 2 and a recording observer (B.Z.) synthesized the results of the 2 translations (T1 and T2), producing one common translation (T1 to 2). The observer produced a written report documenting the synthesis process and how any disagreement was resolved (Report T-II; February 13, 2024).

Step III. Back translation: Working from the T1 to 2 version of the questionnaire, 2 back translators, both native speakers of the source language (English) and totally blind to the original version (back translator 1-G.O.; back translator 2-L.F.), produced 2 independent back translations (BT1 and BT2). The 2 back translators had no medical background and were not informed about the concepts explored, to avoid informational bias.

The recording observer (B.Z.) and translator 1 (S.M.), both with a medical background and aware of the concepts being examined in the questionnaire, compared BT1 and BT2 and produced a written report documenting the critical issues underlined by back translators and the differences in the versions produced (Report T-III; April 17, 2024).

Step IV. Expert committee: To achieve the cross-cultural equivalence, an expert Committee was created consisting of a language professional (R.B.D.), a statistician (A.S.), a health professional (B.Z.), and the translators (S.M., S.C., G.O., L.F.). Experts reviewed the original questionnaire, each translation (T1, T2, BT1, BT2), and the corresponding reports (Reports T-I, T-II, T-III). They reached a consensus on any discrepancy and developed the pre-final version. Each decision made by the Committee was documented along with the corresponding reasons. Four areas of equivalence between the original and pre-final version were achieved: semantic, idiomatic, experiential, and conceptual (Final Report; April 18, 2024).

Step V. Pre-final version: In accordance with the original version of the questionnaire, 2 measures were developed: the cooking skills confidence measure (CS), consisting of 14 items, and the food skills confidence measure (FS), consisting of 19 items. A 7-point Likert scale was provided about the level of individual skill investigated (1 means "very poor" and 7 means "very good"). If a skill was not used, it was scored zero. The confidence score was the sum of the 0 to 7 ratings for the skills. For each participant, the answers to each of the items in the set are summed, according to an additive scale. This process was repeated both for CS and FS, with the minimum-maximum scores achievable being 0 to 98 and 0 to 133, respectively. Out of respect for anonymity and privacy, only the year of birth and gender were requested at the beginning of the questionnaire.

To ensure the level of comprehensibility, and in line with the protocol of Beaton et al,[17] the pre-final version was submitted to 2 anonymous 12-year-old volunteers, who shared their doubts and questions with part of the expert committee (B.Z. and S.M.).

Step VI. Test of the pre-final version: According to the protocol of Beaton,[17] the pre-final version underwent the last stage of the translation and cross-cultural adaptation process through compilation by 40 anonymous pilot volunteers, enrolled from friend and family members of contributors to this project and not belonging to the university staff. Paper questionnaire completion was performed in June 2024, with an average completion time of 15 minutes. Volunteers were encouraged to provide written comments or suggestions to highlight critical aspects and improve the level of understanding. Single responses, missing items, and suggestions were analyzed by the Experts Committee and used to develop the final version[16,19] (Supplementary Material, Supplemental Digital Content 1, http://links.lww.com/NT/A42).

Content Validity Study of the Final Version

Content validity study (CVS), defined as degree to which elements of an assessment questionnaire are relevant and representative for the propose of the instrument,[18] has been performed on the final version of the CS and FC questionnaire. Given the nature of the questionnaire under study, the selection of CVS Experts focused on Dietitians and Nutritionists experienced in epidemiological studies. As the number of Experts defines the content validity index (CVI) cutoff and acceptability, 6 volunteer experts in Nutrition field were selected: G.C.V.V., B.Z., G.G., M.M., E.C., and A.F. In this case, the acceptable cutoff score for the CVI should be at least 0.83.[18]

According to the CVS protocol, we developed a content validation form, consisting of an introductive explanation to Experts about what is required, and a rating scale about the degree of relevance (1 = the item is not relevant to the measured domain; 2 = the item is somewhat relevant to the measured domain; 3 = the item is quite relevant to the measured domain; 4 = the item is highly relevant to the

measured domain). For each item of the questionnaire, Experts are asked to assign a score from 1 to 4; subsequently, the relevance rating was recorded as 1 for scores 3 or 4, and as 0 for scores 1 or 2.

Between May and June 2024, CVS exerts submitted the responses and before calculating CVI, the relevance rating was recorded as 1 for scores 3 or 4, and as 0 for scores 1 or 2. The relevance rating assigned by the individual Expert for each item was recorded in an Excel file and then used to calculate the following indices:

Experts in agreement = sum of the relevant rating provided by all experts for each item

I-CVI = item-level content validity index = (experts in agreement)/(number of experts)

S-CVI/Ave = scale-level content validity index based on the average = average of I-CVI; CVI could be calculate also as the average of proportion relevance score for individual expert.

Universal agreement (UA) = 100% expert in agreement provided a relevance rating of 1 for each item. Possible UA scores are either 1 (all the experts provided a relevance rating of 1) or 0 (not all the experts provided a relevance rating of 1).

S-CVI/UA = scale-level content validity index based on universal agreement = average of UA

A general assessment was then requested regarding the clarity of the instructions, the time required for completion, and the overall adequacy of the questionnaire for the measures it was designed to assess. Finally, the CVS Experts were encouraged to provide written comments to improve the relevance of the items, affiliation E-mail and compilation date.

In addition, the internal consistency reliability of the measures was tested using Cronbach Alpha, testing cooking skills separately and food skills separately, and then comparing the results with those of the English version of the questionnaire.

Data Analysis

The analysis included descriptive statistics (ie, frequencies and percentages for categorical variables and mean values with SDs for continuous variables). Statistical analyses were performed using STATA (Stata Statistical Software: Release 16.0 College Station, TX: Stata Corporation) and graphs processing was performed with Microsoft Excel programme (2016). Given the small number of subjects involved and the non-normality of 20 out of 33 responses, non-parametric tests were used. In particular, with regard to "gender", the Wilcoxon test was used, whereas for the variable "generation", the Kruskal-Wallis test was used.

The validation of the survey content was verified for each item of the questionnaire (I-CVI), indicating the percentage of agreement among the experts, with a preset cutoff of S-CVI/Ave and S-CVI/UA = 0.83 deemed acceptable.

Ethical Considerations

This study was conducted according to the guidelines laid down in the Declaration of Helsinki 2000 and written informed consent was obtained from all subjects involved in the study. The pre-final version of the questionnaire was voluntary completed and pilot volunteers were able to withdraw their participation in the survey at any stage and before returning it to the investigators. To guarantee volunteers' confidentiality, an anonymous questionnaire in paper format was used, and all study procedures were in accordance with the provisions of the General Data Protection Regulation (GDPR 679/2016). Because of the anonymous nature of this survey, personal data could not be traced and, consequently, the protocol study did not require the approval of the local ethics committee.

RESULTS

Results From the Translation and Cross-Cultural Adaptation Process and From the Content Validity Study

The process of translation and cross-cultural adaptation involved the instruction for the questionnaire compilation, individual items, and responses options, and produced equivalency between source and target version. Particular attention was paid to the translation and adaptation of certain terms such as "food skills", "budgeting" and "resourcefulness", which in Italian required the use of short phrases, or certain foods such as "buns and scones", which do not exist in the Italian culinary tradition. Each step of the process, documented in the different Reports, led to the resolution of all divergences and generated the pre-final version of the questionnaire.

The scores obtained from the CVI study (Table 1), and the suggestions shared by the 6 nutrition experts were used for any changes in the final version.

The global assessment of the questionnaire demonstrated that the Content Validity Index reached values higher than 0.83: specifically, S-CVI/Ave and S-CVI/UA averages and SDs were 0.98 ± 0.07 and 0.91 ± 0.29, respectively (Table 1). In addition, except for question 33, where 2 out of 6 Experts did not consider the content relevant, the I-CVI of the other individual items was always equal to or above the cutoff level, with no need to modification. In addition to the degree of relevance, the opinions provided by Experts in Nutrition in the open-ended questions, confirmed the clarity of all contents, quick compilation, and suitability for its purpose. On the basis of the above calculation, I-CVI, S-CVI/Ave, and S-CVI/UA achieved satisfactory level of content validity.

The internal consistency reliability measured by Cronbach Alpha for the cooking skills confidence was 0.94 and for the food skills confidence was 0.93. Comparing these results with those of the original English version, we observed a good maintenance of the consistency reliability (for the cooking skills confidence ranged from 0.79 to 0.93 and for food skills ranged from 0.89 to 0.94).[16]

Preliminary Results From Pilot Volunteers

During the step VI of the process, the questionnaire was completed by 40 pilot volunteers, native Italian speakers, consisting of 20 females and 20 males. The mean age of the population was 46.43 ± 19.21 years (range: 20 to 84 y) and 4 different generations were included (Boomers—born

TABLE 1

Content Validity Index Study and Relevance Ratings on the Item Scale by Experts (n = 6)

The Relevance Ratings of the Item Scale by Experts

	1-GCVV	2-BZ	3-GG	4-MM	5-EC	6-AF	N° Experts in Agreement	I-CVI	UA
Item									
1	1	1	1	1	1	1	6	1.00	1
2	1	1	1	1	1	1	6	1.00	1
3	1	1	1	1	1	1	6	1.00	1
4	1	1	1	1	1	1	6	1.00	1
5	1	1	1	1	1	1	6	1.00	1
6	1	1	1	1	1	1	6	1.00	1
7	1	1	1	1	1	1	6	1.00	1
8	1	1	1	1	1	1	6	1.00	1
9	1	1	1	1	1	1	6	1.00	1
10	1	1	1	1	1	1	6	1.00	1
11	1	1	1	1	1	1	6	1.00	1
12	1	1	1	1	1	1	6	1.00	1
13	1	1	1	1	1	1	6	1.00	1
14	1	1	1	1	1	1	6	1.00	1
15	1	1	1	1	1	1	6	1.00	1
16	1	1	1	1	1	1	6	1.00	1
17	1	1	1	1	1	1	6	1.00	1
18	1	1	1	1	1	1	6	1.00	1
19	1	1	1	1	1	1	6	1.00	1
20	1	1	1	1	1	1	6	1.00	1
21	1	1	1	1	1	1	6	1,00	1
22	1	1	1	1	1	1	6	1.00	1
23	1	1	1	1	0	1	5	0.83	0
24	1	1	1	1	1	0	5	0.83	0
25	1	1	1	1	1	1	6	1.00	1
26	1	1	1	1	1	1	6	1.00	1
27	1	1	1	1	1	1	6	1.00	1
28	1	1	1	1	1	1	6	1.00	1
29	1	1	1	1	1	1	6	1.00	1
30	1	1	1	1	1	1	6	1.00	1
31	1	1	1	1	1	1	6	1.00	1
32	1	1	1	1	1	1	6	1.00	1
33	1	1	1	1	0	0	4	0.67	0
Proportion relevance							S-CVI/Ave	0.98	
	1.00	1.00	1.00	1.00	0.94	0.94	S-CVI/UA		0.91
	Average proportion of item judged as relevant across the 6 experts						0.98		

before 1964, 10 subject; X generation—born from 1965 to 1980, 12 subjects; Millennials—born from 1981 to 1996, 8 subjects; Z generation—born from 1997 to 2012, 10 subjects[20]).

The average cooking skill (CS) confidence, expressed as a sum the scores of all items, was 60.53 ± 26.68, out of possible 98 (61.8% over the maximum score), with a range of score achieved from 0 to 98. Distinguishing females and males' results, we found a mean CS confidence of 76.00 ± 14.54 (77.5%; range of score achieved 34 to 98) versus 45.05 ± 27.32 (45.9%; range of score achieved 0 to 98), respectively. The mean score and SD for each item, referred to total population, females and males, are displayed in Table 2. "Peel and chop vegetables" was the top reported cooking skill (95% usage; 5.75 ± 1.94), followed by "chop, mix and stir food" and "boil or simmer food" (92.5% usage). "Stew food", "microwave food", and "bake goods" were the less used cooking skills (67.5% usage). For all items, the mean values recorded by the male population were lower than those of the females, and in 12 out of 14 questions, the scores achieved by females were significantly higher than males, with a great size effect for 5 items and a moderate size effect for the other 7, respectively (Table 2; Table S1 Supplementary material, Supplemental Digital Content 1, http://links.lww.com/NT/A42).

The average food skill (FS) confidence of the pilot participants was 74.35 ± 31.35, out of possible 133 (56.6% over the maximum score), with a range of scores achieved from 0 to 121. Distinguishing females and males' results, we found a mean FS confidence of 91.15 ± 16.60 (68.5%; range of scores achieved 57 to 121) versus 57.55 ± 33.84 (43.3%; range of scores achieved 0 to 124), respectively. The mean score and SD for each item, referred to total population, females and males, are displayed in Table 3. "Read the best-before date on food" was the top reported food skill (92.5% usage; 5.85 ± 1.85 mean ± SD), followed by "keep basic

TABLE 2

Confidence in Cooking Skills in the Overall Population and Distinguishing by Gender; **N Corresponds to the Actual Number of Those Using That Skill**

Cooking Skills	Usage, N (%)	Total, Mean ± S.D.	Usage, N (%)	Female, Mean ± S.D.	Usage, N (%)	Male, Mean ± S.D.	*P* F vs. M
Cooking methods							
Chop, mix and stir foods…	37 (92.5)	5.33 ± 2.29	20 (100)	6.30 ± 1.26	17 (85)	4.35 ± 2.68	**0.007**
Blend foods to make them smooth. like soups or sauces	34 (85)	4.53 ± 2.65	20 (100)	6.25 ± 1.07	14 (70)	2.80 ± 2.65	**0.000**
Steam food	29 (72.5)	3.58 ± 2.78	17 (85)	4.55 ± 2.56	12 (60)	2.60 ± 2.70	**0.031**
Boil or simmer food	37 (92.5)	5.35 ± 2.07	20 (100)	6.25 ± 1.16	17 (85)	4.45 ± 2.39	**0.004**
Stew food	27 (67.5)	3.23 ± 2.79	16 (80)	4.30 ± 2.74	11 (55)	2.15 ± 2.46	**0.016**
Roast food in the oven	34 (85)	4.6 ± 2.59	20 (100)	6.30 ± 0.92	14 (70)	2.90 ± 2.61	**0.000**
Fry/stir-fry food in a frying pan/wok with oil or fat	35 (87.5)	4.43 ± 2.32	20 (100)	5.40 ± 1.60	15 (75)	3.45 ± 2.54	**0.016**
Microwave food	27 (67.5)	2.75 ± 2.79	15 (75)	2.80 ± 2.73	12 (60)	2.70 ± 2.92	0.718
Bake goods such as cakes. buns. cupcakes…	27 (67.5)	3.58 ± 2.98	18 (90)	5.35 ± 2.25	9 (45)	1.80 ± 2.55	**0.000**
Peel and chop vegetables	38 (95)	5.75 ± 1.94	20 (100)	6.70 ± 0.66	18 (90)	4.80 ± 2.33	**0.001**
Prepare and cook raw meat/poultry	32 (80)	4.28 ± 2.52	19 (95)	5.40 ± 1.64	13 (65)	3.15 ± 2.78	**0.011**
Prepare and cook raw fish	30 (75)	3.85 ± 2.69	18 (90)	4.50 ± 2.33	12 (60)	3.20 ± 2.93	0.172
Make sauces and gravy from scratch	28 (70)	4.2 ± 3.03	18 (90)	5.80 ± 2.21	10 (50)	2.60 ± 2.93	**0.000**
Use herbs and spices to flavor dishes	36 (90)	5.1 ± 2.36	20 (100)	6.10 ± 1.21	16 (80)	4.10 ± 2.81	**0.020**

$P < 0.05$ are expressed in bold.

items in the cupboard for putting meals together" (90% usage; 4.95 ± 2.30). "Know what budget you have to spend on food" and "cook more or double recipes which can be used for another meal" were the less used cooking skills (60% usage; 2.38 ± 2.60 and 2.63 ± 2.59, respectively). As observed for CS, for all FS items, the mean values recorded by the female population were higher than those of the males, and in 11 out 19 aspects the difference was statistically significant, with a great size effect for 3 items and a moderate size effect for the other 8, respectively (Table 3; Table S1 Supplementary material, Supplemental Digital Content 1, http://links.lww.com/NT/A42).

The participation of volunteers from 4 different generations allowed us to compare competence levels of both CS and FS, and we observed the highest rate of skills among Millennials, where no differences by gender were found (Figs. 2 and 3). The Kruskal-Wallis test showed that the Millennial generation had significantly higher scores than the other generations only in relation to questions 5 and 16. Within the different generational groups, the comparison between the male and female population indicates that, especially in the population groups born before 1980, there is a marked difference in the level of skills, with males at a clear disadvantage (Figs. 2 and 3). The different scores recorded between generations do not reach a statistically significant difference, and the interpretation of the effect size is, on the whole, low or insignificant (Table S1 Supplementary material, Supplemental Digital Content 1, http://links.lww.com/NT/A42).

The limited number of volunteers involved in this pilot study allowed only a descriptive analysis of the collected variables.

DISCUSSION

To our knowledge, currently there are no questionnaires for the assessment of cooking and food confidence specifically tailored to the Italian population. This pilot study aimed to translate and cross-culturally adapt a validated and widely used questionnaire, developed to measure a full range of cooking and food skills, developed for an English-speaking population.[16] Given the limited number of participants involved in this pilot analysis, the results of the questionnaires were described qualitatively, without generalized interpretations.

Actually, the food system faces significant challenges, including population growth, globalization, and urbanization, and many factors influence consumers' dietary behaviors, such as eating meals outside the home, seeking convenient food options, and reducing time spent in cooking. At the same time, these changes are associated to an increase in the consumption of ultra-processed foods, which contributes to exacerbating adverse health outcomes.[21,22]

To preserve public health, it is necessary to promote interventions to encourage the consumption of healthy, affordable, and minimally processed foods, and, among potential strategies, the MD model combines the consumption of healthy foods with a lifestyle that takes into account culinary tradition and practice.[2] It is well documented that adults with advanced cooking skills are more likely to have adequate vegetable and fruit intake in association to better general and mental health.[3,8,13,23] Moreover, poor cooking skills and the low quality of ingredients seems associate to less general and mental health, and higher risk of obesity.[23] Recently, in a study on university students living in France, higher cooking skills

TABLE 3

Confidence in Food Skills in the Overall Population and Distinguishing by Gender; **N Corresponds to the Actual Number of Those Using That Skill**

Food Skills	Usage, N (%)	Total, Mean ± S.D.	Usage, N (%)	Female, Mean ± S.D.	Usage, N (%)	Male, Mean ± S.D.	*P* F vs. M
Meal planning and preparing							
Plan meals ahead	33 (82.5)	3.65 ± 2.55	20 (100)	5.35 ± 1.42	13 (65)	1.95 ± 2.28	**0.000**
Prepare meals in advance	27 (67.5)	2.75 ± 2.63	15 (75)	3.50 ± 2.67	12 (60)	2.00 ± 2.43	0.092
Follow recipes when cooking	33 (82.5)	4.1 ± 2.47	19 (95)	5.05 ± 1.79	14 (70)	3.15 ± 2.72	**0.036**
Shop with a grocery list	34 (85)	4.48 ± 2.54	20 (100)	5.95 ± 1.28	14 (70)	3.00 ± 2.66	**0.000**
Shop with specific meals in mind	32 (80)	4.1 ± 2.52	20 (100)	5.35 ± 1.35	12 (60)	2.85 ± 2.81	**0.008**
Plan how much food to buy	31 (77.5)	3.95 ± 2.8	19 (95)	5.05 ± 2.16	12 (60)	2.85 ± 2.98	**0.026**
Budgeting							
Compare prices before you buy food	33 (82.5)	3.2 ± 2.37	20 (100)	3.70 ± 1.87	13 (65)	2.70 ± 2.74	0.133
Know what budget you have to spend on food	24 (60)	2.38 ± 2.6	14 (70)	2.80 ± 2.67	10 (50)	1.95 ± 2.52	0.268
Buy food in season to save money	34 (85)	4.48 ± 2.53	19 (95)	5.20 ± 2.07	15 (75)	3.75 ± 2.79	0.095
Buy cheaper cuts of meat to save money	27 (67.5)	2.23 ± 2.2	17 (85)	2.85 ± 2.11	10 (50)	1.60 ± 2.16	**0.038**
Resourcefulness							
Cook more or double recipes which can be used for another meal	24 (60)	2.63 ± 2.59	14 (70)	3.50 ± 2.74	10 (50)	1.75 ± 2.15	**0.033**
Prepare or cook a healthy meal with only few ingredients on hand	35 (87.5)	4.38 ± 2.39	20 (100)	5.35 ± 1.50	15 (75)	3.40 ± 2.74	**0.024**
Prepare or cook a meal with limited time	35 (87.5)	5.2 ± 2.32	20 (100)	6.10 ± 0.91	15 (75)	4.30 ± 2.92	0.122
Use leftovers to create another meal	31 (77.5)	3.75 ± 2.72	18 (90)	4.55 ± 2.48	13 (65)	2.95 ± 2.78	0.064
Keep basic items in your cupboard for putting meals together	36 (90)	4.95 ± 2.3	20 (100)	6.05 ± 1.39	16 (80)	3.85 ± 2.52	**0.002**
Label reading/consumer awareness							
Read the best-before date on food	37 (92.5)	5.85 ± 1.85	20 (100)	6.55 ± 0.69	17 (85)	5.15 ± 2.35	**0.009**
Read the storage and use-by information on food packets	34 (85)	4.68 ± 2.46	19 (95)	5.05 ± 2.19	15 (75)	4.30 ± 2.72	0.333
Read the nutrition information on food labels	31 (77.5)	3.95 ± 2.73	17 (85)	4.55 ± 2.68	14 (70)	3.35 ± 2.70	0.120
Balance meals based on nutrition advice on what is healthy	30 (75)	3.68 ± 2.57	18 (90)	4.65 ± 1.95	12 (60)	2.70 ± 2.77	**0.041**

$P < 0.05$ are expressed in bold.

were significantly associated with higher nutritional quality.[24] Even in a population of adolescents living in northern Italy, higher cooking skills were correlated with better eating habits and lower consumption of ultra-processed foods.[13] Unfortunately, generational transmission process of food and culinary skills is progressively weakening, both for the inclusion of women into the formal job market, and for the massive supply and aggressive marketing of ultra-processed foods.[3] The shift away from the MD model is well documented in all the populations of Mediterranean countries, and, in particular, data from the ARIANNA (Adherence to the Mediterranean Diet in Italy) study, conducted in Italy, reported that only 4.85% of the sample showed high adherence to MD.[4]

On the basis of these considerations, it is essential to design interventions that promote healthy practices, including the recovery and revaluation of cooking and food skills, in all age and social groups of the general population, having also validated survey instruments adapted to the language and culture of the population under consideration.

The process described in this article refers to the translation and the cross-cultural adaptations of a validated questionnaire for the assessment of cooking and food skills, modifying the items and scales to make the questionnaire relevant and valid in a new culture. The guidelines applied to perform the entire translation and cultural adaptation process maximize the achievement of semantic, idiomatic, experimental, and conceptual equivalence between the source and target questionnaire.[17] Moreover, the content validity evaluation is one of the most reliable types of validity to ensure congruence between the study objective and data collection instrument. According to the protocol of Yusoff,[18] researchers and experts in the field of nutrition and epidemiology calculated the content validity of items individually (I-CVI) and according to the overall scale (S-CVI/Ave; S-CVI/UA), satisfying the designated cutoff and universally rating both relevance and clarity as excellent. These results confirmed that the instrument is relevant and representative for this assessment purpose. Considering that in Italy, now, there are no short questionnaire for the evaluation of CS and FS, the involvement of pilot volunteers was an essential step for the evaluation of the procedural aspects and content validity.

The descriptive analysis of the early results, obtained by this heterogeneous and well-distributed group of volunteers

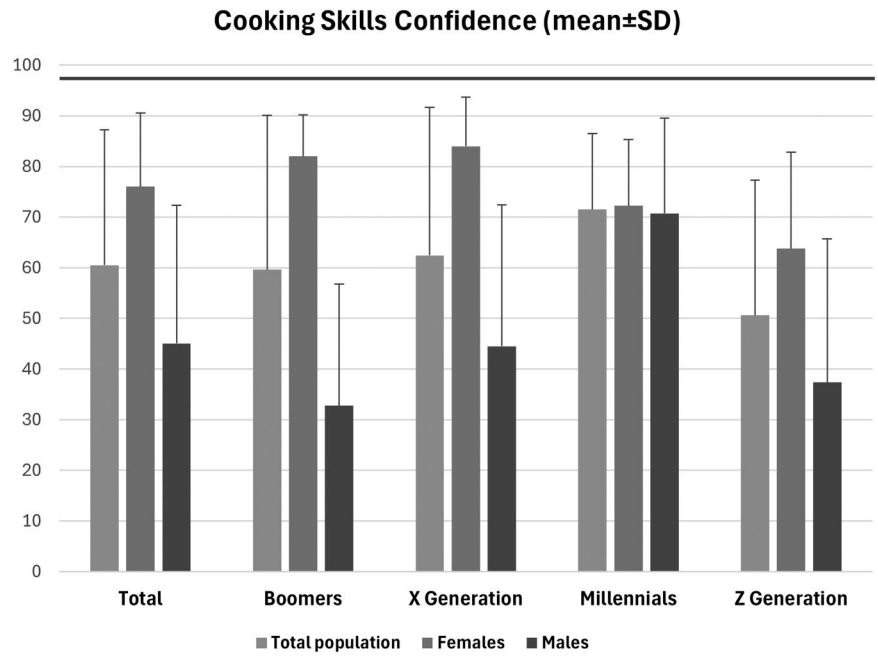

FIGURE 2. Sum of cooking skill confidence according to generations (Boomers, X Generation, Millennials, and Z Generation) and gender; the dark line refers to the maximum achievable score (98).

across generations, allows us to elaborate some observations: in the vast majority of items assessed, the female population scored significantly higher than the male population; moreover, the lowest scores were recorded for males born before 1980. Cooking Skills in which this population was less confident were: using the microwave, not only for heating but for cooking, stewing food and baking a cake. On this last item the male population gave the lowest score. As regards food skills, preparing meals in advance, cooking more for another meal, budgeting for food shopping and buying cheaper cuts of meat, were the items in which the population feels less confident. Working on these aspects could be useful, in the future, both to optimize the time available for cooking and to better manage budget issues as well. Furthermore, it would improve the quality and nutritional density of meals. A large body of literature has studied the relationship between gender and cooking and food skills, showing that women seem to be more likely than men to be involved in food preparation, to spend time in cooking and in the transmission of culinary knowledge between mothers and children.[25] The results obtained in this pilot study seem to confirm this trend. The evolution of society and the changing role of women, who are increasingly engaged with work outside the home, as well as the devaluation of cooking skills observed in the domestic environment, are shaping meal preparation practices.[26] The promotion of CS and FS, beyond possible gender stereotypes and the involvement of the entire population, starting with the younger generations, is a primary objective.

By comparing the results obtained from our pilot volunteers with what has been previously observed by other research groups, we recorded lower scores for both CS and FS. Specifically, in the cross-sectional study performed by Lavelle and colleagues in Australia on over 900 adults, the mean level of CS was 79.33 ± 13.19 and of FS was 108.22 ± 28.70, whereas our small sample recorded 60.53 ± 26.68 and 74.35 ± 3.35, respectively.[27] In another 2020 study of a large US adult population, the mean CS value was 67.44 ± 21.19 and the FS value was 102.90 ± 19.82.[28] Future studies, conducted on a larger population, will allow us to draw more precise conclusions on the cooking and food skills of the Italian population. Regarding the different results observed in males compared with females, our preliminary results are in line with recent literature, where females present significantly higher CS and FS than males in all age groups.[19,25–28] It will be very interesting to explore in the future how age may influence the skills of males and females, and to design interventions that go beyond possible gender stereotypes in the younger generation.

Strengths and Limitations

The present study provides for the first time a validated instrument to measure confidence in cooking and food skills suitable for Italian population, and which has proven to have very satisfactory content validity and internal consistent reliability. A heterogeneous team of experts supervised both the translation, the trans-cultural adaptation procedure and the content validity index analysis, making this work scientifically valuable. All the procedures were conducted in agreement with a validated algorithm, and according to the protocol a team with different areas of competence was involved. The major limitation of the

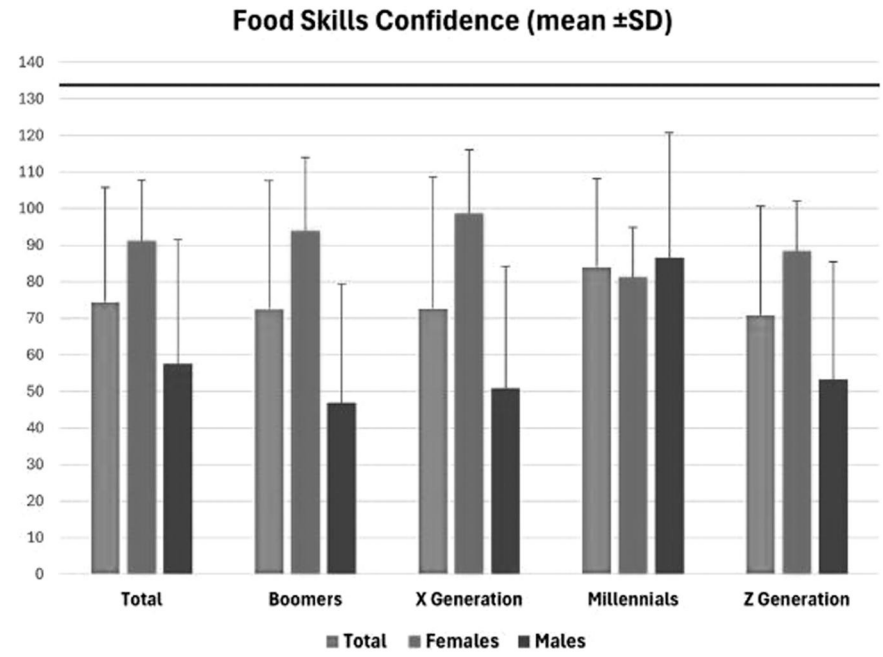

FIGURE 3. Sum of food skill confidence according to generations (Boomers, X Generation, Millennials, and Z Generation) and gender; the dark line refers to the maximum achievable score (133).

present study is the small number of volunteers to test the pre-final version, and this aspect greatly reduces both the heterogeneity and generalizability of the work. In addition, to maintain anonymity and privacy, no socio-economic, anthropometric measures, and other data or dietary habits were collected. Future studies assessing eating habits, education level, socio-economic condition and health condition will be necessary in the future, to measure on large and heterogeneous group of people the complex relationship between cooking and food skills and lifestyle.

Cooking at home, food and cooking competence, are associated with better diet quality, especially related to a higher consumption of vegetables and whole grains and is recommended by both the US and the Italian national food-based dietary guidelines, and by the major international public health authorities.[10,11,28] In the countries bordering the Mediterranean basin, cradle of one of the world's healthiest dietary and lifestyle models, there is currently a gradual shift away from the fundamentals of this paradigm, including the cooking activity starting from simple, fresh, and unprocessed foods.[4] Even Italy, a country where longevity has often been associated with adherence to the MD, is undergoing this westernization, and therefore projects are needed to help Italians regain culinary skills. The tool validated in this work represents a necessary first step, and we hope it will help researchers in designing future interventions to re-appropriate this culinary heritage.

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