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Television cooking shows and culinary programmes – factor analysis and cluster segmentation

Raquel P.F. Guiné *, Sofia G. Florença, Edite Teixeira-Lemos, Maria João Lima

CERNAS-IPV Research Centre, Polytechnic University of Viseu, Viseu, Portugal

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ABSTRACT

This study investigates the viewing habits regarding culinary television content, such as competition shows and recipe programmes, and their impact on eating out and cooking behaviours. Data were collected through a questionnaire survey in Portugal, on a sample of 250 adult citizens. Data analysis included basic statistics, factor and cluster analysis, and characterisation of the obtained clusters. Results showed that when the participants eat out, they usually do it in restaurants that serve national dishes or in fast food service providers. About two-thirds of the participants watch culinary programmes on TV, although with a low frequency, typically less than once a week, and especially at the end of the day. They believe these programmes can influence the diet because they constitute an opportunity to learn new recipes and new ways to prepare food, including reusing food leftovers to prepare innovative and creative meals. The study reveals that culinary programmes encourage viewers to cook more at home, prepare healthier meals, and reduce food waste. Factor analysis allowed the extraction of two factors, one linked to positive perceptions and the other to negative perceptions. Cluster analysis showed three groups of individuals: those who believe the culinary programmes and shows are not useful, those who find them educational and those who find them essentially entertaining. Finally, significant differences were observed between the clusters for variables such as self-evaluation of the health status, frequency of eating out, and frequency of cooking meals. In summary, this work allowed the identification of three differentiated patterns of individuals in relation to the visualisation of TV cooking shows or culinary programmes.

1. Introduction

The act of eating is intrinsic to human beings, as it is essential for human survival. Thus, given the needs of each individual, cooking has been present in history since the discovery of fire and is present in the day-to-day life of many human beings. Cooking is the art of preparing food in a creative and attractive way. In addition to meeting nutritional needs, it seeks to create pleasant sensory experiences, integrating flavour, aroma, texture and visual presentation to enrich the meal. (Arrais, 2023; Daniel and Guttmann, 2024; Ozkan et al., 2025).

Over the years, several cooking programmes have appeared on television in different formats, which were influenced by reality shows, ceasing to be just programmes that taught how to cook and becoming programmes with entertainment content. While cooking programmes show how recipes are prepared and teach step by step how to prepare the dish, reality shows bring participants closer to viewers, in which food is just a means, a pretext, for entertainment (Araújo, 2016).

Today, more than 920 million tons of food are wasted in the world, affecting all stages of the food chain, from producer to consumer. Fruits and vegetables are among the most wasted foods, since these products, when damaged or outside of the standard size, are discarded or not consumed. In order to reduce this food waste, several cooking programmes, books, blogs, and other platforms have been developed to teach people how to combat this waste by making use of food leftovers, saving both time and money (Jobson et al., 2025; Landells et al., 2025; Werkman et al., 2025).

There is currently an evolution in food trends, particularly in some groups among developed countries, that considers concerns regarding health, the environment and animal welfare. Movements such as organic eating, vegetarianism and the use of local and seasonal ingredients are on the rise, demonstrating a growing awareness of sustainable and healthy food choices. Currently, one of the most prominent trends is the search for sustainable and responsible food. Consumers are increasingly aware of the environmental and social impact of their food choices. This has led to an increase in demand for local, seasonal, organic and ethically produced products. The idea is to minimise waste, support local

* Corresponding author.
E-mail address: raquelguine@esav.ipv.pt (R.P.F. Guiné).

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farmers and promote environmentally friendly agricultural practices. Food sustainability aims to reduce the enormous amount of organic waste produced while promoting a healthy diet, thus supporting economic, environmental and social sustainability. (Santos et al., 2023). In a way, having a sustainable kitchen is not just about changing the food, but also about reducing unnecessary expenses (Ahamed and Karthikeyan, 2024; Bayir et al., 2024; Camacho et al., 2025; Gustavson et al., 2011; Heller et al., 2013; Stein, 2024).

The search for a plant-based diet has also seen a considerable increase in followers in diverse geographical and societal groups. Indeed, more and more people are opting for plant-based meals, whether for ethical, health or environmental reasons. McBey et al. (2026) published a very recent research highlighting effectiveness of interventions destined to reduce meat consumption. They suggest that policies targeting cost and appeal of plant-based foods were very effective to meet this objective. The variety and creativity of plant-based recipes have been increasing exponentially, in order to satisfy the needs and preferences of those following this diet (Anjos et al., 2024; Hemler and Hu, 2019). A study by Anjos et al. (2024) investigated the consumption of plant-based beverages on a sample of Portuguese consumers, and reported that about half of the participants consumed vegetable drinks, driven by different motivations, including sustainability aspects and health benefits.

The objective of this work was to investigate the participants' habits and perceptions regarding the preparation of meals consumed at home, eating out, and culinary programmes on TV, like competition shows or recipe programmes. It was further aimed to analyse the participants' perceptions by performing factor analysis and cluster analysis, allowing the establishment of the characteristics of the participants, according to the cluster segmentation.

2. Materials and methods

2.1. Participants and recruitment

This was a cross-sectional study involving individuals recruited through social networks to participate in an anonymous online survey between June 20th, 2023, and July 18th, 2023. Participants were eligible to participate if they were ≥18 years of age and residing in Portugal. This study was carried out in accordance with the guidelines described in the Declaration of Helsinki and was approved by the Ethics Committee of the Polytechnic Institute of Viseu (Ref. CE_18SUB 2023). The questionnaire was created using Google Forms software, and the study protocol and potential risks were clearly described to all interested participants electronically prior to the start of the questionnaire. A link to the survey was sent to all participants who gave informed consent before filling out the form. A snowball methodology was used to reach out to more individuals, and therefore, the sample used was a convenience sample. It is well established that there are some disadvantages when using convenience samples. However it is also known that convenience samples can be recognized as a most useful methodology to conduct research of exploratory nature (Guiné et al., 2020a, 2020b). In fact, convenience samples are easier to recruit and allow obtaining participation from individuals that otherwise might not be possible to reach. On the other hand, they have the disadvantage of not allowing a generalization of the results and trends observed in the sample to a wider population. This occurs to possible biases introduced according to estimates of sociodemographic differences. Still convenience samples can a good tool to conduct exploratory research and investigate possible trends (Bornstein et al., 2013; Hill and Hill, 2008; Marôco, 2018; Robinson, 2014).

2.2. Instrument

The questionnaire was divided into four sections, with questions grouped according to specific objectives. In the first section, there were questions aimed at collecting sociodemographic data, namely in relation to age, gender, and educational qualifications, so as to characterise the participants in the study. The second section was about lifestyle, including questions about physical exercise, diet, and health status. Section three was about habits related to meal consumption, specifically frequency of eating out, aspects valued when eating out in work or leisure contexts, places where the participants have meals and frequency of cooking at home. The last section was about cooking programmes, and aimed to understand whether the respondents usually saw these types of programmes, viewing frequency and what time of the day, type of programmes viewed, reasons for not watching, cooking habits related to watching culinary shows, and influences of cooking programmes in the participants' food consumption. The last part of this section also investigated the participants' opinions about TV culinary programmes though eight items for which the participants had to express their opinion using a Likert scale of agreement with five points: 1 = strongly disagree, 2 = disagree, 3 = no opinion, 4 = agree, 5 = strongly agree (Likert, 1932).

2.3. Data analysis

The frequencies of response were calculated with SPSS (version 29), and appropriate graphics were prepared using Excel (Office version 2016).

The items of the questionnaire related to the perceptions of the participants towards cooking programmes on TV were used to perform factor analysis (FA) based on the principal components (PCs) method. This type of statistical analysis applied to the responses given by the participants to the eight items below allows identification of possible grouping structures:

1. Programmes that teach how to cook recipes are a positive influence on viewers;
2. Programmes promoting healthy recipes are useful;
3. Programmes that present ways of reusing food leftovers help to combat food waste;
4. Cooking competition programmes (like MasterChef) are just for entertainment;
5. Cooking competition programmes provide ideas for innovative dishes;
6. Cooking programmes give you more motivation to cook at home;
7. Cooking programmes help change lifestyles;
8. By watching culinary programmes, people can cook food in a less traditional way.

However, before performing FA, certain conditions are required to guarantee the suitability of the data for applying this technique. Therefore, the following criteria must be ensured (Broen et al., 2015; Kaiser and Rice, 1974):

1) The correlation matrix must reveal some correlations between the variables used in the analysis.
2) The value of the Kaiser–Meyer–Olkin (KMO) measure of adequacy must be adequate. The suitability of the value of KMO is determined according to the following criteria:
   - $0.9 \leq$ KMO ≤ 1.0 – excellent;
   - $0.8 \leq$ KMO < 0.9 – good;
   - or $0.7 \leq$ KMO < 0.8 – acceptable;
   - $0.6 \leq$ KMO < 0.7 – tolerable;
   - $0.5 \leq$ KMO < 0.6 – bad;
   - KMO < 0.5 – unacceptable.
3) The significance of Bartlett's test of sphericity must be lower than the limit considered, which in the present case is 5 %. This tests the hypothesis that the correlation matrix is equal to the identity matrix. Hence, by rejecting H0, it is assumed that there are correlations between the variables.

4) The Measure of Sample Adequacy (MSA) indicates that a variable is suitable to be included in the analysis if the value is equal to or higher than 0.5.

Once the data's suitability for applying FA was confirmed, the FA was performed using the PCs method and Varimax rotation. The Kaiser normalisation criteria to consider eigenvalues greater than one was used to indicate the relevant factors extracted, and the communalities showed the percentage of variance explained by the factors extracted (Broen et al., 2015). To establish which variables were included in each of the factors extracted, only those with an absolute value of factor loadings higher than 0.4 were considered (Rohm and Swaminathan, 2004; Stevens, 2009).

The internal consistency of each factor was determined using the standard measure of Cronbach's alpha (α) (Broen et al., 2015; Tanaka et al., 2000). For this, the reference values considered were (Davis, 1964; Hair et al., 2009; Maroco and Garcia-Marques, 2006):

- $\alpha > 0.5$ – acceptable;
- $\alpha > 0.7$ – good;
- $\alpha > 0.8$ – very good.

The cluster analysis (CA) was applied to both factors previously obtained, following the procedure described by Florença et al. (2024). CA was made in two steps: first using hierarchical methods and then the k-means. Seven hierarchical methods (average linkage – between groups, average linkage – within groups, single linkage – nearest neighbour, complete linkage – furthest neighbour, centroid, and Ward) were used to establish the appropriate number of clusters based on the coefficients of the agglomeration schedule. After fixing the number of clusters, the partitive k-means method was applied, considering the initial solution obtained by the hierarchical clustering. (Dolnicar, 2002).

The clusters were characterised by contingency tables and chi-square tests to verify possible differences between them according to various types of variables (sociodemographics, lifestyle, and visualisation of culinary TV programmes).). The Cramer's V coefficients were used to measure the strength of the associations between the variables tested for the characterisation of the clusters. The Cramer's V coefficient varies from 0 to 1; for $V \approx 0.1$, the association is considered weak; for $V \approx 0.3$, the association is moderate; and for $V \approx 0.5$ or over, the association is strong (Witten and Witte, 2009).

For all statistical analyses, the level of significance considered was 5 % ($p < 0.05$).

3. Results

3.1. Sample characterisation

Table 1 summarises the sociodemographic characteristics of the 250 participants in this study, as well as some lifestyle variables. Most participants were female (75.2 %), and the age class most represented was adults aged 31–50 years old, accounting for half of the sample (50.0 %). Concerning the education level, the majority of the respondents had completed secondary school (42.0 %) or had a university degree or higher level of education (43.6 %).

Regarding lifestyle variables, Table 1 shows that a high percentage of participants never practice physical exercise (26.4 %) or do it less than once per week (22.4 %), while only 24.8 % had a regular physical activity (two to three times per week). Regarding the self-perception of practising a healthy diet, most participants said they sometimes have a healthy diet (46.0 %). Finally, concerning the self-perception of health status, a high percentage of the participants declared to have a good (47.6 %) or reasonable (39.2 %) health.

Table 1
Characterisation of the participants in the study and lifestyle variables (N = 250).

Variables	Groups	N	%
Gender	Female	188	75.2
	Male	62	24.8
Age class	Young adults (18–30 years)	69	27.6
	Adults (31–50 years)	125	50.0
	Senior adults (51 years or over)	56	22.4
Education	Basic school	36	14.4
	Secondary school	105	42.0
	University degree or higher	109	43.6
Exercise	Never	66	26.4
	<1 time/week	56	22.4
	1 time/week	49	19.6
	2-3 times/week	62	24.8
	>3 times/week	17	6.8
Healthy Diet	Never	4	1.6
	Sometimes	115	46.0
	Several times/week	74	29.6
	Always	57	22.8
Health status	Excellent	12	4.8
	Good	119	47.6
	Reasonable	98	39.2
	Unsatisfactory	18	7.2
	I don't know	2	0.8
	I don't want to inform	1	0.4

3.2. Meals and eating out

Most participants eat out between once and four times per month (41.2 %), while 32.0 % eat out less than once per month, 14 % do it 1–3 times/week, 8.4 % eat out 4–5 times per week, and 4.4 % do it six or more times per week.

Table 2 shows the frequency of eating out in various places. The participants in this study do not usually eat out in canteens, 185 never do it, and 31 do it sporadically. A similar result was obtained for eating out in snack bars, with 125 participants never doing it and 86 doing it sporadically. Additionally, eating out in gourmet restaurants is not a frequent option (163 never go to these restaurants and 62 go rarely), with similar results for eating out in ethnic food restaurants (133 never go to them and 72 participants only go sporadically). The results in Table 2 highlight that the most frequent options for eating out are restaurants that serve traditional Portuguese food (98 participants go sporadically while 84 go sometimes and 49 frequently), fast food restaurants (104 go sporadically, 69 sometimes and 25 frequently) and restaurants in shopping centres (110 go sporadically, 67 sometimes and 24 frequently).

Fig. 1 presents the characteristics that the participants value when eating out in a restaurant, depending on whether it is for work or pleasure. When in a work context, the aspects most valued include fast cooking (by 75.8 % of the participants), quality of the food (62.5 %), peaceful environment (59.1 %) and diversity of foods available on the menu (55.9 %). On the contrary, when eating out for pleasure, fast cooking is not the most valued (40.4 %) factor, not in comparison to landscape (85.3 %), quality of the food (75.7 %), diversity of choice/menu (74.9 %), location (74.5 %) and peaceful environment (74.1 %).

With respect to the frequency of preparation of meals at home, 32.0 % of the respondents do it less than once a month, 41.2 % do it between 1 and 4 times per month, 14.0 % do it 1 to 3 times per week, 8.4 % do it 4 to 5 times per week and only 4.4 % do it six or more times per week.

3.3. Visualisation of TV cooking shows and culinary programmes

Table 3 presents the results of the questions related to the viewing of TV programmes related to culinary and cooking shows. About half of the participants (50.8 %) watch these types of programmes occasionally, and 12 % watch them frequently, while 37.2 % do not watch these types of TV programme. The reasons pointed out for not watching include lack

Table 2
Frequency with wat the participants eat out in different places.

Places where to eat	Number of participants[a]					Total
	Never	Sporadically	Sometimes	Frequently	Always	
Canteen	185	31	16	12	6	250
Snack bar	125	86	33	6	0	250
Gourmet food restaurant	163	62	23	2	0	250
Traditional food restaurant	13	98	84	49	6	250
Ethnic food restaurant (Mexican, Italian, …)	133	72	38	7	0	250
Fast food restaurant	51	104	69	25	1	250
Shopping centre	49	110	67	24	0	250

[a] All participants expressed their answer for each of the places (lines).

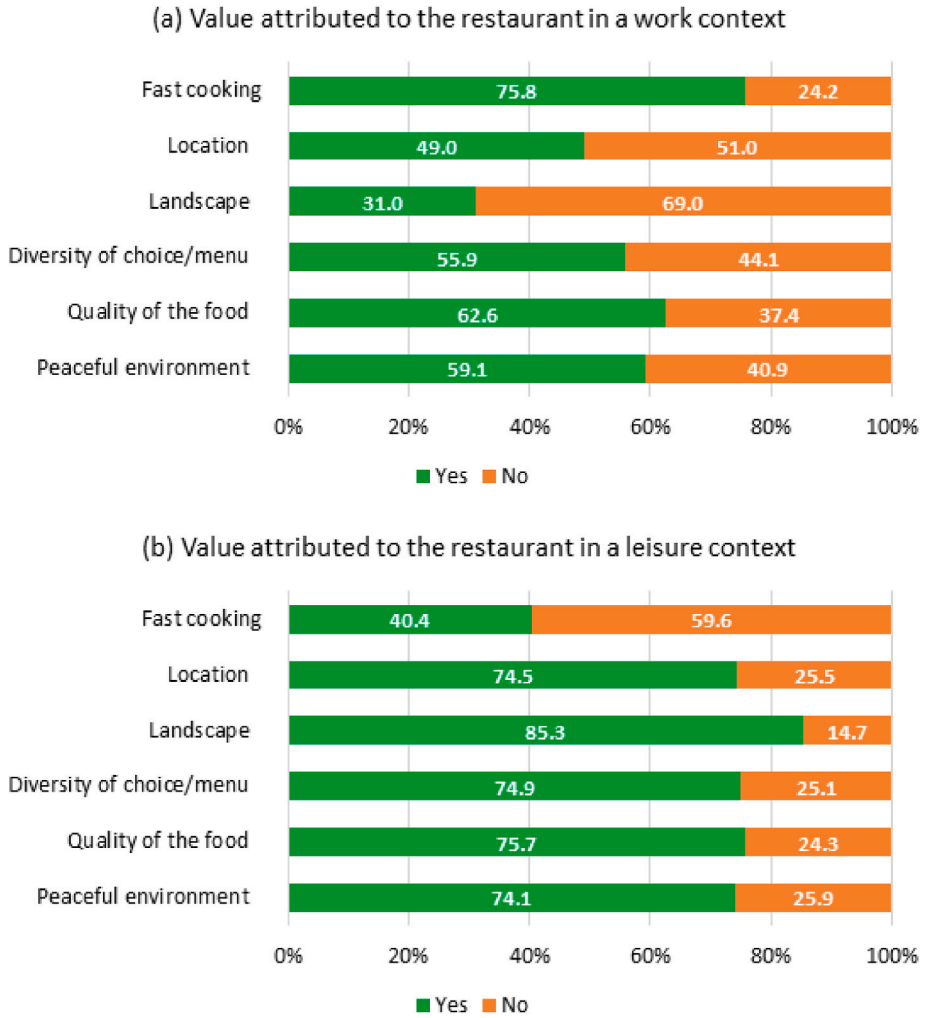

Fig. 1. Value attributed by the participants to the restaurants characteristics, according to context: (a) work, (b) leisure.

of habit (33.3 %), lack of time (26.9 %), and not feeling the need to watch them (17.2 %).

For those participants who watch culinary programmes, the frequency of doing so is low, with most of them, 62.9 %, watching them less than once per week. However, there are 23.0 % of the participants who watch them several times per week (one to three times). Undoubtedly, the time of the day when most participants watch these programmes is in the evening or after dinner (71.0 %), but still 22.2 % watch them in the afternoon (Table 3).

Regarding the type of programmes most viewed, the results in Table 3 indicate that they are competition programmes, like MasterChef (viewed by 61.8 % of the participants) and programmes showing the preparation of recipes (viewed by 59.2 %). With respect to the recipe's programmes, the participants mostly view Portuguese programmes (65.3 %). It was further observed that 45.6 % of the respondents sometimes prepare recipes seen in these culinary programmes. In fact, 53.5 % of the participants believed that viewing these types of programmes influenced their diets, essentially because it gave them ideas for recipes to prepare (66.7 %).

3.4. Perceptions of the participants towards cooking on TV

Table 4 shows the results obtained for a set of eight statements related to the spectators' perceptions regarding the viewing of cooking shows and culinary programmes on television. A high percentage of participants are in agreement towards practically all items, except for

Table 3
Viewing cooking TV programmes.

Variables	Groups	N	%
It is usual to see culinary programmes (n = 250)	Yes, frequently	30	12.0
	Yes, sometimes	127	50.8
	No	93	37.2
Reasons for not watching[a] (n = 93)	I don't like them	10	10.8
	I don't feel the need	16	17.2
	I'm not used to watching	31	33.3
	I have no interest in this subject	10	10.8
	I don't have time	25	26.9
	Other	1	1.1
Frequency of watching culinary programmes (n = 178)	2 or more times/day	5	2.8
	1 time/day	9	5.1
	4–6 times/week	11	6.2
	1–3 times/week	41	23.0
	Less than once/week	112	62.9
Time of day when the participants usually watch culinary programmes[b] (n = 176)	In the morning	12	6.8
	At lunchtime	16	9.1
	In the afternoon	39	22.2
	After dinner/in the evening	125	71.0
Type of culinary programmes viewed[b] (n = 157	Competition programmes (e.g. MasterChef)	97	61.8
	Recipes programmes	93	59.2
	Cookery blogs	38	24.2
	Other	3	1.9
Which recipe programmes are most viewed[b] (n = 150)	Portuguese programmes	98	65.3
	Foreign programmes	24	16.0
	Dessert-only programmes	5	3.3
	Programmes with recipes for a whole meal	21	14.0
	Other	2	1.3
It is usual to cook recipes seen in culinary programmes (n = 157)	Yes, very frequently	8	3.2
	Yes, sometimes	114	45.6
	No	35	22.3
Belief that viewing these programmes influences the daily diet (n = 157)	Yes	73	53.5
	No	84	46.5
Reasons why culinary programmes influence daily diet[a] (n = 78)	I cook more often at home	2	2.6
	I'm more motivated to cook	14	17.9
	I cook healthier food	10	12.8
	I have more recipe ideas to make	52	66.7

[a] Question for the participants who answered NO to the previous question.
[b] The participants could choose more than one option.

Table 4
Perceptions of the participants about TV cooking shows and culinary programmes.

Statement	% of participants				
	Strongly disagree	Disagree	Indifferent	Agree	Strongly agree
1. Programmes that teach how to cook recipes are a positive influence on viewers	5.1	8.9	15.9	44.6	25.5
2. Programmes promoting healthy recipes are useful	3.8	3.8	4.5	49.0	38.9
3. Programmes that present ways of reusing food leftovers help to combat food waste	3.8	3.8	5.7	39.5	47.1
4. Cooking competition programmes (like MasterChef) are just for entertainment	14.0	25.5	19.7	33.1	7.6
5. Cooking competition programmes provide ideas for innovative dishes	5.7	9.6	14.6	50.3	19.7
6. Cooking programmes give you more motivation to cook at home	4.5	7.6	17.2	49.7	21.0
7. Cooking programmes help change lifestyles	8.9	10.8	26.1	39.5	14.6
8. By watching culinary programmes, people can cook food in a less traditional way	10.8	11.5	16.6	45.9	15.3

item number 4. In this way, the respondents recognise the role of these programmes as a positive influence on spectators (44.6 % agree and 25.5 % strongly agree), that programmes stimulating the confection of healthy recipes are useful (49.0 % agree and 38.9 % strongly agree), that programmes showing how to reuse food leftovers help to combat food waste (39.5 % agree and 470.1 % strongly agree), that cooking competition programmes can give ideas to prepared different and innovative dishes (50.3 % agree and 19.7 % strongly agree), that cooking programmes can give additional motivation to cook at home (49.7 % agree and 21.0 % strongly agree), that these programmes can help modifying lifestyles (39.5 % agree and 14.6 % strongly agree), and finally that watching culinary programmes can drive people to cook food in a less traditional way (45.9 % agree and 15.3 % strongly agree). Furthermore, in relation to item 4, 25.5 % of the participants do not believe that competitions like MasterChef are just for entertainment, whereas 39.5 % believe otherwise.

3.5. Factor analysis and cluster analysis

3.5.1. Factor analysis (FA)

The date confirmed its suitability to perform FA, since the value of the KMO obtained was good (KMO = 0.849), the Bartlett's test was significant ($p < 0.001$), and the correlation matrix showed 17 correlations higher than 0.5 between the variables. Hence, the conditions to apply the this type of analysis were fulfilled. Additionally, the anti-image matrix revealed that all variables had values of MSA of 0.5 or higher, indicating that all eight variables could be included in the analysis.

The solution obtained with FA and PCs revealed final communalities between a minimum of 0.520 and a maximum of 0.944, confirming that all variables had a high percentage of their variance explained by the solution, the lowest being for item 5, with only 52 % of its variance explained.

The solution, after rotation, converged in three iterations and extracted two factors with eigenvalues greater than one (4.534 and 1.070) and explained 70.0 % of the variance: 55.5 % for factor F1 and 14.5 % for factor F2). (Table 5).

The distribution of the variables by the two factors was very asymmetric, with one factor (Factor F1) including practically all variables (items 1, 2, 3, 5, 6, 7, and 8) and Factor F2 including only one variable (item 4) (Table 5). Nevertheless, this distribution was rather interesting, because if we look at the contents, we realise that all items included in F1 correspond to positive perceptions linked with usefulness and suitability of the TV shows and programmes, while the only item included in F2 (item 4. *Cooking competition programmes (like MasterChef) are just for entertainment*) corresponds to a negative perception, i.e., this item presupposes a very limited role of this type of show.

Table 5
Solution obtained with FA and Varimax rotation.

Factor	Eigenvalue	%VE[a]	Item	Loading	α[b]
F1 (Positive perceptions, PP)	4.534	55.5 %	1.Programmes that teach how to cook recipes are a positive influence on viewers	0.785	0.903
			2.Programmes promoting healthy recipes are useful	0.850	
			3.Programmes that present ways of reusing food leftovers help to combat food waste	0.822	
			5.Cooking competition programmes provide ideas for innovative dishes	0.746	
			6.Cooking programmes give you more motivation to cook at home	0.859	
			7.Cooking programmes help change lifestyles	0.842	
			8.By watching culinary programmes, people can cook food in a less traditional way	0.649	
F2 (Negative perceptions, NP)	1.070	14.5 %	4.Cooking competition programmes (like MasterChef) are just for entertainment	0.970	NA[c]

[a] %VE = percentage of variance explained.
[b] α = Cronbach's alpha.
[c] NA = not applicable. For factor F2 alpha can't be computed because the factor includes one single variable.

Table 5 shows that all variables had positive and generally high loadings, meaning that all variables contributed decisively to the definition of the factors (all values were above 0.4, corresponding to a minimum of 16 % variance explained). For factor F1, the item with the highest loading (0.859) was item 6. *Cooking programmes give you more motivation to cook at home*, meaning that this item contributed more strongly to the definition of the factor. In the case of F2, the only item had a loading of 0.970, which is also very high.

Internal reliability analysis (Table 5) showed that factor F1 had a very strong internal consistency between the items (α = 0.903, which is considered very good), and therefore all the items are very intimately interconnected with each other. Furthermore, it was observed that internal consistency did not improve by deleting any of the items from the factor. On the other hand, F2 includes only one item, and consequently, reliability analysis does not apply.

Fig. 2 shows the rotated component plot, confirming the special distribution of the two factors F1 and F2), with all items included in F1 clearly close and separated from the item in F2.

The results from ANOVA showed a significant ($p < 0.001$) differentiation between the two factors, evidenced by the high values of F, which corresponds to the ratio F = variation between groups/variation within the groups.

3.5.2. Cluster analysis (CA)

The coefficients of the agglomeration schedule obtained with CA using the seven hierarchical methods allowed the establishment of three clusters. Fig. 3 shows the agglomeration schedule for the Ward method, as an example. After this, CA was performed with the k-means method, considering three clusters, using the initial solution obtained by hierarchical clustering.

Table 6 reveals that the participants were quite evenly distributed between clusters C1 and C2, and only a small percentage was in cluster C3. The information about cluster centres shows that members of cluster

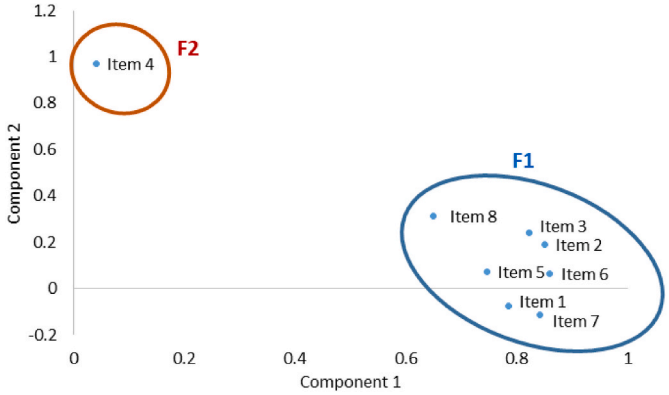

Fig. 2. Factor Analysis component plot for solution obtained with Varimax rotation.

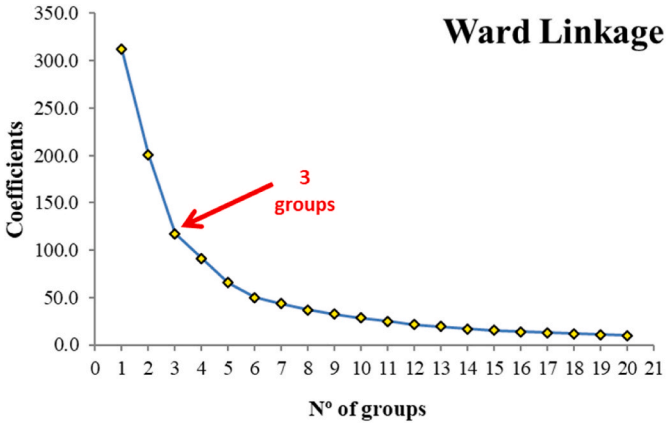

Fig. 3. Agglomeration schedule coefficients in hierarchical cluster analysis.

Table 6
Results of the k-means cluster analysis.

Cluster	% of cases	Cluster Centres	
		F1 (Positive perceptions)	F2 (Negative perceptions)
C1	49.0	−0.063	0.846
C2	43.3	0.504	−0.755
C3	7.7	−2.452	−1.150
ANOVA (F; p-value)		104.196; <0.001	182.079; <0.001

C1 have a strong input for factor F2 and a negligible input for factor F1, so these individuals score high in the negative perceptions but practically do not consider the positive perceptions.

Regarding the participants in cluster C2, they score positively in F1 and negatively in F2, so they score high in the positive perceptions, i.e., tend to find these programmes useful in diverse ways, while contradicting the negative perceptions, i.e., they do not consider that cooking competition programmes (like MasterChef) are solely for the purpose of entertainment.

Finally, the participants in cluster 3 scored negatively in both factors, so they are essentially against positive perceptions about the TV cooking programmes, but considered that cooking competition programmes are in fact, essentially just for fun.

In view of these findings, the clusters can be identified as:

- C1. Not interested in TV cooking programmes or competition shows
- C2. Consider all cooking programmes useful and educational, even the shows
- C3. Just consider cooking shows for entertainment

3.6. Characterisation of the clusters

The CA allowed distributing the participants into the three clusters, and therefore it becomes relevant to understand the characteristics of the individuals in each of the three clusters, according to their perceptions about these types of TV contents related to gastronomy: C1 – Not useful, C2 – Educational, and C3 – Entertaining.

Table 7 shows the characterisation of the clusters according to the sociodemographic variables, and for all variables there were no significant differences ($p > 0.0$ %), although in two cases the significance was marginal (for variable gender, $p = 0.062$, and variable education, $p = 0.052$). Because the p-values were not significant, there were no statistical differences between the clusters, and therefore, the values of the Cramer's V coefficients were low, meaning that the associations between the variables were weak. Even though not statistically significant, some differences were observed between the individuals in each of the clusters. In the case of variable gender, a trend is visible for men to be more represented, 33.3 %, in cluster C3 (entertaining) and less, 10.3 %, in C2 (educational). On the contrary, women were more represented in C2 89.7 %) and less in C3 (66.7 %). For variable age, it was observed that young adults were more represented, 35.3 %, in cluster C2 (educational), while senior adults were more represented, 33.3 %, in C3 (entertaining). With regards to education, people with a university degree tend to be more represented in cluster C2 (educational) and less in cluster C3 (entertaining), 51.5 % and 16.7 %, respectively. Concerning areas of study, individuals with health studies were more in cluster C2 (educational), 17.8 %, while those with food or nutrition studies were more in cluster C3 (entertaining), 50.0 %. With respect to professional situation, the unemployed were more represented, 16.7 %, in cluster C3 (entertaining), and students were slightly more represented, 17.6 %, in cluster C2 (educational). Finally, regarding household, individuals who lived alone were slightly more represented in cluster C2 (educational), and individuals who lived with three or more persons were more in cluster C3 (entertaining), 11.8 % and 41.7 %. However, as previously mentioned, these differences were not statistically significant.

Table 8 shows the cluster membership of individuals according to some lifestyle variables. Although the differences were not significant ($p > 0.05$) for variables exercise and healthy diet, significant differences were found between clusters for variable health status ($p = 0.025$), although the association was moderate ($V = 0.255$). In the case of health status, which was a self-reported question, individuals with a good health status were more represented in cluster C3 (entertaining), 66.7 %, while people with a reasonable health status were more represented in clusters C2 (educational) and C1 (not useful), 42.6 % and 36.4 %, respectively. Regarding the two other variables, despite not having significant differences, some trends were also observed, namely for exercise in which case the participants that never exercise were more in cluster C3 (entertaining), 50.0 %, while those who have moderate exercise levels (2–3 times/week) were more represented in clusters C1 (not useful) and C2 (educational), 24.7 % and 19.1 %, respectively. Regarding self-report of practising a healthy diet, those who do it sometimes were more in cluster C3 (entertaining), 50.0 %, and those who practice a healthy diet several times per week were more represented in cluster C2 (educational), 38.2 %. However, those who stated that they always practice a healthy diet were also more represented in cluster C3 (entertaining), 33.3 %.

Table 9 presents the results for the cross-tabulation between cluster membership and cooking variables. Significant differences were observed for the variables frequency of eating out and of cooking meals

Table 7
Association between cluster membership and sociodemographic variables.

Sociodemographic Variables & Groups	Cluster membership (% of cases)			
	C1 Not useful	C2 Educational	C3 Entertaining	Total
Gender[a]	p = 0.062; V = 0.188			
Female	77.9	89.7	66.7	82.2
Male	22.1	10.3	33.3	17.8
Total	100.0	100.0	100.0	100.0
Age class[a]	p = 0.280; V = 0.127			
Young adults (18–30 years)	20.8	35.3	16.7	26.8
Adults (31–50 years)	54.5	41.2	50.0	48.4
Senior adults (51 years or over)	24.7	23.5	33.3	24.8
Total	*100.0*	*100.0*	*100.0*	*100.0*
Education[a]	p = 0.052; V = 0.073			
Basic school	22.1	8.8	16.7	15.9
Secondary school	36.4	39.7	66.7	40.1
University degree or higher	41.6	51.5	16.7	43.9
Total	*100.0*	*100.0*	*100.0*	*100.0*
Area of studies[a]	p = 0.208; V = 0.231			
Food/Nutrition	26.5	13.3	50.0	22.5
Health	10.2	17.8	0.0	12.7
Physical activity/Sports	8.2	4.4	0.0	5.9
Tourism	6.1	2.2	12.5	4.9
Psychology	0.0	0.0	0.0	0.0
Other	49.0	62.2	37.5	53.9
Total	*100.0*	*100.0*	*100.0*	*100.0*
Professional situation[a]	p = 0.424; V = 0.161			
Unemployed	3.9	4.4	16.7	5.1
Student	10.4	17.6	16.7	14.0
Working student	0.0	0.0	0.0	0.0
Employed	79.2	76.5	66.7	77.1
Retired	5.2	1.5	0.0	3.2
Domestic	1.3	0.0	0.0	0.6
Total	*100.0*	*100.0*	*100.0*	*100.0*
Household[a]	p = 0.817; V = 0.097			
Alone	11.7	11.8	0.0	10.8
2 people	27.3	20.6	33.3	24.8
3 people	28.6	30.9	25.0	29.3
≥4 people	32.5	36.8	41.7	35.0
Total	*100.0*	*100.0*	*100.0*	*100.0*

[a] Chi-square test p-value and Cramer's' coefficient.

Table 8
Association between cluster membership and lifestyle variables.

Lifestyle Variables & Groups	Cluster membership (% of cases)			
	C1 Not useful	C2 Educational	C3 Entertaining	Total
Exercise[a]	p = 0.425; V = 0.161			
Never	26.0	22.1	50.0	26.1
<1 time/week	23.4	29.4	8.3	24.8
1 time/week	22.1	20.6	25.0	21.7
2-3 times/week	24.7	19.1	8.3	21.0
>3 times/week	3.9	8.8	8.3	6.4
Total	*100.0*	*100.0*	*100.0*	*100.0*
Healthy diet[a]	p = 0.386; V = 0.142			
Never	3.9	0.0	0.0	1.9
Sometimes	46.8	39.7	50.0	43.9
Several times/week	29.9	38.2	16.7	32.5
Always	19.5	22.1	33.3	21.7
Total	*100.0*	*100.0*	*100.0*	*100.0*
Health status[a]	p = 0.025; V = 0.255			
Excellent	7.8	1.5	0.0	4.5
Good	45.5	47.1	66.7	47.8
Reasonable	36.4	42.6	16.7	34.6
Unsatisfactory	10.4	7.4	8.3	8.9
I don't know	0.0	0.0	8.3	0.6
I don't want to inform	0.0	0.0	0.0	0.6
Total	*100.0*	*100.0*	*100.0*	*100.0*

[a] Chi-square test p-value and Cramer's' coefficient.

Table 9
Association between cluster membership and cooking variables.

Cooking Variables & Groups	Cluster membership (% of cases)			
	C1 Not useful	C2 Educational	C3 Entertaining	Total
Eat out[a]	p = 0.032; V = 0.232			
Less than once per month	35.1	22.1	66.7	31.8
1-4 times/month	35.1	51.6	33.3	42.0
1-3 times/week	19.5	10.3	0.0	14.0
4-5 times/week	7.8	8.8	0.0	7.6
≥6 times/week	2.6	7.4	0.0	4.5
Total	*100.0*	*100.0*	*100.0*	*100.0*
Cook meals[a]	p = 0.040; V = 0.246			
Never	3.9	1.5	0.0	2.5
Several times/year	0.0	0.0	8.3	0.6
Once/month	1.3	0.0	0.0	0.6
Several times/month	2.6	1.5	0.0	1.9
Once/week	0.0	0.0	0.0	0.0
Several times/week	26.0	27.9	0.0	24.8
Everyday	66.2	69.1	91.7	69.4
Total	*100.0*	*100.0*	*100.0*	*100.0*
Watch culinary contents[a]	p = 0.391; V = 0.165			
2 or more times/day	1.3	5.9	0.0	3.2
1 time/day	8.0	2.9	0.0	5.2
4–6 times/week	6.7	7.4	8.3	7.1
1–3 times/week	29.3	25.0	8.3	25.8
Less than once/week	54.7	58.8	83.3	58.7
Total	*100.0*	*100.0*	*100.0*	*100.0*
Cook recipes seen on TV[a]	p = 0.771; V = 0.076			
No	23.4	19.1	33.3	22.3
Yes, sometimes	71.4	76.5	58.3	72.6
Yes, very frequently	5.2	4.4	8.3	5.1
Total	*100.0*	*100.0*	*100.0*	*100.0*
Influence of culinary TV on diet[a]	p = 0.192; V = 0.145			
No	58.4	45.6	66.7	53.5
Yes	41.6	54.4	33.3	46.5
Total	*100.0*	*100.0*	*100.0*	*100.0*

[a] Chi-square test p-value and Cramer's' coefficient.

(p = 0.032 and p = 0.040, respectively). In both cases, the associations between variables were weak to moderate (V = 0.232 and V = 0.246). The participants who eat out less than once per month tend to be in cluster C3 (entertaining), 66.7 %, while participants who eat out 1–4 times per month were more represented in cluster C2 (educational), 51.6 %. In relation to the frequency of cooking meals, those who cook several times per week were equally distributed by clusters C1 (educational) and C2 (educational), 26.0 % and 27.9 %, respectively, while those who cook everyday were more in cluster C3 (entertaining), 91.7 %, although also well represented in clusters C1 and C2 (66.2 % and 69.1 %.

Regarding the other variables in Table 9 (watch culinary contents, cook recipes seen on TV and influence of culinary TV on diet), no significant differences were observed (p < 0.05). Still, some trends could be observed, for example, those who watch culinary programmes on TV very rarely, less than once per week, find these programmes essentially entertaining (were more in cluster C3, 83.3 %). Also, participants who did not cook recipes seen on TV were more represented in cluster C3 (entertaining), 33.3 %, and those who sometimes cooked recipes seen on TV were more in cluster C2 (educational), 76.5 %. Regarding the perception that culinary programmes influence the participants' diets, those who replied 'yes' were more in cluster C2 (54.4 %), i.e., found these programmes educational, while those who replied 'no' were more in cluster C3 (66.7 %), i.e., considered these programmes entertaining.

4. Discussion

This study aimed to understand the habits of people who watch culinary programmes on television, like competition shows or recipe programmes, regarding eating out and watching these types of TV content. The majority of the participants were women, demonstrating a female-dominated sample, and it is well known that women have played a pivotal role in shaping culinary traditions. Their contributions to the culinary field are diverse, spanning leadership, creativity, and the preservation of cultural heritage. However, does not only involve preparation of food for covering nutritional needs. It is recognized by nome as an art form that involves both creativity and technical skills, with visual presentation, flavours and aromas that come together to create unique experiences (Arrais, 2023; Daniel and Guttmann, 2024; Ozkan et al., 2025).

Although cooking is an ancient human activity, technology has been transforming the way we prepare, cook and experience food. From apps that help with meal planning to new smart appliances in the kitchen, technology is making life easier for home and professional cooks. Furthermore, 3D food printing and the use of artificial intelligence in cooking are emerging areas that promise to revolutionise the food industry, as well as the way we prepare food at home. Cooking shows have also adapted to these technological advancements as a way to diversify content and innovate the way food is prepared (Agunbiade et al., 2022; Bagnulo et al., 2024; Chauhan et al., 2025; Saha et al., 2025).

Literature indicates that individuals with higher education are more likely to meet nutritional recommendations, emphasising the role of education in promoting healthier dietary behaviours (Carrasco-Marín et al., 2024). A study by Carrasco-Marín et al. (2024) analysed data from 437,860 participants and found that individuals with lower educational levels were significantly less likely to adhere to healthy dietary guidelines. Considering that our study has 43.6 % of participants with a university degree and 42 % with completed secondary school, there appears to be a tendency that people who watch these programmes have health considerations in mind. These results support the possible idea that TV cooking shows can be a tool to incentivize the preparation of healthy recipes, while also innovative.

Our study provided evidence that most participants consider that they have a self-perception of health status as good (47 %) or reasonable (39.2 %), which is in agreement with the work by Shaaban et al. (2022) that guided factors that can affect self-perceived health status in Portugal. According o that research, which used representative data collected at the National Health Survey of 2014, almost half of the participants were inclined to rate their health as good or very good (Shaaban et al., 2022). Self-perception of health status can be highly relevant for defining people's actions towards actively improve health status and well-being.

Another key factor influencing Portuguese consumer choices is the type of establishment where they choose to eat. Traditional food restaurants are preferred sometimes (84 %) and frequently (49 %). These are followed by fast food restaurants (69 % chose them sometimes and 25 % frequently) and restaurants located in shopping centres (67 % sometimes and 24 % frequently). Siopa et al. (2016) also conducted a study on the profile of Portuguese consumers of local food in which they identified four key attributes that consumers consider most important: the quality of the food, the price, the ambience or atmosphere of the place, and the kindness of the staff. Habits towards eating out versus preparing meals and eat at home can be related with personal preferences as well as time or financial issues.

Additionally, factors such as previous experiences, information-seeking behaviour, and the variety of restaurant types could be valuable considerations for future restaurant models, as these factors have been shown to significantly influence decisions regarding local traditional restaurants. Furthermore, a study made in 2024 by Oliveira and Raposo (2024) based on an online questionnaire, reported that nearly 80 % of the respondents admited consuming fast food, and

approximately 40 % consumed it more than once or twice a week. The factors that most influenced the choice of fast food were ease or convenience of preparation (59.9 %), price (48.5 %), and flavour (28.3 %). In our study, curiously, when eating out participants valued fast cooking (75.8 %), quality of food (62.5 %), peaceful environment (59.1 %), and diversity of foods available on the menu (55.9 %).

The findings suggest that celebrity chefs and cooks have a huge influence on the majority of people who visualize TV culinary programmes (Wood, 2000). However, only 44.6 % of our participants agreed with this, and 25.5 % strongly agreed. In fact, literature has shown that these celebrity chefs nowadays significantly influence food trends and consumer behaviours (Giousmpasoglou et al., 2020), namely by advocating for ethical eating practices, emphasising local sourcing, sustainability, and animal welfare. By encouraging these values, they inspire audiences to reconnect with food sources and consider the broader implications of their dietary choices. Moreover, as the majority of the participants said (47,1 %), these programmes inspired watchers to diminish waste, as Sayed Elhoushy (2022) detailed in his study, where cooking shows across countries present a powerful medium for educating millions of consumers about food waste management and minimization.

Moreover, these programmes give ideas for innovative dishes (50.3 % agree and 19.7 % strongly agree), and this can contribute to therapy, from a sociological perspective, because, as expected, watching food-related versus non-food-related TV content resulted in more hedonic eating, as previously published by Alblas et al. (2019).

Contemporary studies have examined the influence of watching culinary programmes on viewers' eating behaviours and food choices (Folkvord et al., 2020). Children exposed to programmes that promote healthy content were more inclined to select fruit and/or vegetables over less unhealthy alternatives, such as chips or salted mini-pretzels. These findings align with our data, which indicate that television programmes have the potential to educate viewers on how to prepare recipes (44.6 % agree) and that nearly half of the respondents (49 %) consider such programmes promoting healthy eating habits to be beneficial.

Research suggests that observing others peoples' eating behaviours and the social expectations around food can significantly shape individual dietary choices in diverse environments. This cross-sectional study was in accordance with this, since only 22.3 % of the participants did not try out the recipes seen in the culinary programmes.

Also, several studies confirmed the potential influence of eating out and television cooking programmes on dietary behaviours and health, highlighting the importance of mindful eating practices and critical food-related media (Pope et al., 2019). In this study, the authors stated that the only sources of recipe evidence related to one's BMI were cooking shows and social media. Moreover, exposure to less nutritious food content through cooking shows was considered to establish perceived social norms around the preparation and consumption of such foods. This perception was also seen in our study since 45.6 % of the inquired (sometimes) or 3.2 % frequently cook recipes seen in culinary programmes, making these an example to be followed.

Suzanne Higgs (2015) back in 2015 has already studied this effect of social norms and modelling of eating Behaviour and established that social norms have a powerful impact in food intake, in many settings and contexts. Also Neyens and Smits (2017) suggested that food cues in TV cooking showed stimulate consumption by inducing food cravings, especially in children and portion-size cues only appeared to affect older children's food selection. These assumptions seem to have higher importance than 33.1 % of the participants affirmed. In fact, they said that these competition programmes are just for entertainment, and literature contradicts this opinion since not only does food marketing enhance attitudes and preferences, but exposure to some programmes can also influence their choices (van der Bend et al., 2022).

The present investigation exhibits commendable aspects. Specifically, the study delivers a particularised understanding of perceptions and behavioural patterns within a segment of Portuguese viewers, by utilising an easily administered online questionnaire that facilitates the prompt collection of data across various geographical settings.

Moreover, this investigation provides noteworthy contributions to understanding the media's role in shaping dietary habits and health perceptions within this cultural context. The study centres upon the projected influence of present media consumption patterns and their effects on existing dietary practices.

Finally, despite the modest engagement with culinary shows among the sample, there is a perceived positive impact on cooking habits and food choices. The sociocultural dynamics, including gender roles and education, play significant roles in shaping these perceptions and behaviours.

These results provide a preliminary overview of how television cooking shows and culinary programmes can influence behavioural eating habits. Additionally, they can provide insights into participants' dietary standards and serve as one possible tool to help guide the development of health promotion efforts and healthier eating practices.

Future research should delve deeper into content-specific influences and leverage technological innovations to promote healthier lifestyles through media.

5. Conclusions

This study focused on two main topics, eating habits and the viewing of culinary programmes on TV.

Regarding the first topic, the results showed for the sample at study a low frequency of eating out in canteens, snack bars, gourmet food restaurants and ethnic food restaurants. On the contrary, the frequency of eating out was higher for restaurants serving traditional Portuguese food, fast food places and shopping centres.

Additionally, it was found that the respondents valued different restaurant characteristics depending on the context, so that, in a work context, was more valued the fast preparation of the meal, while in a leisure context, the view was the most valued factor.

The participants in this study showed a low frequency of meals prepared at home, with only a small fraction doing it on a daily basis.

Regarding the second topic, it was observed that half of the participants sometimes watch culinary programmes, and those who do not watch it do so because they are not used to it, lack the time, and do not feel the need to do so. Two-thirds of the participants watch these programmes less than once per week, and the most viewed types of programmes are competition shows, followed by recipe programmes, which are viewed mainly at the end of the day. The participants showed a preference towards national programmes and believe that these types of TV content can influence their daily diet, mostly due to the possibility of learning new recipes, thus having more ideas to prepare food at home. Some of the participants have answered that, occasionally, they prepare and cook recipes seen on cooking shows.

With respect to perceptions, the respondents were very positive about these types of programmes, believing they can be useful, educational and can help shape their eating habits, more specifically, to prepare healthier meals or reuse leftovers in a creative way to avoid food waste.

Factor analysis was performed on the eight items used to assess the participants' perceptions, and two groups of items were clearly separated, one including the positive perceptions (containing seven items) and the other the negative perceptions (only one item). The internal reliability of the first factors was very high, meaning that there was a strong cohesion between the items. Furthermore, cluster analysis performed over the factors extracted allowed for the establishment of three clusters, namely those individuals whose perception is that TV culinary contents are not useful, those individuals who find them educational, and those who consider them entertaining. Finally, significant differences were found between the clusters for variables such as health status, frequency of cooking out, and cooking meals.

In conclusion, it can be inferred that these types of programmes

could serve as a useful tool to transmit content that could help shape people's eating habits, leading to a greater frequency of meals prepared at home, and healthier and more sustainable cooking, besides just pure entertainment.

6. Limitations and future work

This work was relevant to understand the correlation between the viewing of TV cooking programmes and the influence of these shows on the eating habits and meal preparation of a sample of the Portuguese population.

Online and anonymous enquiries have some advantages, such as affordability, convenience to the participants, saving time and resources and more honest answers. Nevertheless, this methodology also entails some disadvantages.

One of the limitations of this research is the small sample size of only 250 Portuguese citizens. However, this sample size is already representative of the Portuguese population, given that it is a relatively small country, and it demonstrates some relevant, preliminary results in an area that has not yet been studied.

Another limitation could be identified as relating to unequal group representation, typically with a higher representation of the female gender. This was a direct consequence of recruiting a convenience sample, which can introduce some bias. Still, this trend of having more female than male respondents is very common in surveys where a non-probabilistic convenience sample is used, owing to the ease of recruitment and usually a higher predisposition of female participants to engage in questionnaire surveys than men. Additionally, women may have a higher tendency to watch cooking programmes in those cases where the women are responsible for the preparation of the meals for the household, a role that is still very much attributed to women as compared to men, although this trend has been shifting over the years. Because of this, some bias can be present in this analysis, and therefore, the conclusions obtained for this sample, might not necessarily be indicative of the general Portuguese population.

One other limitation is regarding accessibility to electronic devices (smartphones, computers, etc.) and the internet, thus excluding people who are not versatile in these new technologies. However, these situations are increasingly rarer.

In regard to future work, it is important to focus on understanding, more specifically, what changes TV cooking programmes encourage in people's eating habits, for example, if it is the introduction of new products or flavours, teaching of different cooking techniques, or emphasising a specific type of diet. Moreover, the type of content that is broadcast in these shows should also be something that needs further exploration.

CRediT authorship contribution statement

Raquel P.F. Guiné: Writing – review & editing, Supervision, Software, Methodology, Investigation, Data curation, Conceptualization. **Sofia G. Florença:** Writing – original draft, Methodology, Investigation. **Edite Teixeira-Lemos:** Writing – original draft, Investigation. **Maria João Lima:** Writing – original draft.

Implications for gastronomy

The current work has no direct gastronomic implications, however, these results can contribute to gastronomy by highlighting the role of TV cooking shows and culinary programmes in shaping the spectators' cooking habits and preparation of meals. This article can serve as a guidance to understand how spectators can shape their habits and influences according to the viewing of such TV programmes. In fact, these data can be used, as a tool to design TV programmes destined at improving culinary skills, stimulating home preparation of meals and improving the quality of the dishes prepared. All these could be contributing to a healthier lifestyle, with impact not only at physical, but also, at a psychological level, promoting self-esteem and raising interest for culinary practices.

Declaration of competing interest

All authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Note: This statement was also included in the manuscript file.

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Data availability

Data will be made available on request.

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