



Meal planning by high and low health conscious individuals during a simulated shop in the supermarket: A mixed methods study

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ABSTRACT

Planning is an essential component of home meal preparation. While level of health consciousness permeates both activities, this relationship is underexplored in the scientific literature. Using a mixed-methods convergent parallel design this study identified the reasoning behind meal planning and compared the characteristics of meals planned by high and low health-conscious adults during a simulated shopping task in a supermarket store. Participants were assigned a task where they were asked to choose ingredients to prepare a hot evening meal for a last-minute guest. High Health Conscious (HHC) participants planned healthier meals with more whole grains/breads/pasta, fruits, and vegetables than Low Health Conscious (LHC) participants. HHC participants mentioned not only health-related motives, but also ingredients' characteristics and cooking habits as influencers of their choices. LHC individuals focused on their own preferences, acknowledged that they struggled with the skills needed to prepare a meal and considered the presence of a guest as the only reason why they would prepare a meal. The mixed methods approach enabled us to link the participants' reasoning with the quantitative differences between meals planned by them - HHC individuals planned healthier meals and manifested closeness to the act of cooking. This suggests that the link between health interest and learning how to cook deserves to be further explored.

1. Introduction

In western urban societies, time devoted to cooking is shrinking and homemade meals are becoming less frequent (Healy, 2014; Möser, 2010; Smith, Ng, & Popkin, 2013; Warde, Cheng, Olsen, & Southerton, 2007), while consumption of ready-to-eat, processed, and ultra-processed foods is increasing (Louzada et al., 2015; Popkin, Adair, & Ng, 2012). Concomitantly, meal planning is associated with a higher intake of fruits and vegetables (Boutelle, Birnbaum, Lytle, Murray, & Story, 2003; Crawford, Ball, Mishra, Salmon, & Timperio, 2007; Neumark-Sztainer et al., 2014), and a lower intake of fast foods (Neumark-Sztainer et al., 2014). In addition, planning ahead increases meal variety (Fordyce-Voorham, 2011), and helps the person responsible for cooking satisfy his/her family's preferences and needs (Bassett, Beagan, & Chapman, 2008).

Previous research indicates that people consider meal planning as to *think ahead*, i.e conceptualize what one is going to prepare (Fiese, Foley, & Spagnola, 2006). The process might include consulting with household members to accommodate their needs, checking pantry and refrigerated food stock, and searching recipe sources (Fordyce-Voorham,

2011); its complexity requires anticipating time, thinking about oneself and family members' daily schedules, as well as coming up with strategies to make food preparation easier and food budgets last (Engler-Stringer, 2010). Planning meals ahead is linked to food shopping (Bassett et al., 2008; Fordyce-Voorham, 2011), and also includes constructing images or representations of relationships that define meal gatherings (Fiese et al., 2006).

Conceptually speaking, meal planning is a component of 'food literacy', defined as 'the scaffolding that empowers individuals, households, communities or nations to protect diet quality through change and strengthen dietary resilience over time' (Vidgen & Gallegos, 2014). The inter-related knowledge, skills and behaviours required to plan, manage, select, prepare and eat food to meet needs and determine intake are all part of this construct (Vidgen & Gallegos, 2014).

In spite of the importance of planning for successful meal preparation, there is a paucity of research on the reasoning behind home meal planning. The few studies we were able to locate focused on who was present and who prepared the meal, when it took place, what was served, where the meal was prepared, where the ingredients were bought, and how the meal was prepared (Bassett et al., 2008; Blake,

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Bisogni, Sobal, Jastran, & Devine, 2008; Ducrot et al., 2015; Engler-Stringer, 2010; Henry et al., 2003). Some of them dealt with factors involved in a specific meal planning context, but not the meal characteristics, nor how meal quality was affected by the planning process (Basset, Beagan, & Chapman, 2008; Blake et al., 2008; Henry et al., 2003).

Regarding the relationship between nutritional quality of meals and factors involved in planning, studies focus on perceived time pressure, convenience orientation and self-efficacy to prepare a healthy meal (Beshara, Hutchinson, & Wilson, 2010), as well as on work-life-related stress, parental depressive symptoms, and family functioning (Neumark-Sztainer et al., 2014). Information however was obtained post hoc and not at the time of decision making, which would provide a better understanding of how the quality of the meal relates to the planning process.

Another important determinant of food choice and therefore crucial to meal planning is health consciousness (Roininen, Lähteenmäki, & Tuorila, 1999), a psychological concept that refers to 'the degree to which health concerns are integrated into a person's daily activities' (Jayanti & Burns, 1998). It assesses a subject's readiness to undertake health actions (Becker, Maiman, Kirscht, Haefner, & Drachman, 1977), including the consumer interest in eating healthy foods (Soares, Deliza, & Gonçalves, 2006). Studies have shown that health consciousness influences a variety of health attitudes and behaviours (Michaelidou & Hassan, 2008; Schifferstein & Oude Ophuis, 1998), and also determines which attributes consumers consider to be important when making food choices (health-related versus health-unrelated attributes) (Mai & Hoffmann, 2012). As a consequence, health conscious individuals have different food choice motives (Sun, 2008), are more inclined to seek out nutritional knowledge and are far more likely to choose fruits, vegetables and low-fat alternatives compared to those individuals with little or no nutritional knowledge (Park, Ham, & Lee, 2015). Research also shows that people who are more interested in nutrition issues eat more fruits and vegetables, and drink more milk (Bowman, 2005). Because of the aforementioned reasons, it is important to consider individual health concerns when trying to rigorously explain how people form their healthy eating attitudes (Sun, 2008).

According to the Health Belief Model (a psychological health behaviour change model developed to explain and predict health-related behaviours), the adoption of health-promoting behaviours depends on the individual's perception about his/her susceptibility to and severity of a particular health problem. Additionally, the benefits of the new behaviour must outweigh the barriers to preventive action (Janz & Becker, 1984; Ogden, 2012). In a previous study, we identified that high health-conscious individuals selected more unprocessed/minimally processed and less ultra-processed foods than those with low health consciousness when asked to plan a meal for two (Botelho, Camargo, Dean, & Fiates, 2019). The study however did not include a qualitative component to explore participants' reasoning behind meal planning, and food choices were analysed using a different approach (level of industrial processing of foods, with no focus on the meal characteristics).

As planning is an essential component of home meal preparation and level of health consciousness permeates both activities, this underexplored relationship merits further investigation. Therefore, this study aimed to identify the reasoning behind meal planning and relate it to characteristics of meals planned by High and Low Health Conscious adults during a simulated shopping task in a supermarket store. A mixed-methods convergent parallel design was used to explore the links between the rationale behind meal planning and the differences between the meals planned by the two groups.

2. Material and methods

A convergent parallel mixed methods design (Fig. 1) was adopted in order to obtain complementary data on the same topic. Data was

collected in parallel, analysed independently and discussed in a comparative and contrasting way (Creswell & Clark, 2017).

2.1. Participants, recruitment and setting

Participants were adults (18–59 y-o), urban residents of a Southern Brazil State Capital used to shop for groceries in supermarkets. Sample size ($n = 50$) was defined according with a previous study that described weeknight dinner preparation at home (Beck, 2007). Researchers actively invited individuals who circulated in and around two university campuses to participate in the study. Social network (Facebook®) was also used to advertise the research. Those who manifested interest were invited to answer a screening questionnaire and only the ones who met the eligibility criteria were included in the study. A screening questionnaire was used to gather participants' main demographics and health consciousness.

Health consciousness was assessed with the General Health Interest Scale (Roininen et al., 1999) translated and adapted for Portuguese speakers (Soares, Deliza, & Gonçalves, 2008). The scale was constructed on the basis of factor and reliability analysis, and respondents were divided into three groups depending on their scale values, using the 33rd and 66th percentile points as cut-off points. These groups were designated 'low', 'moderate' and 'high' health conscious, respectively (Roininen et al., 1999). Individuals who fell on the moderate health conscious category were not included in the study. In order to eliminate potential bias due to possible greater knowledge about healthy eating, people with health-related occupations or who followed a specific diet for health reasons were also not included.

Time between screening and conducting the simulated shop ranged from 24 h to one week. All data collection took place in a single store to control for variables such as store size, variety, price and distribution of products. The chosen venue was conveniently located in a residential neighbourhood, near two university campuses. Data collection took place between October 2016 and May 2017 and was interrupted between early December and middle January to avoid the influence of seasonal offers on food choices (Christmas and New Years' holiday season).

2.2. Procedures

2.2.1. Data collection

In the supermarket store, HHC and LHC participants were individually instructed to complete the following task - *'imagine a friend or family member has just informed you that they are calling by for a meal this evening. Please choose all food items you would use to prepare a meal for two'*. We reinforced the need to choose all necessary ingredients to prepare the meal, including items already available at home (Botelho et al., 2019). The instruction took into consideration that preparing meals for others is a motivator for cooking at home (Jones, Walter, Soliah, & Phifer, 2014), because it takes more time and demands more preparation than solitary eating (Yates & Warde, 2017). As not having time or feeling pressured by time is also shown to affect the motivations of individuals to cook (Daniels, Glorieux, Minnen, & van Tienen, 2012; Jones et al., 2014), participants were asked to plan a meal for the same day. The idea of having a last-minute guest was supposed to get the participant to plan a different meal than the one he/she would normally have for dinner in a usual day. As it was a shopping simulation, participants carried out the shopping on their own, and no time and cost limits were set. When the shopping task was finished, researchers photographed all the participant's selected products with a Smartphone camera, including the front-of-pack (FoP) labels and ingredient lists (when available), and returned the products to their original shelves.

Data collection continued with a semi structured interview in order to investigate the details of the planned meal and the reasoning behind the planning process. Participants were asked three main questions

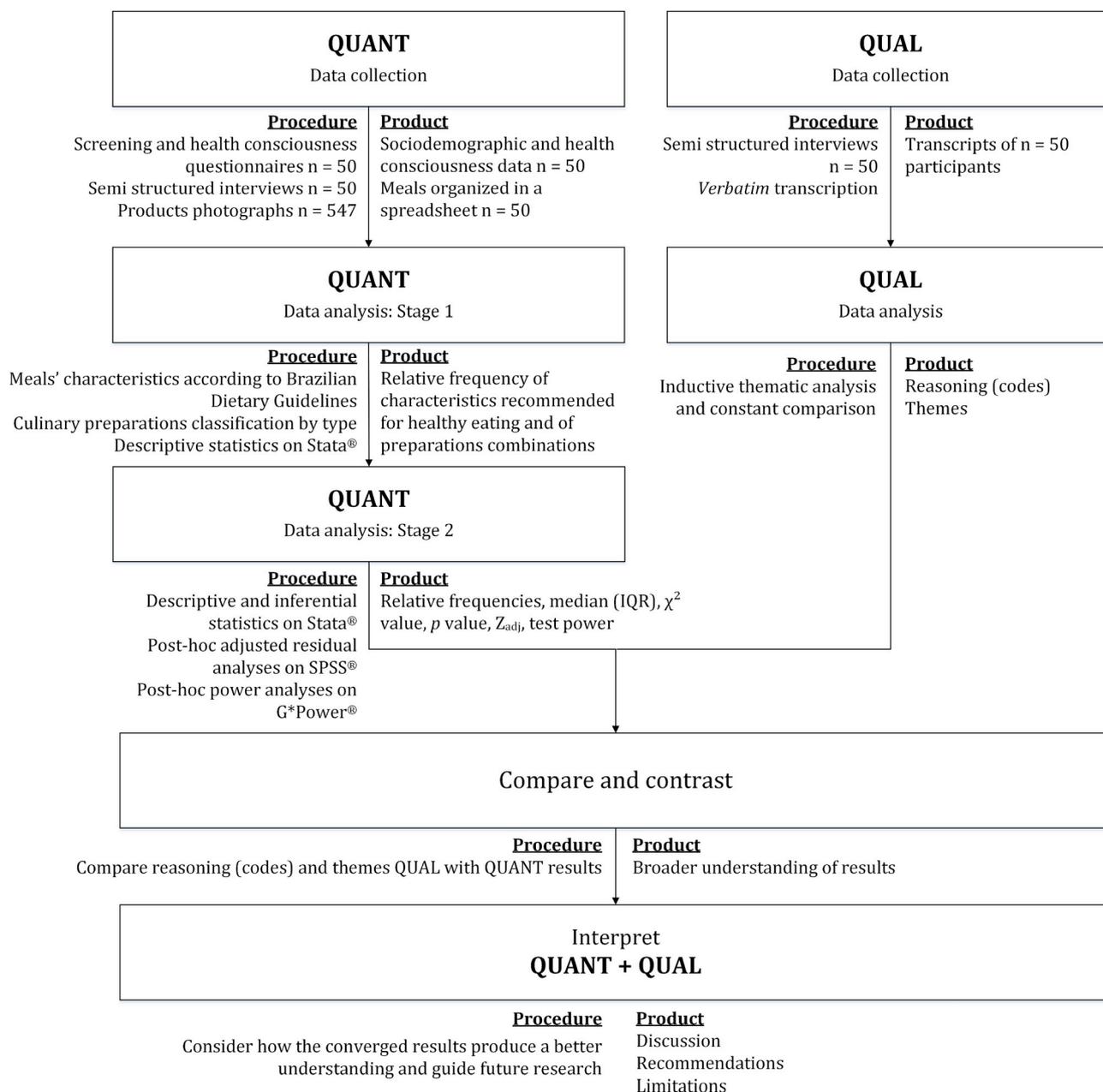


Fig. 1. Design of the mixed methods with a parallel convergent approach. The authors (Creswell & Clark, 2017). QUAL – qualitative. QUANT – quantitative.

(What were you planning to prepare with the items you chose? What were you thinking when you chose the items? How having a guest influenced your choices?). Further probes were used to deepen the reasoning behind planning.

Interviews were conducted in a strategic place outside the supermarket and participants were able to visualize the chosen food items' photographs during the interview. Interviews were audio recorded and transcribed.

2.2.2. Data treatment and quality control

A panel of five specialists in qualitative research on food behaviour discussed the interview guide prepared by the first author. AMC and AMB, who collected all the data, were trained in qualitative research methods. A pilot test was performed with five participants who met the same eligibility criteria of the sample in order to calibrate the study protocols. The researcher who conducted the interviews (AMC) carried out the transcription *verbatim*. AMB created a database with

sociodemographic information from the sample as well as names, brands and ingredients lists of all products chosen by each participant. AMC checked all the data entered into the database.

2.2.3. Characteristics of planned meals

Participants were asked to name and describe the dishes they would prepare, as well as their components/ingredients and preparation methods – these were transcribed, recorded in a spreadsheet and classified as appetizer, main, side, salad, or pudding (Abreu, Spinelli, & Pinto, 2009; Drummond & Brefere, 2010; Philippi, 2016).

Meal characterization was based on directives from both editions of the Dietary Guidelines for the Brazilian Population (Brasil, 2006; Brazil, 2015) regarding lunch and dinner according to presence/absence and types of certain food groups/components, and cooking method employed. The food groups/components assessed were cereals, breads, pasta, tubers and roots; whole cereals, breads and pasta; fruits, vegetables and legumes; meat; milk and dairy products; added fat; sauces;

Table 1
Sample characteristics.

Characteristic	Total % (n)	HHC % (n)	LHC % (n)	Overall χ^2 (p)
Sex				
Female	50 (25)	56 (14)	44 (11)	0.7 (0.396)
Male	50 (25)	44 (11)	56 (14)	
Age				
18–29 years	58 (29)	36 (9) ^a	80 (20) ^b	10.4 (0.015)
30–39 years	16 (8)	24 (6)	8 (2)	
40–49 years	12 (6)	16 (4)	8 (2)	
50–59 years	14 (7)	24 (6)	4 (1)	
Marital status				
Single	62 (31)	36 (9) ^c	88 (22) ^d	12.5 (< 0.001)
Married	32 (16)	52 (13) ^e	12 (3) ^f	
Divorced	6 (3)	12 (3)	0 (0)	
Education				
Incomplete primary education	2 (1)	0 (0)	4 (1)	3.8 (0.282)
Primary education	4 (2)	0 (0)	8 (2)	
Secondary education	44 (22)	36 (9)	52 (13)	
Higher education	50 (25)	64 (16)	36 (9)	

HHC – High Health Conscious. LHC – Low Health Conscious. ^aZ_{adj} = -3.15, *p*_{adj} = 0.002; ^bZ_{adj} = 3.15, *p*_{adj} = 0.002; ^cZ_{adj} = -3.30, *p*_{adj} = 0.001; ^dZ_{adj} = 3.60, *p*_{adj} < 0.001 ^eZ_{adj} = 2.90, *p*_{adj} = 0.004 ^fZ_{adj} = -2.80, *p*_{adj} = 0.005.

seasonings; and foods with high sugar concentration (Brasil, 2006; Brazil, 2015). Meals were also characterized according to the number of different dishes they comprised.

2.2.4. Statistical analysis

Sample characteristics (Table 1) and characteristics of meals planned by HHC and LHC individuals (Tables 2 and 3) were compared using the Pearson chi-square test. Significant differences found between polytomous variables were followed by post-hoc adjusted residual analyses with Bonferroni corrections to assess pairwise differences (Beasley & Schumacker, 1995; García-Pérez & Núñez-Antón, 2003). A post-hoc power analysis (w) of Pearson's chi-square tests was conducted

Table 2

Characteristics of meals according to recommendations for healthy eating proposed in the two editions of the Dietary Guidelines for the Brazilian Population (2006, 2015).

Characteristic	Criteria	Total % (n)	HHC % (n)	LHC % (n)	χ^2 (p)
Presence of cereals, breads, pasta, tubers and roots ¹	+	98 (49)	100 (25)	96 (24)	0.35 (0.554)
Presence of whole cereals, breads and pasta ^{1,2}	+	28 (13)	48 (12)	5 (1)	11.04 (0.001)*
Presence of vegetables ^{1,2}	+	90 (45)	100 (25)	80 (20)	4.10 (0.043) [#]
Presence of legumes ^{1,2}	+	6 (3)	8 (2)	4 (1)	0.35 (0.552)
Presence of fresh or dried fruits in salads or as pudding ^{1,2}	+	20 (10)	36 (9)	4 (1)	8.00 (0.005) ^S
Presence of meats and/or eggs	N.A.	92 (46)	84 (21)	100 (25)	3.00 (0.083)
Presence of lean cuts of meat or poultry or fish or eggs ^{1,2}	+	59 (27)	67 (14)	52 (13)	1.01 (0.314)
Exclusive presence of non-lean cuts of meat or poultry ^{1,2}	-	41 (19)	33 (7)	48 (12)	
Presence of milk and dairy products	-	70 (35)	60 (15)	80 (20)	2.38 (0.123)
Presence of skimmed or semi-skimmed/low-fat dairy products ^{1,2}	+	57 (20)	73 (11)	45 (9)	2.80 (0.094)
Exclusive presence of non-skimmed or semi-skimmed/low-fat dairy products ^{1,2}	-	43 (15)	27 (4)	55 (11)	
Use of vegetable oils in place of butter and margarine ¹	+	93 (39)	96 (22)	89 (17)	0.60 (0.439)
Presence of sauce	N.A.	74 (37)	76 (19)	72 (18)	0.10 (0.747)
Presence of tomato sauce with herbs ¹	+	41 (15)	42 (8)	39 (7)	0.04 (0.842)
Exclusive presence of white sauce, with mayonnaise or cheese ¹	-	59 (22)	58 (11)	61 (11)	
Type of seasoning					
Presence of olive oil, lemon and fresh or dried herbs ^{1,2}	+	84 (42)	88 (22)	80 (20)	0.59 (0.440)
Exclusive presence of industrialized spices, sauces and broths ^{1,2}	-	16 (8)	12 (3)	20 (5)	
Presence of processed foods with high sugar concentration ¹	-	22 (11)	24 (6)	20 (5)	0.12 (0.733)
Method of cooking					
Use of steam, cooking in water without or with little fat, stewing, roasting, broiling, sautéing ^{1,2}	+	88 (43)	88 (21)	88 (22)	0.00 (0.957)
Use of steam, cooking in water without or with little fat, stewing, roasting, broiling, sautéing and frying ^{1,2}	-	12 (6)	12 (3)	12 (3)	

HHC – High Health Conscious. LHC – Low Health Conscious. N.A. – not applicable. ¹Brasil, 2006. ²Brazil, 2015. Criteria: + and - indicate recommended and not recommended characteristics for healthy eating, respectively, that apply to lunch and dinner meals. The selection of canned vegetables and legumes was not counted as presence, since the incentive to consume these foods occurs mainly in the fresh form and in culinary preparations (Brasil, 2006; Brazil, 2015). ^{*},[#],^S post-hoc power analysis (w) respectively = 0.47; 0.28; 0.40.

with G*power 3.1.9.2 considering an alpha of 0.05 (Faul, Erdfelder, Lang, & Buchner, 2007). The Mann-Whitney test was used to check for differences in time spent shopping, considering the non-normality of the data (Shapiro-Wilk test). Stata 13.0 (Stata Corp., USA) and SPSS 16.0 (IBM, USA) were used and differences with *p* values < 0.05 were considered significant.

2.2.5. Reasoning behind meal planning

To explore the participants' rationale for planning the meals they would offer to a last-minute guest, the interview transcript was thematic analysed using Braun & Clarke's approach (2006). Thematic analysis was chosen because it constitutes a qualitative analytic method which can be used within different theoretical, epistemological or ontological frameworks (Braun & Clarke, 2006; 2013). An inductive approach was adopted, meaning the themes identified are strongly linked to the data themselves (Braun & Clarke, 2006). This is considered a reflexive approach, where themes result from considerable analytic work on the part of the researcher and coding is an organic and open iterative process, in order to provide a coherent and compelling interpretation of the data, grounded in the data (Braun, Clarke, Hayfield, & Terry, 2019).

The first phase of the analysis was familiarization with the data, which means transcripts were approached through repeated and active readings. After familiarization, initial codes were generated in a data-driven way through converting/transforming raw data (phrases or words) into codes with characteristics in common. The entire data set was coded without using a pre-existing coding frame. To ensure intra-coder reliability, coding was repeated within one month by AMC. To ensure inter-coder reliability, a second researcher (AMB) independently coded the transcripts and checked with AMC to identify, discuss and resolve any differences. Subsequently, codes representing the different aspects of the meal planning process were grouped by researchers (AMC and AMB) into key initial themes. These are defined as reflecting a pattern of shared meaning, organized around a core concept or idea (Braun & Clarke, 2013). Themes were reviewed and refined to make sure they were coherent and distinct from each other. This process happened through discussions with a third researcher, experienced in

Table 3
Combinations of culinary preparations grouped by number and type.

Number of preparations	Combinations	Total % (n)	HHC % (n)	LHC % (n)	χ^2 (p)
1	Main	26 (13)	12 (3)	40 (10)	8.4 (0.038)*
2	Main + Side	22 (11)	20 (5)	24 (6)	
	Main + Salad				
	Main + Pudding				
	Appetizer + Main				
3	Main + Side + Salad	30 (15)	32 (8)	28 (7)	
	Main + Salad + Pudding				
	Main + Side + Pudding				
	Appetizer + Main + Side				
4	Main + Side + Salad + Pudding	22 (11)	36 (9)	8 (2)	
	Appetizer + Main + Side + Salad				
	Appetizer + Main + Side + Pudding				
Total		100 (50)	100 (25)	100 (25)	

HHC – High Health Conscious. LHC – Low Health Conscious. *no significant difference was observed in the post-hoc adjusted residual analyses with Bonferroni corrections.

qualitative methods (GMRF), until achieving consensus. At this stage the transcripts were re-read to ensure that the final themes accurately reflected the data. The three researchers agreed that data saturation was reached before the 50th interview. Themes were named and representative quotes were extracted from the data to illustrate typical views within each one – they are presented in the mixed methods results section. The source of all verbatim quotes is displayed in brackets in terms of gender and health consciousness. Microsoft Office 2016® was used to assist in the analyses.

2.2.6. Mixed methods analysis

A parallel comparison of quantitative with qualitative data was conducted to relate the differences in meal characteristics with the reasoning behind planning (Creswell & Clark, 2017). For this purpose, a side-by-side approach through multiple and sequenced phases of iterative analyses was conducted (Creswell & Clark, 2017). Each significant quantitative difference between meal characteristics of the two groups was integrated with qualitative content from a theme to search for communality between both types of data, and the merged result is illustrated in a joint display. Interpretation in the convergent approach involved looking across the quantitative results and the qualitative findings and making an assessment of how the information addressed the study's aim through drawing inferences (conclusions drawn from the separate quantitative and qualitative parts of the study), as well as from across the quantitative and qualitative parts (meta-inferences) (Teddle & Tashakkori, 2008).

2.2.7. Ethical considerations

Research protocol was submitted to and approved by an Institutional Research Ethics Committee (N. 1.692.203) and followed the Helsinki guidelines. The store manager authorized data collection in the supermarket. Participants were assured that there were no right or wrong answers and that everything they said would be kept anonymous; they gave their written consent for the interviews to be audio recorded. Researchers also were careful so that participants were comfortably placed in a reserved area outside the supermarket during the interview.

3. Results

Table 1 presents the characteristics of the 50 participants. Half of them were women ($\chi^2 = 0.72$; $p = 0.396$), the majority had completed secondary or higher education ($\chi^2 = 3.8$; $p = 0.282$), and 74% were aged between 18 and 39 y-o. The group aged 18 to 29 y-o was mostly represented by LHC participants (80%, $Z_{adj} = 3.15$, $p_{adj} = 0.002$). There were significantly more single LHC participants (88%,

$Z_{adj} = 3.60$, $p_{adj} < 0.001$) than single HHC participants (36%) in the sample. Significantly more HHC participants were married (52%, $Z_{adj} = 2.90$, $p_{adj} = 0.004$) than LHC ones (12%). HHC and LHC spent similar median times of 7.5 min shopping (IQR = 6; 10, $p = 0.072$).

3.1. Meals' characteristics

The most frequent characteristics of the meals planned by the 50 participants were the presence of cereals/breads/pasta/tubers and roots, followed by the presence of vegetables, of meats and/or eggs, of sauces, of natural seasonings, of milk and dairy products, and of the use of vegetable oils in place of butter and margarine. The less frequent characteristics were the presence of whole cereals/breads/pasta, of processed foods with high sugar concentration, of legumes, of fruits and of frying as cooking method (Table 2).

The 25 meals planned by HHC participants had more whole cereals/breads/pasta (48%, $p = 0.001$), vegetables (100%, $p = 0.04$) and fruits (36%, $p = 0.005$) than the ones planned by the LHC individuals. The remaining characteristics did not differ significantly between the two groups (Table 2).

Participants planned meals which included a total of 124 dishes. The number of different dishes composing a meal varied from one to four (Table 3). The most frequent combination of two dishes was main + side (10%, $n = 5$, e.g. beef stroganoff, boiled rice and straw potatoes). Among the combinations of three and four dishes, the most frequent were main + side + salad (22%, $n = 11$, e.g. baked salmon with passion fruit sauce, boiled rice and vegetables sautéed in butter) and main + side + salad + pudding (12%, $n = 6$, e.g. beef stroganoff, boiled rice, green salad with tomatoes and fruit salad) respectively (data not shown).

The planning of only one main dish was the most frequent choice in the LHC group (40%, e.g. spaghetti carbonara). HHC individuals mostly planned meals with a combination of three (32%) and four dishes (36%). Although the overall chi-square test indicated a difference in the composition of meals planned by HHC and LHC individuals ($p = 0.038$), the post-hoc analysis could not pinpoint the difference, suggesting a weak global effect (Table 3).

3.2. Reasoning behind meal planning

Qualitative findings from the thematic analysis of the transcripts of the 50 interviews conducted after the shopping task (which lasted between 6 and 15 min) are presented next. A diversity of aspects was involved in participants' meal planning for a dinner for two.

3.2.1. The outcome is important

When describing the meals they would prepare, the composition of the dishes and the ingredients selected, most participants mentioned that they took into account the desired characteristics of the meal when ready to be served. It should be pleasant, and not on the heavy side, as it was an evening meal. This was the reason given by many participants for not planning to serve red meat, pudding or appetizers to the guest. Participants described the meals they would serve according to the dishes they comprised, as *simple* (roast beef, rice, pasta, and lasagne) or *sophisticated* (grilled salmon, risotto, ethnic dishes). HHC participants showed greater concern in harmonizing the preparations and further detailed specific characteristics of the selected ingredients, such as *whole, protein-rich, natural, lean*.

3.2.2. My personal tastes and ways

In both groups, individuals said that their own preferences were important when deciding what to offer to a guest. LHC participants however, mentioned liking certain dishes' tastes and flavours but not being able to serve them because of the limited number of recipes they knew how to prepare, as they were not used to cooking frequently. HHC participants also planned according to their tastes, but not only in terms of dishes' flavour. They elaborated further about their preferences for certain cooking methods, the desired resulting texture of a dish, the appropriateness of certain cuts of meat, and the importance of serving fruit as part of the meal. HHC participants also mentioned that the dishes they planned to serve for a guest would be the ones they prepared frequently for themselves.

3.2.3. Trying to please the guest

Participants took the guest's preferences and wellbeing into consideration, and said they would certainly try to do their best. Some LHC participants even said that the presence of the guest would be the only reason to prepare a meal for dinner. Some participants thought about a specific friend or relative and their favourite dishes and habits when planning what to serve, therefore including, excluding or substituting certain ingredients.

3.2.4. Prep time versus skills

Participants considered how much work the meal would demand, and if the time available would be enough. They mentioned convenience and ease of preparation (i.e. requiring few elaboration steps or no heat) as key factors for saving time, together with being skilled enough to prepare what they planned. This line of reasoning was mentioned by participants who opted to serve a single dish, and also by those who planned to offer multiple dishes. Being confident that their cooking skills were enough to achieve a good result was also mentioned by the participants as key factors to decide what to include in the meal. LHC participants however, declared more frequently that they did not know how to cook very well.

3.2.5. Health issues matter

Nutrient content, variety, use of organic ingredients and feeling well while eating were all mentioned during the interviews, but only by HHC participants.

3.3. Mixed methods result

Table 4 illustrates the mixed methods analysis. The side-by-side comparison of quantitative differences between meal characteristics of HHC and LHC participants with the reasoning behind meal planning revealed that quantitative and qualitative results were concordant, i.e. all significant differences in meals' characteristics were justified by the reasoning mentioned by the participants for planning the meal.

4. Discussion

This study compared the characteristics of meals planned by HHC and LHC adult consumers and related them to the reasoning behind meal planning.

Quantitative results revealed that meals planned by HHC individuals would be healthier than those planned by LHC individuals according to the Dietary Guidelines for the Brazilian Population (Brasil, 2006; Brazil, 2015), as their meals would contain more whole cereals/breads/pasta, fruits and vegetables. HHC individuals did consider health issues when planning their meals, but they also thought about the ingredients' characteristics, the importance of harmonizing the dishes, being used to prepare the dishes they would serve, their personal tastes, and the presence of the guest.

These findings could be a consequence of the fact that HHC individuals reported being used to cooking and were more concerned with the meals' final characteristics than the LHC ones. A recent study that used the life course perspective (Swan et al., 2018) may help us understand why HHC participant's planned meals were healthier, as the ability to deal effectively with barriers to healthy eating such as time pressure was found to be enabled by an interaction between coping strategies (e.g., self-efficacy, cooking skills, flexibility) and the cumulative effect of learned life experiences in childhood and adult life (Swan et al., 2018). Therefore, it could be argued that HHC participants received a particular culinary socialization that makes their choice of cooking with more basic ingredients (natural and minimally processed) their chosen habitual way of cooking, resulting in healthier meals. It is important to mention that culinary knowledge is part of the concept of food literacy, which empowers individuals to protect diet quality through change, and strengthens dietary resilience over time (Vidgen & Gallegos, 2014). Truman and Elliott (2019) argue that conceptualizations of food literacy emphasize the importance of knowledge acquisition to establish behavioural changes in relation to food, but that the potential to achieve health-related outcomes requires a focus on the connections and mutual influence of not only knowledge, but also other factors such as attitudes (e.g. motivation), behaviours, and external barriers. Culinary knowledge can develop early in childhood in social contexts (such as belonging to a family that has the habit of cooking), as well as in educational contexts (cooking/nutrition classes); or in adulthood due to sociocultural expectations (learning to be the primary responsible for preparing food at home, leaving home, having children), or as a consequence of media exposure (Jones et al., 2014; Wolfson et al., 2017). Urdapilleta, Dany, Bousso, Schwartz, and Giboreau (2016) argue that for individuals who are close to cooking - i.e. have greater knowledge, involvement and level of practice - meal preparation is part of a general script that organizes their way of living. These individuals refuse to be affected by stressors such as work overload and personal schedules and tend to protect routines associated with the act of cooking. Again, this could explain why HHC participants were not fazed by having to plan a meal on the same day for a last-minute guest and planned healthier meals than LHC participants.

Regardless of their willingness to invest time as well as mental and physical effort in meal preparation, HHC individuals possibly had greater knowledge about preparing foods - skills which are also learned throughout life in social contexts. Possessing the mechanical skills for food preparation is another facilitator for cooking at home from basic (natural and minimally processed) ingredients (Hartmann, Dohle, & Siegrist, 2013), and together with valuing the organization and planning of meals and knowing how to shop healthily, is extremely important when thinking about health outcomes (McGowan et al., 2015; Stead et al., 2004; Wolfson et al., 2017).

The presence of a guest was also behind the HHC participants' reasoning leading to healthier meals, as it motivated a higher offer of vegetables. This relationship has been reported in previous studies, as the one by Swan et al. (2018), which found that valuing good company at meals makes it possible to eat healthier during the course of life. For

scratch more often and are less dependent on convenience products (Brunner, van der Horst, & Siegrist, 2010; Worsley, Wang, Wijeratne, Ismail, & Ridley, 2015), as they have more time or grew up at a time when the availability of convenience products was lower (Urdapilleta, Dany, Boussoico, Schwartz, & Giboreau; Brunner et al., 2010; Gatley et al., 2014; Swan et al., 2018). Despite this, a study by Stead et al. (2004) identified that age did not appear to increase confidence or cooking-related feelings (Stead et al., 2004).

The frequency of single people was higher in the LHC group than in the HHC group, but this may be due to how the information was collected. Participants were asked about their marital status and not about whom they lived with. Nevertheless, the relationship between being single and LHC needs to be investigated further.

Sample size was determined according to a previous study, but the post-hoc analysis indicated a moderate power of the test (> 0.40) (Cohen, 1988) in identifying differences in the presence of whole cereals/breads/pasta and fruits in the meals planned by HHC and LHC individuals. Also, collection of qualitative data achieved saturation.

Because the study was based on a simulated purchase and self-reported data, it may not necessarily reflect the actual consumption and attitudes of individuals. However, it was conducted in a real environment where all subjects were exposed to the same stimuli, unlike other studies which also investigated choices (Bucher, van der Horst, & Siegrist, 2013) but did so in an experimental condition (Costa, Schoolmeester, Dekker, & Jongen, 2007).

5. Conclusion

The mixed methods approach helped to identify the reasoning behind the differences in meal characteristics planned by HHC and LHC individuals. HHC individuals manifested closeness to the act of cooking, and meals planned by them were healthier than those planned by LHC individuals as it contained more whole grains/breads/pasta, fruits, and vegetables. LHC participants were less used to cooking regularly, considered having a guest as the only reason for preparing an evening meal and planned less healthy meals taking their own preferences into consideration. Results indicate that the link between being interested in health issues and knowing how to cook deserves to be further explored.

Conflicts of interest

The authors declare no conflict of interests.

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References

Abreu, E. S., Spinelli, M. G. N., & Pinto, A. M. S. (2009). *Gestão de unidades de alimentação e nutrição: Um modo de fazer* (3rd. ed). Metha: São Paulo.

Bassett, R., Beagan, B., & Chapman, G. E. (2008). Grocery lists: Connecting family, household and grocery store. *British Food Journal*, 110(2), 206–217. <https://doi.org/10.1108/00070700810849916>.

Beasley, T. M., & Schumacker, R. E. (1995). Multiple regression approach to analyzing contingency tables: Post hoc and planned comparison procedures. *The Journal of Experimental Education*, 64(1), 79–93. <https://doi.org/10.1080/00220973.1995.9943797>.

9943797.

Beck, M. E. (2007). Dinner preparation in the modern United States. *British Food Journal*, 109(7), 531–547. <https://doi.org/10.1108/00070700710761527>.

Becker, M., H., Maiman, L., A., Kirscht, J., P., Haefner, D., P., & Drachman, R., H. (1977). The Health Belief Model and prediction of dietary compliance: A field experiment. *Journal of Health and Social Behavior*, 18(4), 348–366. <https://doi.org/10.2307/2955344>.

Beshara, M., Hutchinson, A., & Wilson, C. (2010). Preparing meals under time stress. The experience of working mothers. *Appetite*, 55(3), 695–700. <https://doi.org/10.1016/j.appet.2010.10.003>.

Blake, C. E., Bisogni, C. A., Sobal, J., Jastran, M., & Devine, C. M. (2008). How adults construct evening meals. Scripts for food choice. *Appetite*, 51(3), 654–662. <https://doi.org/10.1016/j.appet.2008.05.062>.

Botelho, A. M., Camargo, A. M. de, Dean, M., & Fiates, G. M. R. (2019). Effect of a health reminder on consumers' selection of ultra-processed foods in a supermarket. *Food Quality and Preference*, 71, 431–437. <https://doi.org/10.1016/j.foodqual.2018.08.017>.

Boutelle, K. N., Birnbaum, A. S., Lytle, L. A., Murray, D. M., & Story, M. (2003). Associations between perceived family meal environment and parent intake of fruit, vegetables, and fat. *Journal of Nutrition Education and Behavior*, 35(1), 24–29. [https://doi.org/10.1016/S1499-4046\(06\)60323-0](https://doi.org/10.1016/S1499-4046(06)60323-0).

Bowman, S. A. (2005). Food shoppers' nutrition attitudes and relationship to dietary and lifestyle practices. *Nutrition Research*, 25(3), 281–293. <https://doi.org/10.1016/j.nutres.2004.11.004>.

Brasil Ministério da Saúde (2006). *Guia alimentar para a população brasileira (Portuguese)*. Retrieved from http://189.28.128.100/nutricao/docs/geral/guia_alimentar_conteudo.pdf.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <http://doi.org/10.1191/1478088706qp0630a>.

Braun, V., & Clarke, V. (2013). *Successful qualitative research: A practical guide for beginners* (1st ed.). Londres: Sage.

Braun, V., Clarke, V., Hayfield, N., & Terry, G. (2019). Thematic analysis. In P. Liamputtong (Ed.). *Handbook of research methods in health social sciences* (pp. 843–860). Singapore: Springer 2019.

Brazil Ministry of Health of Brazil (2015). *Dietary Guidelines for the Brazilian population* (2nd ed.). Retrieved from http://bvsm.sau.de.gov.br/bvs/publicacoes/dietary_guidelines_brazilian_population.pdf.

Brunner, T. A., van der Horst, K., & Siegrist, M. (2010). Convenience food products. Drivers for consumption. *Appetite*, 55(3), 498–506. <https://doi.org/10.1016/j.appet.2010.08.017>.

Bucher, T., van der Horst, K., & Siegrist, M. (2013). Fruit for dessert. How people compose healthier meals. *Appetite*, 60, 74–80. <https://doi.org/10.1016/j.appet.2012.10.003>.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2^o ed). Hillsdale: Erlbaum.

Connors, M., Bisogni, C. A., Sobal, J., & Devine, C. M. (2001). Managing values in personal food systems. *Appetite*, 36(3), 189–200. <https://doi.org/10.1006/appe.2001.0400>.

Costa, A. I. de A., Schoolmeester, D., Dekker, M., & Jongen, W. M. F. (2007). To cook or not to cook: A means-end study of motives for choice of meal solutions. *Food Quality and Preference*, 18(1), 77–88. <https://doi.org/10.1016/j.foodqual.2005.08.003>.

Crawford, D., Ball, K., Mishra, G., Salmon, J., & Timperio, A. (2007). Which food-related behaviours are associated with healthier intakes of fruits and vegetables among women? *Public Health Nutrition*, 10(3), 256–265. <https://doi.org/10.1017/S1368980007246798>.

Creswell, J. fi, & Clark, V. L. P. (2017). *Designing and conducting mixed methods research* (3rd. ed). Thousand Oaks: Sage Publications.

Daniels, S., Glorieux, I., Minnen, J., & van Tienoven, T. P. (2012). More than preparing a meal? Concerning the meanings of home cooking. *Appetite*, 58(3), 1050–1056. <https://doi.org/10.1016/j.appet.2012.02.040>.

Drummond, K. M., & Brefere, L. M. (2010). *Nutrition for foodservice and culinary professionals* (7th. ed). Nova Jersey: Wiley & Sons.

Ducrot, P., Méjean, C., Allès, B., Fassier, P., Hercberg, S., & Péneau, S. (2015). Motives for dish choices during home meal preparation: Results from a large sample of the NutriNet-Santé study. *International Journal of Behavioral Nutrition and Physical Activity*, 12. <https://doi.org/10.1186/s12966-015-0270-9>.

Engler-Stringer, R. (2010). The domestic foodscapes of young low-income women in Montreal: Cooking practices in the context of an increasingly processed food supply. *Health Education & Behavior*, 37(2), 211–226. <https://doi.org/10.1177/1090198109339453>.

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), 175–191. <https://doi.org/10.3758/BF03193146>.

Fiese, B. H., Foley, K. P., & Spagnola, M. (2006). Routine and ritual elements in family mealtimes: Contexts for child well-being and family identity. *New Directions for Child and Adolescent Development*, (111), 67–89. <https://doi.org/10.1002/cd.156>.

Fordyce-Voorham, S. (2011). Identification of essential food skills for skill-based healthful eating programs in secondary schools. *Journal of Nutrition Education and Behavior*, 43(2), 116–122. <https://doi.org/10.1016/j.jneb.2009.12.002>.

García-pérez, M. A., & Núñez-antón, V. (2003). Cellwise residual analysis in two-way contingency tables. *Educational and Psychological Measurement*, 63(5), 825–839. <https://doi.org/10.1177/0013164403251280>.

Gatley, A., Caraher, M., & Lang, T. (2014). A qualitative, cross cultural examination of attitudes and behaviour in relation to cooking habits in France and Britain. *Appetite*, 75, 71–81. <https://doi.org/10.1016/j.appet.2013.12.014>.

Hartmann, C., Dohle, S., & Siegrist, M. (2013). Importance of cooking skills for balanced food choices. *Appetite*, 65, 125–131. <https://doi.org/10.1016/j.appet.2013.01.016>.

- Healy, A. H. (2014). Convergence or difference? Western European household food expenditure. *British Food Journal*, 116(5), 792–804. <https://doi.org/10.1108/BFJ-11-2012-0274>.
- Henry, H., Reicks, M., Smith, C., Reimer, K., Atwell, J., & Thomas, R. (2003). Identification of factors affecting purchasing and preparation of fruit and vegetables by stage of change for low-income African American mothers using the think-aloud method. *Journal of the American Dietetic Association*, 103(12), 1643–1646. <https://doi.org/10.1016/j.jada.2003.09.039>.
- Janz, N. K., & Becker, M. H. (1984). The health Belief model: A decade later. *Health Education Quarterly*, 11(1), 1–47. <https://doi.org/10.1177/109019818401100101>.
- Jayanti, R., K., & Burns, A., C. (1998). The antecedents of preventive health care behavior: An empirical study. *Journal of the Academy of Marketing Science*, 26(1), 6–15. <https://doi.org/10.1177/0092070398261002>.
- Jones, S. A., Walter, J., Soliah, L., & Phifer, J. T. (2014). Perceived motivators to home food preparation: Focus group findings. *Journal of the Academy of Nutrition and Dietetics*, 114(10), 1552–1556. <https://doi.org/10.1016/j.jand.2014.05.003>.
- Lavelle, F., McGowan, L., Spence, M., Caraher, M., Raats, M. M., Hollywood, L., ... Dean, M. (2016). Barriers and facilitators to cooking from 'scratch' using basic or raw ingredients: A qualitative interview study. *Appetite*, 107, 383–391. <https://doi.org/10.1016/j.appet.2016.08.115>.
- Louzada, M. L. da C., Baraldi, L. G., Steele, E. M., Martins, A. P. B., Canella, D. S., Moubarac, J.-C., ... Monteiro, C. A. (2015). Consumption of ultra-processed foods and obesity in Brazilian adolescents and adults. *Preventive Medicine*, 81, 9–15. <https://doi.org/10.1016/j.ypmed.2015.07.018>.
- Mai, R., & Hoffmann, S. (2012). Taste lovers versus nutrition fact seekers: How health consciousness and self-efficacy determine the way consumers choose food products. *Journal of Consumer Behaviour*, 11(4), 316–328. <https://doi.org/10.1002/cb.1390>.
- Marteau, T. M., Hollands, G. J., & Fletcher, P. C. (2012). Changing human behavior to prevent disease: The importance of targeting automatic processes. *Science (New York, N.Y.)*, 337(6101), 1492–1495. <https://doi.org/10.1126/science.1226918>.
- McGowan, L., Caraher, M., Raats, M., Lavelle, F., Hollywood, L., McDowell, D., & Dean, M. (2015). Domestic cooking and food skills: A review. *Critical Reviews in Food Science and Nutrition*, 57(11), 2412–2431. <https://doi.org/10.1080/10408398.2015.1072495>.
- Meiselman, H. L. (2008). Dimensions of the meal. *Journal of Foodservice*, 19(1), 13–21. <https://doi.org/10.1111/j.1745-4506.2008.00076.x>.
- Michaelidou, N., & Hassan, L. M. (2008). The role of health consciousness, food safety concern and ethical identity on attitudes and intentions towards organic food. *International Journal of Consumer Studies*, 32(2), 163–170. <https://doi.org/10.1111/j.1470-6431.2007.00619.x>.
- Mills, S., White, M., Brown, H., Wrieden, W., Kwasnicka, D., Halligan, J., ... Adams, J. (2017). Health and social determinants and outcomes of home cooking: A systematic review of observational studies. *Appetite*, 111, 116–134. <https://doi.org/10.1016/j.appet.2016.12.022>.
- Möser, A. (2010). Food preparation patterns in German family households. An econometric approach with time budget data. *Appetite*, 55(1), 99–107. <https://doi.org/10.1016/j.appet.2010.04.008>.
- Murcott, A. (1982). On the social significance of the "cooked dinner" in South Wales. *Social Science Information/sur les sciences sociales*, 21(4–5), 677–696. <https://doi.org/10.1177/053901882021004011>.
- Neumark-Sztainer, D., MacLehose, R., Loth, K., Fulkerson, J. A., Eisenberg, M. E., & Berge, J. (2014). What's for dinner? Types of food served at family dinner differ across parent and family characteristics. *Public Health Nutrition*, 17(1), 145–155. <https://doi.org/10.1017/S1368980012004594>.
- Ogden, J. (2012). Health beliefs. In J. Ogden (Ed.). *Health psychology: A textbook* (pp. 38–63). Maidenhead: Open University Press 2012.
- Park, S., Ham, J.-O., & Lee, B.-K. (2015). Effects of total vitamin A, vitamin C, and fruit intake on risk for metabolic syndrome in Korean women and men. *Nutrition*, 31(1), 111–118. <https://doi.org/10.1016/j.nut.2014.05.011>.
- Philippi, S. T. (2016). *Nutrição e técnica dietética (3th. Ed). Barueri: Manole.*
- Popkin, B. M., Adair, L. S., & Ng, S. W. (2012). Global nutrition transition and the pandemic of obesity in developing countries. *Nutrition Reviews*, 70(1), 3–21. <https://doi.org/10.1111/j.1753-4887.2011.00456.x>.
- Roininen, K., Lähteenmäki, L., & Tuorila, H. (1999). Quantification of consumer attitudes to health and hedonic characteristics of foods. *Appetite*, 33(1), 71–88. <https://doi.org/10.1006/appe.1999.0232>.
- Schifferstein, H. N. J., & Oude Ophuis, P. A. M. (1998). Health-related determinants of organic food consumption in The Netherlands. *Food Quality and Preference*, 9(3), 119–133. [https://doi.org/10.1016/S0950-3293\(97\)00044-X](https://doi.org/10.1016/S0950-3293(97)00044-X).
- Smith, L. P., Ng, S. W., & Popkin, B. M. (2013). Trends in US home food preparation and consumption: Analysis of national nutrition surveys and time use studies from 1965–1966 to 2007–2008. *Nutrition Journal*, 12, 45. <https://doi.org/10.1186/1475-2891-12-45>.
- Soares, L. L. S., Deliza, R., & Gonçalves, E. B. (2008). Escalas atitudinais utilizadas em estudos de consumidor: Tradução e validação para a língua portuguesa. *Alimentos e Nutrição Araraquara*, 17(1), 51–64.
- Stead, M., Caraher, M., Wrieden, W., Longbottom, P., Valentine, K., & Anderson, A. (2004). Confident, fearful and hopeless cooks: Findings from the development of a foodskills initiative. *British Food Journal*, 106(4), 274–287. <https://doi.org/10.1108/00070700410529546>.
- Sun, Y.-H. C. (2008). Health concern, food choice motives, and attitudes toward healthy eating: The mediating role of food choice motives. *Appetite*, 51(1), 42–49. <https://doi.org/10.1016/j.appet.2007.11.004>.
- Swan, E., Bouwman, L., Aarts, N., Rosen, L., Hiddink, G. J., & Koelen, M. (2018). Food stories: Unraveling the mechanisms underlying healthful eating. *Appetite*, 120, 456–463. <https://doi.org/10.1016/j.appet.2017.10.005>.
- Teddlie, C., & Tashakkori, A. (2008). *Foundations of mixed methods research (1st.)*. Thousand Oaks: Sage Publications.
- Truman, E., & Elliott, C. (2019). Barriers to food literacy: A conceptual model to explore factors inhibiting proficiency. *Journal of Nutrition Education and Behavior*, 51(1), 107–111. <https://doi.org/10.1016/j.jneb.2018.08.008>.
- Urdapilleta, I., Dany, L., Bousso, J., Schwartz, C., & Giboreau, A. (2016). Culinary choices: A sociopsychological perspective based on the concept of distance to the object. *Food Quality and Preference*, 48, 50–58. <https://doi.org/10.1016/j.foodqual.2015.08.007>.
- Vidgen, H. A., & Gallegos, D. (2014). Defining food literacy and its components. *Appetite*, 76, 50–59. <https://doi.org/10.1016/j.appet.2014.01.010>.
- Warde, A., Cheng, S.-L., Olsen, W., & Southerton, D. (2007). Changes in the practice of eating: A comparative analysis of time-use. *Acta Sociologica*, 50(4), 363–385. <https://doi.org/10.1177/0001699307083978>.
- Wolfson, J. A., Bostic, S., Lahne, J., Morgan, C., Henley, S. C., Harvey, J., et al. (2017). A comprehensive approach to understanding cooking behavior: Implications for research and practice. *British Food Journal*, 119(5), 1147–1158. <https://doi.org/10.1108/BFJ-09-2016-0438>.
- Worsley, T., Wang, W. C., Wijeratne, P., Ismail, S., & Ridley, S. (2015). Who cooks from scratch and how do they prepare food? *British Food Journal*, 117(2), 664–676. <https://doi.org/10.1108/BFJ-01-2014-0018>.
- Yates, L., & Warde, A. (2017). Eating together and eating alone: Meal arrangements in British households. *British Journal of Sociology*, 68(1), 97–118. <https://doi.org/10.1111/1468-4446.12231>.