Research protocol

Corona Cooking Survey

Project summary

The global COVID-19, along with the social and economic restrictions, has led to a profound impact on how people deal with food and cooking worldwide. This study was set up to examine the effect of COVID-19 and its accompanying stressors on food literacy. We aim to study how food literacy changes on the short- and long-term and in association with contextual factors, including economic changes, social distancing measures and mass media influences.

Understanding the changing impact on our dietary and cooking habits is highly necessary to improve future public health policies and effective strategies to deal with worldwide nutrition challenges. This project has immediate and long-term societal implications; (health) policy makers learn how to communicate about- and facilitate personal and contextual factors that influence food literacy during the ongoing pandemic, and beyond.

General information

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Background/rationale

Since the onset of the COVID-19 crisis, "panic buying" of grocery staples and time-intensive cooking and baking activities emerged worldwide.[1,2] The closure of restaurants, pubs, and bars, along with enforcements to stay at home and other rules of social distancing, created a unique worldwide situation that may have forced people to change the way they plan, select, and prepare food. Planning, selecting and preparing foods are crucial composites of food literacy, needed for a healthy lifelong relationship with food.[3,4] Food literacy, or "the tools needed for a healthy lifelong relationship with food", logically directly affects food intake.[3]

It is well-known that food literacy contributes to health and nutrition, yet there is a lack of empirical studies to identify factors attributing to food literacy[5]. There was a need to study what predicts food literacy before COVID-19, and since the pandemic this has become more urgent and conceivable than ever:

Certain elements, such as financial feasibility, might be potential stressors and are suspected to directly impact changes in food literacy.[4,6] Additionally, based on former literature stress factors are also believed to directly impact healthy food choices, possibly mediated by the changes in food literacy.[7-11]

Besides, it is well known that food media and the therein represented persons, amongst others lifestyle guru's and scientific experts, have made consumers to be more knowledgeable on the one hand, but more confused than ever about which food to consume on the other hand.[12,13] Especially at crucial moments such as the COVID-19 pandemic, consumers might be more often looking for reliable information than usual.

That is why this research wants to investigate whether participants' habits concerning food and food media have changed since the start of the COVID-19 measures.

Results will be useful to advice governments and policy makers to (a) monitor and change social distancing measures in the upcoming weeks and months, and (b) how to communicate about this in ways the general public will understand and accept.

Results will be relevant for long-term health interventions, because we will learn which personal and contextual factors are most crucial for boosting food literacy, which can in the long-run be applied to health interventions in high-risk (low food literate) groups.

Study goals and objectives

The aim of the Corona Cooking Survey is to monitor peoples' changes in food behavior because of the COVID-19 pandemic and lockdown measures. We also aim to explore the potential role of media in this process. With this study, we want to learn how to better communicate about nutrition and how we can help stakeholders to adjust their strategies.

Objective 1: To identify short-term shifts in food literacy during COVID-19 in relation to personal (stress, time perceptions) and contextual (economic & social constraints ; mass media influence) determinants in at least 38 countries worldwide

Objective 2: To investigate long-term shifts, maintenance and relapse in food literacy during COVID-19.

Objective 3: To examine the use of food-related media during COVID-19 and how this has changed compared to before.

Study design

Study population

All participants were between 18 and 92 years old, with an average age of 36•71 (SD=14•79). The sample consisted of 76•6% women, 23•1% men, and 0•3% another gender.
Of all 80 363 people that started the survey, 37 374 completed the survey to the end.

Respondents were recruited via a convenience sample. In order to reach out to a diverse sample, several recruitment methods were used. First of all, multiple banners for social media were designed and shared by the international research team on sites such as Facebook, Twitter, Instagram, and LinkedIn in both private and public online groups. In addition, an international press release was shared amongst the spokespersons of the research teams per country, who could send it to their local press. Also, the international news agency Reuters made a video-article on the CoronaCookingSurvey and spread it to multiple international press organizations. The CoronaCookingSurvey was mentioned multiple times in newspapers, on the radio, or on news sites in twenty-four different countries, and so, it helped to share the link to a global web page where participants could find the right survey link for their own country.[14] In addition, to motivate potential participants, the research team donated 1 € per fully completed questionnaire to the Global FoodBanking Network, with a maximum amount set at 3000 €.

Study design

This is a cross-sectional observational study conducted in 39 countries. The online questionnaire was disseminated during the COVID-19 pandemic, resulting in a total sample size of 37 374 participants. Data collection was situated between April 17th 2020 and June 25th 2020 in all participating countries, with some ending their data collection earlier when the minimum amount of respondents was reached (n=500).
The survey consisted of a self-administered online questionnaire, via the online survey tool Qualtrics. Participants were asked about their shopping, eating, and cooking behaviors, both of before and during the COVID-19 pandemic.

Settings

We ran the survey in 39 countries stretching over 6 continents, listed here in alphabetical order: Australia, Austria, Bahrein, Belgium, Brazil, Canada, Chile, China, Denmark, Ecuador, Egypt, Finland, France, Germany, Greece, Iran, Ireland, Italy, Japan, Jordan, Kuwait, Lebanon, Mexico, Netherlands, New Zealand, Oman, Palestine, Peru, Poland, Qatar, Romania, Saudi Arabia, Singapore, South Africa, Spain, Uganda, United Arab Emirates, United Kingdom, United States.

Participating researchers translated the survey into a language-equivalent version for their country. The survey items and assessment scales remained identical in each country apart from the item "alcoholic beverages" mentioned above.

Data collection and procedures

Each country used the same survey structure as a starting point, some of them added extra questions or adapted a question because of the socio-cultural background of their countries (e.g. alcohol use in Arabic countries).

The food literacy questions were included in a bigger survey on the impact of COVID-19 on shopping, cooking, and eating habits in general. The complete questionnaire consisted of six main parts: (1) profiling questions, (2) lockdown and consequences, (3) general food behavior, (4) grocery shopping, (5) cooking and baking, and (6) eating behavior. Food literacy questions were included in the third part of the questionnaire about general food behavior.

The average time to fill out the survey was 151•58 minutes (SD= 701•05 minutes), a value that was highly affected by outliers created by people who used multiple days to fill out the questionnaire. Therefore, in this study, the mean is a more accurate measurement tool, which equals 32•38 minutes.

We obtained a general, international ethics review and approval from the Ethics Advisory Committee on Social and Human Sciences, UAntwerp (Belgium). Besides, some additional local ethical approvals were sought and obtained if it was required in a participating country.

Immediately following the welcome page of the survey, respondents were required to give their fully informed consent and indicate whether they were over the age of 18 before continuing to the survey questions.

Study variables

The variables for this study are divided into ten main groups.

First, respondents' demographics were investigated, more precisely, their nationality, the country of their current location, age, gender, household composition, education, mothers' education, financial status, and employment status before the lockdown. Besides, we checked how much the COVID-19 measures had impacted these demographics by asking about changes in employment status, loss of income, or changes in the number of household members.

Furthermore, the COVID-19 measures per country were taken into account to get a view on the impact of the pandemic on respondents' life. These measures include variables such as closed schools, restaurants, or pubs, working from home in the period that the survey was conducted, restricted or forbidden private gatherings, suspended events, a temporary stop of non-essential production, limited or prohibited visitors allowed in elderly homes, closed country borders, mandatory facemasks in public or non-essential movement is banned.
To better estimate the situation per country, respondents were asked to indicate how long their country had been in lockdown at the time of the survey.

The group of stressors consists of 9 items, gauged participants' mental well-being, sense of connectedness or nervousness, and how much financial pressure or time pressure they experience.

Fourth, the changes in food literacy were researched. The food literacy scale consisted of 13 items. It measured how respondents planned & managed their meals, how they selected food, how they prepared it, and finally, what they ate.[6]

Additionally, changes in participants' shopping experiences and behavior were examined. The following items were asked for both before and during the lockdown: the primary household member responsible for the grocery shopping, the respondent's attitude towards shopping, the shopping process and location, the primary motivators, and finally, the persons who influenced their grocery choice. Besides, we also asked respondents whether they made a stock of certain products because of the pandemic.

Furthermore, cooking attitudes and behavior were also examined for both before and during lockdown measures. Respondents were asked about the primary cook in their household, their own cooking abilities, their attitudes towards cooking, the main barriers, and the frequency of using food-related media or recipes from others. Also, respondents had to write down the name of their most influential figure and rate him or her on trustworthiness, expertise, how relatable he/she is, and attractiveness. Moreover, participants had to indicate if they actively searched for recipes before or during the lockdown and which motivations were most decisive while choosing which recipes to make.

The difference in food intake was measured via a food frequency questionnaire, which examined the consumption of different food products, such as, fruit, vegetables, and sweet and salty snacks. As published by The Lancet EAT-commission, it is well-known that eating fruit and vegetables on a daily basis, is beneficial for good health.[15] Besides, overconsumption of both salt and sweet snacks creates health risks. In addition, other items of the food frequency questionnaire were also included, such as the intake of meat, nuts, legumes and pulses, and many more food products. Next, respondents' frequencies were asked regarding eating out, using delivery, or takeout services or eating dishes made out of meal boxes.

Furthermore, respondents were asked how often they looked for advice on healthy eating before and during the lockdown measures and whose advice they would listen to.

Additionally, attitudes towards meals were examined by gauging how often respondents ate their dinner at a dinner table, had their meals while watching television or another screen and how often they considered the meal to be an important part of the day for them or their households.

Finally, due to the lockdown measures, social contact was restricted in many participating countries. As a result, new creative ways of contact with friends emerged, for example,

e-drinking and e-dining, which equals video-chatting with peers or friends while sharing a drink or a meal. Respondents had to indicate how often they had participated in an e-drink or dining session and their attitude towards it.

Data sources/measurement

In terms of **lockdown measures**, we observed the steps taken by different international governments at the time of constructing the survey and presented them using a multiple choice question where multiple items could be selected.[16]

Items from the screening scale for psychological distress by Kessler and colleagues were used to measure overall respondent sentiments during COVID-19,[17] of which the items of feeling **hopeless, restless, worthless, nervous, depressed, and fatigue** was retained for this study. This was then complemented by items probing respondents' feelings of **financial instability**, **connectedness**, and **time availability** which we noticed to be relevant during this epidemic.[18-22] Participants evaluated these experiences on a seven-point frequency scale (1 = never; 2 = very rarely; 3 = rarely; 4 = sometimes; 5 = frequently; 6 = very frequently; 7 = all the time).

We assessed **food literacy** among our respondents using the 13-item scale by Begley and colleagues,[23] of which we kept the 11 items pertaining to planning, managing, and food preparation for this study. To be more specific, respondents had to indicate the frequency of the following 11 items: (1) plan meals ahead of time, (2) make a list before they go shopping, (3) plan meals to include all food groups (a varied diet), (4) think about healthy choices when deciding what to eat, (5) feel confident about managing money to buy healthy food, (6) use the nutritional information panel (nutritional breakdown of the products) to make food choices, (7) Use other parts of the food label to make food choices (like which ingredients are in the product), (8) cook meals at home using healthy ingredients, (9) feel confident about cooking a variety of healthy meals, (10) try a new recipe and (11) change recipes to make them healthier. Answer options took the form of a seven-point frequency scale (1 = never; 2 = very rarely; 3 = rarely; 4 = sometimes; 5 = frequently; 6 = very frequently; 7 = every time). In addition, two more items were included to check how frequent respondents cooked with leftovers or how often they threw away (leftover) food.

To examine changes in **shopping experiences**, all the following questions were posed for the situation before and during the lockdown measures. First, we asked to indicate the main person responsible for grocery shopping in the participant's household. Multiple answers were possible, and the options were based on a scale of Hagmann et al.,[24] to which a few extra items were added, resulting in the following items: 'me', 'my partner', 'my mother', 'my father', 'my housemate', 'no one', or the open answer category 'another person'. Next, attitudes towards shopping were examined via a seven-point Likert scale, on which participants had to indicate if they found grocery shopping to be time-consuming, frustrating, a type of relaxation, a way they could play out their creativity or discover new things, enjoyable or stressful. Items of the Likert-scale were 1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4= neither agree nor disagree, 5 = somewhat agree, 6 = agree, 7 = strongly agree. Additionally, shopping process and locations were examined using a seven-point frequency scale (1 = never; 2 = very rarely; 3 = rarely; 4 = sometimes; 5 = frequently; 6 = very frequently; 7 = all the time). Participants had to indicate how often they physically went to the store, they preordered their groceries and picked it up at a seller's point or they had their food delivered at home after ordering it online. Also, respondents had to indicate how often they did go to specific locations for their groceries, going from supermarkets to straight from the farm. Next, respondents were asked to indicate how important certain aspects of the store were to them, again by indicating the importance of 10 items on a seven-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4= neither agree nor disagree, 5 = somewhat agree, 6 = agree, 7 = strongly agree). Items were partially based on the findings of a focus group study our research team was working on when the pandemic started. Further, the impact of 8 potential food influencers were measured via a seven-point frequency scale (1 = never; 2 = very rarely; 3 = rarely; 4 = sometimes; 5 = frequently; 6 = very frequently; 7 = every time I went grocery shopping). Finally, respondents had to indicate on a 7-item scale of which of the 23 listed products they had made a stock (1 = a lot less than usual, 2 = less than usual, 3 = a little less than usual, 4 = not more or less than usual, 5 = a little more than usual, 6 = more than usual, 7 = a lot more than usual).

Next, **cooking behavior and attitudes** were examined. All questions were also asked for both before and during the lockdown measures. First, respondents were asked to indicate the person who usually prepared food in their households. Again, multiple answers were possible, and the same list of persons was used as for the shopping questions.

To understand participants' **cooking behavior**, a short question of Barton, Wrieden, and Anderson[25] was included, in which participants had to indicate on a seven-point scale whether their cooking was mostly based on ready-made meals and pre-prepared ingredients or on mostly basic and fresh ingredients. Second, a scale based on former research[24] was included gauging how often respondents prepared some dishes, going from a hot main meal from basic ingredients to soup, baked goods, or bread. (1 = never; 2 = very rarely; 3 = rarely; 4 = sometimes; 5 = frequently; 6 = very frequently; 7 = every time I eat these foods)

In addition, **cooking skills** were questioned by asking participants how capable they felt to prepare the same items as the formerly mentioned scale. For each dish, they had to indicate on a 7-item scale how much they agreed with the statement that they had the skills to prepare that specific food (1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4= neither agree nor disagree, 5 = somewhat agree, 6 = agree, 7 = strongly agree).

Furthermore, **cooking attitudes** were researched. Respondents had to indicate on the same last-mentioned seven-point scale, how much they agreed with six statements on the feeling of cooking. In addition, 5 barriers for cooking were questioned via a seven-point frequency scale (1 = never; 2 = very rarely; 3 = rarely; 4 = sometimes; 5 = frequently; 6 = very frequently; 7 = every time I cooked or baked).

Besides, respondents' **inspiration sources** were examined on 10 items for which they had to indicate how often they used their recipes on a 7-item scale (1 = never; 2 = very rarely; 3 = rarely; 4 = sometimes; 5 = frequently; 6 = very frequently; 7 = every time I prepared food).

Also, their **food media use** was questioned for 7 different sorts of media, going from cookbooks to social media. Again, the same last-mentioned seven-point frequency scale was used. Next, frequency of actively searching for recipes was questioned via a seven-point scale (1 = never; 2 = very rarely; 3 = rarely; 4 = sometimes; 5 = frequently; 6 = very frequently; 7 = All the time). Respondents also had to indicate how much they agreed with 11 possible motivations for recipe use on a 7-item Likert scale (1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4= neither agree nor disagree, 5 = somewhat agree, 6 = agree, 7 = strongly agree). Again, these items were based on the previous findings of the not yet published study of our research teams. Finally, respondents were asked in an open question to write down the name of their main food-related influential figure, organization or brand whose recipes they used the most. Next, they were asked to rate this specific influencer on four source-credibility items: trustworthiness, expertise, how relatable he/she/it is, and attractiveness[26].

Respondents were also asked about their **eating behavior** using a scale adapted from Vereecken and colleagues,[27,28] to which we added some items and grouped others together. The item "alcoholic beverages" was not implemented in all country surveys, as some participating countries prohibit alcohol consumption which would make the item redundant or sensitive to a social desirability bias. Respondents reported their eating habits on a seven-point frequency scale (1 = (almost) never; 2 = less than 1x a week; 3 = 1x a week; 4 = 2-4x a week; 5 = 5-6x a week; 6 = 1x a day; 7 = 2x or more times a day). For this study, we mainly focused on the items "fruit", "vegetables", "sweet snacks" and "salty snacks" to discern between healthier and unhealthier foods. Besides, we have also asked our participants to indicate on a 7-item frequency scale how often they ate out at a restaurant or café, they used delivery or takeout services, and, used meal boxes (1 = never; 2 = very rarely; 3 = rarely; 4 = sometimes; 5 = frequently; 6 = very frequently; 7 = every time I eat a warm meal).

Furthermore, we examined the most commonly used sources for **advice on healthy eating** for both before and during the pandemic. First, respondents had to indicate on a 7-item frequency scale how often they listened to the food advice of ten potential information sources (1 = never; 2 = very rarely; 3 = rarely; 4 = sometimes; 5 = frequently; 6 = very frequently; 7 = every time I needed/wanted advice).
 Again, these ten potential sources were based on the unpublished findings of the formerly mentioned research team. Second, participants were asked to indicate on a 7-item frequency scale how often they actively searched for food-related advice (1 = never; 2 = very rarely; 3 = rarely; 4 = sometimes; 5 = frequently; 6 = very frequently; 7 = All the time).

Besides, respondents' **attitudes towards meals** were examined by asking them to indicate on a 7-item frequency scale to what extent they agreed with the following three statements: (1) Meals are an important part of the day for me/my household, (2) I eat dinner at my dinner table, and (3) I eat while watching television or another screen (1 = never; 2 = very rarely; 3 = rarely; 4 = sometimes; 5 = frequently; 6 = very frequently; 7 = All the time).

Finally, **e-drinking and e-dining experiences** were researched. Participants had to indicate on a 7-item scale how often they had organized or participated in an e-drinking or e-dining session since the start of the lockdown (1 =

(almost) never, 2 = less than 1x a week, 3 = 1x a week, 4 = 2-4x a week, 5= 5-6x a week, 6 = 1x a day, 7= 2 or more times a day). All participants who indicated that they had once participated to such a session, had to rate their experience on two follow-up questions. They had to indicate on a 7-item scale how much they agreed with the statement that they enjoyed drinking or eating together online and that they felt awkward drinking or eating together online (1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4= neither agree nor disagree, 5 = somewhat agree, 6 = agree, 7 = strongly agree).

Data handling

Cases with invalid values for age (5 cases) and gender (1 case) were removed. X-gendered respondents (n = 112) were also removed for analyses, since this answer option was not used in every country, and the subsample was too small for meaningful analyses.
Of all 81 486 people that started the survey, 38 666 completed more than 90% of the questions. All respondents who completed less than 90% of the survey were removed.

Expected outcomes of the study

Outcomes of this study will inform us on changing food literacy and dietary patterns worldwide due to COVID-19 and the different measures. These findings are important for policy makers and media that must urge the population to maintain a healthy diet. Results will be useful to advice governments and policy makers to (a) monitor and change social distancing measures in the upcoming weeks and months, and (b) how to communicate about this in ways the general public will understand and accept.
Results will be relevant for long-term health interventions, because we will learn which personal and contextual factors are most crucial for boosting food literacy, which can in the long-run be applied to health interventions in high-risk (low food literate) groups.

Quality assurance and bias

Acquiescence bias
Our reliance on seven-point scales throughout the survey, with a balanced amount of positive and negative options where relevant, aimed to circumvent acquiescence bias.

Social desirability bias
This study avoided inquiring about topics sensitive to social desirability bias and where its potential existed, in the case of educational background for instance, we opted for a straightforward and neutrally worded multiple choice question.

Self-report
The nature of our study, with questions relating to personal perceptions and experiences concerning cooking and eating during the COVID-19 epidemic, unavoidably lent itself to forms of self-reporting biases. However, we formulated the survey questions in a straightforward, quickly comprehensible way such that respondents would not over-think their responses.

Non-response bias
Our sampling method and the time restrictions related to this study leave room for forms of non-response bias. Where possible, however, we avoided this by formulating the questions with accessible vocabulary and grammar. We made the topic of study and respondent recruitment campaigns on social media as attractive and easily comprehensible as possible as well, besides relying on a broad range of media for our survey distribution. During the survey data collection we also monitored the population representation in terms of geography, socio-economic background, and gender in order to increase survey sharing efforts for underrepresented groups if needed.

Ethics

The survey was conducted completely anonymously, so no personal data were questioned that would allow identification. Furthermore, IP addresses were not saved by Qualtrics. In addition, participants were clearly informed about the study's subject in advance via an informed consent [see section below], so that there was no deception. Informed consent was obtained at the start of the survey in the form of a written consent. The informed consent process consisted of providing adequate information concerning the study objectives and implications, providing the opportunity to stop at any time and ensuring that the participant understood this information.

The study protocol was approved by the Ethics Committee for the Social Sciences and Humanities at the University of Antwerp, Belgium (Ref No: SHW_19_44).

Informed consent forms

Thank you for your interest and welcome to this survey about your cooking, eating and media behavior before and during the corona measures.

1. What is the study about?
The survey is about **your shopping, cooking, eating and media habits** before the corona measures and during the corona measures.

We want to map out the similarities and differences between what we cook and eat, and we also want to look at the possible impact of various media.
This study is part of ongoing research projects funded by VLAIO (InFlOOD) and FWO (From Food Media to Food Literacy)

2. Who can participate?
At least 1000 Belgian respondents who are at least **18 years old** are expected to participate in this study. We will ask international colleagues to share this survey in their country as well. This way we can map the trends internationally.

3. What is expected of you?
After you have given your permission, the questionnaire will start. **The entire questionnaire will assess the situation <u>before </u>the corona measures and <u>during </u>the measures**. It is important to know in advance that most questions are always repeated. The questionnaire takes about <u>25 minutes</u> to complete. We realize this is a little longer than the usual survey but we hope you will take the time to fill it in!

4. What are your rights and responsibilities
Your participation is **completely voluntary** and **anonymous**. We will not ask for personal data and your IP address will not be stored.

- You have the **right to refuse** to participate
- You can **stop at any time**, even after you have given permission
- You do **not have to give a reason to stop**
- Stopping your participation will **not bring any disadvantages**
- If you start but terminate before completing the survey, you agree that we use the responses you had provided up to that point

Your data can be **reused** at a later stage for other research purposes by our research group, perhaps in collaboration with (inter)national colleagues. We guarantee the same careful handling of the data provided as with the initial collection.
This study has been **approved** by an independent ethics committee, namely the ethics advisory committee on social and human sciences (UAntwerp).

5. Compensation
You will not receive compensation for participating in this study. We will, however, donate **€1** per completed

survey to the **Global FoodBanking Network** (www.foodbanking.org), who are requesting donations to help people in need of food worldwide. We will use our personal research budget, the reserved amount of which is limited to €3,000.

6. Contact details
If you have any questions or comments concerning the survey, you can send an email to our correspondence address: **charlotte.debacker@uantwerpen.be**

Thank you in advance for filling in our survey,
FOOMS (Food, Media, & Society) team

7. Giving permission
I'm older than 18 and I agree that my data will be used for research purposes, even if I do not fully complete the survey,

- I'm older than 18 and wish to participate in the study
- I do not wish to participate in the study

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