

# *Measuring Food Culture: a Tool for Public Health Practice*

**Rebecca Kanter & Joel Gittelsohn**

**Current Obesity Reports**

e-ISSN 2162-4968

Curr Obes Rep

DOI 10.1007/s13679-020-00414-w



**Your article is protected by copyright and all rights are held exclusively by Springer Science+Business Media, LLC, part of Springer Nature. This e-offprint is for personal use only and shall not be self-archived in electronic repositories. If you wish to self-archive your article, please use the accepted manuscript version for posting on your own website. You may further deposit the accepted manuscript version in any repository, provided it is only made publicly available 12 months after official publication or later and provided acknowledgement is given to the original source of publication and a link is inserted to the published article on Springer's website. The link must be accompanied by the following text: "The final publication is available at [link.springer.com](http://link.springer.com)".**



# Measuring Food Culture: a Tool for Public Health Practice

Rebecca Kanter<sup>1</sup> • Joel Gittelsohn<sup>2</sup>

Accepted: 7 October 2020

© Springer Science+Business Media, LLC, part of Springer Nature 2020

## Abstract

**Purpose of Review** Food culture is a ubiquitous aspect of all societies. This review provides an overview of methods for measuring food culture, and emphasizes the importance of these measures not just for description, but also for strengthening public health practice, primarily through the development of better interventions; to monitor and evaluate changes in diet and nutrition; and for the development of strategies for sustainability and dissemination.

**Recent Findings** Food culture measurement has enriched public health practice through its use of myriad approaches, including interviews, cultural domain analysis, visual methods, observation, time allocation studies, focus groups and community workshops, household studies, and textual analysis.

**Summary** Food culture measurement is essential for public health practice related to food and nutrition, and can lead to, among other outcomes, improved implementation research in nutrition, understanding household dynamics that impact nutritional outcomes, innovative textual analysis to identify food culture through language, and the selection of interventions conveyed through multiple strategies, including digital means, such as via social media.

**Keywords** Food culture · Nutritional anthropology · Public health · Qualitative · Mixed methods

## Introduction

What humans eat, why we choose to eat those foods, the meanings and significance humans attach to foods, also known as food culture, is a ubiquitous aspect of all societies. While no single definition of food culture exists, the concept has been characterized by different scholars. Long defines the cultural construction of food as “the ways in which a group of people sharing a similar worldview and practices (a culture) define what can or cannot be considered food [1].” Long asserts that

“one approach, then, is to examine foodways—the total network of activities, practices, and concepts surrounding food and eating [2].” The seminal review “Anthropological Perspectives on Diet” by Messer is a comprehensive review of the scientific literature on food culture within anthropological studies up until 1984 [3]. A shorter precursor to the review by Messer is Fischler’s paper on “Food habits, social change and the nature/culture dilemma [4],” which stands out as a scientific work because in it Fischler links food culture to dietary habits and one’s food environment, before formal food environment studies had yet to be considered an independent research area. Both of these publications, not heavily focused on food culture measurement methods, preceded the seminal textbook published in 1989, “Research Methods in Nutritional Anthropology [5],” in which nutrition became a focal point of anthropological research.

Nearly three decades later, the textbook “Food culture: anthropology, linguistics and food studies”, edited by Chzran and Brett, was designed to fill the methodological gap between the biocultural focus of nutritional anthropology and the wider-ranging constantly evolving field of food studies by comprehensively describing, in a user-friendly manner, the myriad methods that have been used to “measure” food culture [6•]. Chzran and Brett soundly describe many of the

This article is part of the Topical Collection on *The Obesity Epidemic: Causes and Consequences*

✉ Rebecca Kanter  
 rkanter@med.uchile.cl

Joel Gittelsohn  
 jgittel1@jhu.edu

<sup>1</sup> Department of Nutrition, Faculty of Medicine, University of Chile, Independencia 1027, 8380453 Santiago, Chile

<sup>2</sup> Department of International Health, Center for Human Nutrition, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA

main methods used to measure food culture, but do not explicitly illustrate how and why food culture measurement is important for public health applications. Therefore, the objective of this paper was to describe the main methods used to measure food culture in terms of their ability to generate useful information for public health practice, while also providing recent examples from the applied literature.

## Why Measure Food Culture?

From an applied public health perspective, food culture consists of ideational and behavioral concepts (e.g., the rules for food and how people follow or do not follow these rules, including foodways and food proscriptions and prescriptions). Foodways encompass the multi-dimensional practices (socio-cultural, economic, etc.) related to the production, exchange, and consumption of food [7], while food proscriptions and prescriptions encompass the specific cultural systems and related rules regarding the avoidance or preferential consumption of certain foods [8]. Food culture differs from, but is related to of the concept of the food environment, an increasing area of study in public health nutrition that centers on characterizing different types of food sources in a given setting, the foods they sell, prices, etc. Within public health practice, it is important to measure food culture to understand the elements of a complex system in order to develop better interventions to improve diet and reduce risk for under- and over-nutrition, monitor and evaluate change in diets as well as nutritional status, and develop strategies for sustainability and dissemination regarding healthy diet options.

## Developing Interventions

A purpose of measuring food culture for public health practice is to shift the study focus away from specific individual inferences to that of society to improve public health outcomes. For example, it is useful to identify food proscriptions and prescriptions, or food classification systems that can be subsequently used for intervention development that influence food choices in particular settings. A common research tool to conduct this type of context-specific formative research focused on informing specific intervention activities which are manuals that present guidelines for conducting applied, relatively short-term ethnographic field research that can be used by academic and non-academic researchers in the field [9]. Some of the most common types of manuals to guide how to conduct formative research for intervention planning include rapid appraisal (or Assessment) procedures (RAP) used for short-term, qualitative studies and focused ethnographic studies (FES) used for multi-method, short-term research strategies focused on the specific research target related to the intervention being planned. Chzran and Brett include a list of the most well-known RAP and FES manuals that have been

used to guide food culture measurement for intervention development. Another example of how food culture measurement may positively influence population health is through the design of culturally competent obesity prevention programs, such as the Healthy Migrant Families Initiative, designed for Sub-Saharan African families that had migrated to Australia that included incorporating common traditional African foods into healthy food pyramids provided to participants for home use [10].

## Monitoring and Evaluation

Describing relevant aspects of food culture can help identify what to monitor and subsequently, evaluate as part of health intervention programs. This may include who is involved in food-related behaviors (e.g., food server and cook), the sequence of eating the unique courses or dishes within a meal, and evidence of preferential food allocation. For example, how changes in dietary patterns affect the nutrition transition in a particular country or region [11]; and why acculturation is often linked to changes in nutritional status [12]. Such research studies can elucidate food culture as a potential indicator of change, if social norms are shifted. Some of the most notable food culture studies related to health, particularly nutrition-related non-communicable diseases, come from acculturation studies [13], while culturally related festive eating events have been suggested as a means to both help explain and interpret temporal changes in both dietary intake and excess weight gain [14].

## Sustainability and Dissemination

Food culture studies are imperative for the development of effective strategies for sustainability of interventions and their dissemination within public health practice. Sustainability has myriad meanings, but for this paper, we refer to sustainability in terms of figuring out in which institutions to base a public health intervention, how to institutionalize the intervention within a particular setting, and perform capacity building, among other actions [15]. It follows that more culturally adapted public health nutrition strategies are more sustainable—as they will be viewed to be acceptable and resonant with the cultural setting [16].

The rest of this article will highlight the qualitative and quantitative methods that have been used to conduct food culture measurement; and then describe some of the main limitations to food culture measurement. The food culture methods will be reviewed for their (1) inherent strengths as a method and (2) role in facilitating public health practice.

## How to Measure Food Culture?

Traditionally, food culture has been measured, or assessed, by sociocultural anthropologists. In Food Culture: anthropology,

linguistics and food studies, Moreno-Black summarizes the classical methods and texts that cultural anthropologists have used for the study of food and nutritional anthropology; emphasizing research topic selection and the extent to which research design is theory driven as hallmarks [17]. From an applied public health perspective, we suggest the following framework when utilizing food culture measurement. Prior to data collection, it is important to answer two questions to elucidate the underlying motives for the data collection itself. First, think about why, or for what purpose, food culture measurement is necessary. Second, think about which food culture measurement method or methods has the greatest potential to generate useful information to answer this “why.” In Table 1, we have summarized the main methods used to assess food culture in public health practice. With the answers to these questions in mind, one can refer to Table 1 to guide data collection that entails food culture measurement: (1) Determine which method(s) is most suitable for answering the intended purpose by looking at both the application and “degree to which characteristics of culture can be measured”; (2) Confirm that the assumptions can be met or addressed. It may be necessary to perform more than one measurement method to address the research aims; and (3) Prior to any data collection, a comprehensive literature search about the food culture under study is recommended to provide an initial knowledge base for the researcher or observer. The following subsections describe in detail the different methods that can be used for food culture measurement; and are presented in terms of a description of the method, and ability to generate useful information for public health practice. Examples from recent research are provided.

## Interview Methods: to Develop a Broad Understanding of Food Culture in Context

### The Method

Qualitative interviewing can be thought of as a guided conversation to make cultural inferences [18]. There are many types of qualitative interview methods that may be employed to collect food culture data that can be with key informants, unstructured, semi-structured, or open-ended, and which often complement other methods described below. Compared to individual interviews where the sample size might be based on a sample size calculation, a smaller number of key informants is useful for determining insights about the food culture of a community, and can provide baseline information through free listing or help confirm cultural domains. Free listing is a systematic interviewing technique in which the informant is asked to list all the items that come to mind that they believe make up a particular cultural or cognitive domain [19]. Individual interviews can complement other methods to

collect food culture data. All individual interviews should be audio recorded, ideally using a high-quality digital recorder, and subsequently transcribed. Unstructured interviews do not rely on an interview guide and are carried out through conversation in which to freely explore questions and concepts. As a result, the interviewer is more likely to gain novel insights through unstructured interviews than more structured interview types [20].

### Use in Public Health Practice

In general, interview methods are used in applications for public health to further explore cultural perceptions (e.g., related to: awareness, challenges, practices) that cannot be adequately captured in a closed questionnaire, and in some cases, perform ratings exercises. They can be used to generate, enumerate, and prioritize cultural domains [21] of foods, as well as behaviors related to food selection, preparation, and consumption. One example of ethnographic methods regarding interviewing and food centered life histories is through Ramona Lee Pérez’s use of what she calls “kitchen table ethnography” that emphasizes a non-hierarchical, coexisting relationship between informant and interviewer to redirect a conversation around a particular topic [22]. In her most recent publication, Pérez utilized her kitchen table ethnographic methods to develop an ethnographic model of taste [23]. Another recent example of how interviews used to measure food culture can provide inputs for the design and planning of nutrition interventions as well as future dissemination strategies comes from Zobrist et al. [24•]. In their work, the authors conducted 46 in-depth interviews with Senegalese mothers to explore how perceptions around food decision-making was related to 38 local food items, identified through cultural domain analysis, described below that in turn form a basis for future intervention planning and dissemination strategies around infant and young child feeding in Senegal [24•]. Semi-structured or structured interviews with consumers, producers, and others involved with food (e.g., chefs) have the potential to shed light on how food is conceptualized and represented linguistically [25]. Weisburg-Shapiro and Devine built a semi-structured interview guide from Counihan’s “food-centered life history” method to assess to what degree the immigrant experience over the life-course influenced the eating behaviors of Dominican men and women [26]. Focused ethnographic studies (FES) and rapid assessment procedures (RAP) are more recent methodological tools in the emerging field of implementation research in nutrition [27]. FES combine a variety of specific ethnographic methods [28, 29], while RAPs provide systematic methods to conduct rapid qualitative assessments [30, 31]. Overall, FES and RAP manuals are intended to facilitate the generation of data about specific problems, while providing information about the local

**Table 1** A brief comparison and contrast of the different “measurement” approaches in the study of food culture

| Approach                           | Sample/sampling strategies                                                                                           | Outputs                                                                                                                                                                                                                                             | Application to which characteristics of culture can be measured                                                            | Use in public health practice                                                                                                     | Assumptions and limitations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Qualitative interview methods      | -Small number of individuals/key informant interviews<br>-Individuals/individual interviews                          | -Ethnographic field notes together with digitally-recorded interviews that provide:<br>-Background information; baseline information for free listing activities; confirmation of cultural domains<br>-Cultural perceptions related to food culture | -Material culture<br>-Social norms<br>-Concepts and groupings<br>-Behaviors (e.g., food preparation; food decision-making) | -Design and planning public health nutrition interventions; or implementation research in nutrition                               | Assumptions:<br>-Key informants are good key informants<br>-Trained interviewer -Ideally, rapport between interviewer and participant (interviewee) Limitations:<br>-Can be time consuming<br>-Can generate large amounts of data (e.g., interview transcripts)                                                                                                                                                                                                                                                                                                                                               |
| Cultural domain analysis (CDA)     | -Individuals/individual interviews                                                                                   | -Vocabulary for items in a domain<br>-Characteristics of items in a domain<br>-Relationships between items in a domain<br>-Differences and similarities between individuals regarding their knowledge of a particular domain                        | -Concepts and groupings                                                                                                    | -Intervention planning<br>-Sustainability and dissemination                                                                       | Assumptions:<br>-Emic approach<br>-Participants will be able to understand questions<br>-Participants will be able to free list<br>-Together, selected participants will be able to produce all the salient items in the domain<br>-In free listing participants tend to list items based on familiarity and; those who know more about the subject may list more items<br>Limitations:<br>-Salience is a subjective statistic<br>-A large number of items may be compiled<br>-Pile sort activities are difficult to design (e.g., inadequate domains or items for sorting) or for participants to respond to |
| Visual methods                     | -Photos; documents/Small groups or archives<br>-Mapping; drawing/small groups or individuals, such as key informants | -Photos with narration<br>-Community-level maps<br>-Documentaries<br>-Photojournalistic books                                                                                                                                                       | -Material culture<br>-Concepts and groupings<br>-Social norms (e.g., food choice)<br>-Behaviors (e.g., food choice)        | -Intervention planning<br>-Monitoring and evaluation<br>-Sustainability and dissemination                                         | Assumptions:<br>-The technological tool(s) chosen is the most appropriate to answer the research question Limitations:<br>-Sample size representativeness<br>-Photo quality<br>-Costs associated with technological tools                                                                                                                                                                                                                                                                                                                                                                                     |
| Direct and participant observation | -Household/communities—walking around                                                                                | -Ethnographic field notes<br>-Photographs                                                                                                                                                                                                           | -Material culture (e.g. cooking areas)<br>-Social norms<br>-Behaviors (e.g., cooking processes)                            | -Design and planning public health nutrition interventions; or implementation research in nutrition<br>-Monitoring and evaluation | Assumptions:<br>-Field notes are as accurate as possible<br>-Rapport between observer and participants<br>Limitations:<br>-Long periods of observation<br>-Limited by the perceptions and biases of the persons making the observations; as                                                                                                                                                                                                                                                                                                                                                                   |

**Table 1** (continued)

| Approach                             | Sample/sampling strategies                                                                                                                      | Outputs                                                                                                                                  | Application to which characteristics of culture can be measured                                                                                                                                                                                                                 | Use in public health practice                                                             | Assumptions and limitations                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Time allocation studies              | -Randomly selected individuals; households/observer appears at randomly selected places at random times                                         | -Codebook; data sheets or; structured forms                                                                                              | -Material culture<br>-Social norms<br>-Concepts and groupings<br>-Behaviors (e.g., food preparation; cooking; dietary habits)                                                                                                                                                   | -Intervention planning<br>-Monitoring and evaluation<br>-Sustainability and dissemination | well as by their ability to capture these observations<br>Assumptions:<br>-Easier to train observer than for direct/participant observation, but assumes standardization of observers<br>-Reactivity is present (i.e., behavior is modified in the presence of an observer)<br>-Produces data that can be quantitatively analyzed<br>Limitations:<br>-Large number of visits per unit of observation<br>-Judgment and interpretation required to fill out data collection forms |
| Focus groups and community workshops | -Small groups of people/select participants from communities of interest, such as through different community, cultural or neighborhood centers | -Focus groups: range of information produced<br>-Community workshops: data to inform public health intervention strategies and materials | -Material culture (e.g., if used to generate feedback on specific food preparation electronic products)<br>-Social norms<br>-Concepts and groupings<br>-Behavior (e.g., in terms of how participants discuss a particular topic leading to insights from the group interaction) | -Intervention planning                                                                    | Assumptions:<br>-Focus group is <i>focused</i> on a particular topic selected by the researcher<br>-For research purposes<br>-Real discussion between participants<br>Limitations:<br>-Confidentiality cannot be assured<br>-Generates lots of qualitative data<br>-Limited amount of time, especially for a focus group, in which to ask questions<br>-Requires moderator with background knowledge of cultural context                                                        |
| Household studies                    | -Household surveys/randomly selected households based on inclusion criteria; nationally representative available household survey data          | -Qualitative data<br>-Survey data<br>-Nutritional assessment                                                                             | -Material culture<br>-Social norms<br>-Concepts and groupings<br>-Behaviors (e.g., food preparation; food decision-making)                                                                                                                                                      | -Intervention planning<br>-Monitoring and evaluation                                      | Assumptions:<br>-Based on conceptual framework(s) underlying study design (if applicable)<br>-Based on researchers' a priori assumptions (e.g., degree of intra-household resource sharing or distribution, or lack thereof)<br>Limitations:<br>-Limited by the conceptual framework(s) underlying study design<br>-Can be limited by research scope (e.g., food allocation, but not food purchasing or preparation)                                                            |
| Textual analysis                     | -Textual sources/software that captures text from social media (e.g., Tweets from twitter; screenshots)                                         | -Databases with information from social media usage (e.g., text, screenshots)                                                            | -Material culture<br>-Social norms<br>-Behavior (e.g., social media use related to food and nutrition)                                                                                                                                                                          | -Intervention planning<br>-Monitoring and evaluation<br>-Sustainability and dissemination | Assumptions:<br>-Social media is a strong influence on, and indicator of, human behavior<br>Limitations:                                                                                                                                                                                                                                                                                                                                                                        |

**Table 1** (continued)

| Approach | Sample/sampling strategies | Outputs | Application to which characteristics of culture can be measured | Use in public health practice | Assumptions and limitations                                                                                                                                                                                                                                                                                                                                                             |
|----------|----------------------------|---------|-----------------------------------------------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          |                            |         |                                                                 |                               | <ul style="list-style-type: none"> <li>-Sampling bias regarding textual analysis of digital data: includes only those with some degree of digital literacy</li> <li>-Generates large amount of data that may be difficult to analyze</li> <li>-Social media use may be confused with actual human behavior (e.g., an individual has consumed all the foods they tweet about)</li> </ul> |

context, including cultural definitions, terminology, and resources necessary for the design of intervention programs [9].

## Cultural Domain Analysis: to Identify and Explore Shared Perceptions

### The Method

Cultural domain analysis (CDA) is a set of methods that emerged from cognitive anthropology [32] in which the research objective is to determine how people in a given cultural group understand, organize, and navigate the material goods, events, and experiences within their world that together form cognitive categories, or cultural domains [33]. Cultural domains refer to concepts/categories that are meaningful within a given local culture (i.e., emic concepts and terms), such as junk foods, healthy foods, or hot foods. A free listing activity is used to identify the items within a cultural domain. Methods commonly used in CDA, and in concert, are item elicitation techniques (e.g., free listing), grouping techniques (e.g., pile sorts, triad tests), and ordering techniques (e.g., rankings, paired comparisons). Pile sorts and triad tests are both systematic interview methods to examine the organization of cultural domains through exploring how people organize, categorize or rank the items within a domain. In pile sorts, the main objective is for interview participants—individually or in groups—to try to group, or sort, different cards together in which each card has a different item listed. This provides an idea of the internal taxonomy/subgroupings within a domain. Unstructured interviews, described previously, often with key informants, are the ideal environment in which to conduct free listing activities to help identify the items in a cultural domain. Taken together, CDA can be used to capture emic concepts, terms, and groupings that are perceived as meaningful in and by the local culture. Of the methods used in CDA, free listing is one of the quickest ways to collect data on the cultural salience of items within a community as well as the individual variation in knowledge of the domain in question (e.g., local perceptions related to food items associated with disease risk) [34]. Salience refers to the perceived importance or awareness of a particular cultural domain and/or on the items that should be included in that domain. The salience of items within a domain can be assessed quantitatively using a quantitative measure (Smith's Salience) that accounts for the frequency of mention and is weighted for the position of the item in the free list. Thus, items that are mentioned more frequently and sooner in a free list can be considered more salient.

A research team can use pile sorts and triad tests to more closely examine how study subjects perceive the items within a cultural domain are related, either by using all the items mentioned during the free listing activities or a shorter list of items. When free listing is used to study cultural domains

related to food culture, such as traditional food systems, Kuhnlein et al. recommend the generation of a “short list” of the top, most salient 25–30 items from the free listing activities [35]. Using only the items in the short list makes pile sorts and triad tests more feasible. Triad tests require that the study subject identify which of three items does not belong or put another way, which two items out of three are more similar.

## Use in Public Health Practice

Cultural domain analysis is frequently used in RAP and FES manuals, especially as it relates to better understanding the concepts and groupings of different food items within different local contexts. An example of how CDA was used to describe local beliefs and perceptions concerning cultural concepts of dietary risk factors related to type 2 diabetes is regarding research with the Ojibway-Cree in Northern Ontario, Canada [36]. Whereby, the authors used CDA to identify the main cultural domains related to food in the study community, and found that within the community, there was a strongly perceived dichotomy “Indian” and “White man’s” foods; the latter of which included “store-bought foods” and “junk foods” that were perceived to be “unhealthy” and thus, associated with type 2 diabetes risk [36]. The work by Kanter and León Villagra is a recent example of a “methodological sandwich” in which CDA was used to study food culture, specifically traditional Chilean diets [37•]. In this study, Kanter and León Villagra conducted a free listing activity with key informants as well as in focus groups to identify traditional Chilean culinary preparations. Then, based on a short list of culinary preparations and food items, research assistants conducted pile sort activities with different research participants to characterize the perceived dietary sustainability of each pile sort item. The results from the pile sort activities were repurposed into a recipe book with associated cooking demonstrations. Whereby, brief questionnaires were collected from an even larger number of study subjects to further understand the significance in terms of taste and acceptability, either through willingness to cook or buy the culinary preparation.

## Visual Methods: to Collect and Analyze Visual Representations of Food Culture

### The Method

Commonly used visual ethnographic methods used to assess food culture are photography, mapping, drawing, and document collection from study subjects [38]. Ethnography is visual, through the use of visual representations of culture. Thus, visual ethnography includes methods of film and digital media, photography, mapping, and drawing. Photographic

methods have been used to engage participants in their own assessment of the food culture around them.

Mapping through the use of direct observation (e.g., walking neighborhoods), and through the now commonly accessible, GIS coordinates is used to collect food environment data in which inferences about food culture can be made. Food mapping is another emerging ethnographic method for food culture studies that was first defined by Marte in 2007 as “a methodology to research spatial temporal aspects of food relations as experienced from the cultural perspectives of people in specific communities [39].” Food maps often encompass a myriad of the previously mentioned ethnographic methods, which can also include hand drawn maps, whereby the researcher and study participant collaboratively construct the local food system situated around the participant’s home. Drawing is another ethnographic method to study food culture, especially by having children draw their food preferences [40]. Documents one might collect for food culture studies include recipe books (or photos of recipe books) and menus. Taken together, Long argues that “an ethnography of eating approach helps in identifying the reasons behind people’s food choices as they understand them [2].” Finally, sensory ethnography has emerged since the 1990s as an important means by which to design and conduct food studies research [41]. According to Black, “sensory ethnography encourages engagement of the ethnographer’s entire body as a sensory apparatus for knowing the world.” Detailed descriptions of taste and smell, sensory labs, including cooking demonstrations and taste testing, and extending food-centered interview techniques to having research participants prepare and cook recipes in their own kitchens are methods used to conduct sensory ethnography within food studies.

## Use in Public Health Practice

While still underutilized in public health practice, visual ethnographic methods generate sociocultural knowledge that enriches the understanding of public health problems to foster culturally sensitive approaches and solutions. From parents in Vanuatu using photography to assess the dietary diversity, or lack thereof, of their child feeding practices to the frequently used “Photovoice” method [42]. An emerging method that combines aspects of individual photography and photovoice is mobile phone visual ethnography (MpVE) that has been shown to capture food culture within everyday life [43•]. The Chinese television documentary series, *Flavorful Origins*, is an example of how film can be used to convey food culture through the presentation of unique culinary ingredients and traditional recipe preparations. Photographic methods have been used in different ways for ethnographic data collection related to food culture, such as by having students take pictures within their community about their eating habits, and food environments [44]. There are

photojournalistic books, such as the seminal “Hungry Planet: what the world eats,” among others, by Menzel and D’Aluisio [45]. In photovoice, participants are asked to take photos related to the research themes, and subsequently interpret the photographs through small and large group discussions. Photovoice is often used to assess the food environment that can in turn be incorporated into the design of public health nutrition programs and policies [46].

## Direct and Participant Observation: Living Food Culture

### The Method

Direct observation techniques provide unique insights into material culture, social norms, and actual human behavior, well beyond with that provided by traditional public health methods (e.g., surveys). There are various types of direct observation that can facilitate the collection of food culture data including participant observation, unstructured focused observations (i.e., scripting), continuous monitoring, spot check observations that are frequently used in time allocation studies (described below), and rating observations. Continuous monitoring, spot check, and ratings observations all require preliminary unstructured research. Structured direct observations are useful for the central study of observable behaviors that are not very salient or memorable to the people performing those behaviors.

Participant observation occurs when field work involves lengthy community stays, and field workers have ample time to participate in some aspects of life around them to ideally gain an intuitive understanding of what is happening within a particular culture [47]. In participant observation, the research team is the data collection instrument in which interacting with those being studied allows for observations of naturally occurring events [48]. Participant observation can be used to develop positive relationships between researchers and study participants, improve the design of subsequent qualitative research methods, determine study settings and recruitment procedures, and facilitate the cultural meaning of study participant responses [49]. Bernard argues that it is possible to do useful participant observation in just a few days, but the longer the time spent in the field, the bigger the difference in what will be learned; whereby, very long-term, decade-long, participant observation can lead to data that is impossible to get through other means, as presence builds trust and trust lowers reactivity [47]. The common types of data collected during participant observation include diagrams, such as maps, extensive detailed field notes, and quantification of distinct participant behaviors, such as how many times one enters a particular space [49].

### Use in Public Health Practice

Medin and colleagues used direct observation to validate a web-based questionnaire designed to monitor and evaluate the diet and nutrition of school-children in Norway [50]. SturtzSreetharan et al. use a novel approach to collecting data about fat talk by recruiting citizen sociolinguists who did not have any previous social science training [51]. While the focus of this study was on “spontaneous fat talk” in public areas, the presence of food culture was ubiquitous in their observational findings. Bridle-Fitzpatrick accompanied adults while food shopping and went on walks with students in their neighborhoods to determine how perceptions of one’s food environment may differ by age or socioeconomic group in the Mexican city of Mazatlán that generated findings aimed at improving both interventions and policy related to obesity prevention [44]. As there are global cultural differences surrounding food choice, both within and between countries, Freedman used ethnographic methods, especially participant observation, to further explore the culture-specific motives related to food choice [52]. And found that in Japan, qualitative data collected about food variety and people being adventurous regarding taste support more quantitative findings from the widely used Food Choice Questionnaire (FCQ) [52].

## Time Allocation Studies: to Understand How Food Culture Is Inextricably Linked to Time

### The Method

Time allocation studies are any study that collects data about how time is used or allocated to different activities (e.g., childcare, food processing, eating, and harvesting). Time use surveys are the classical method by which to conduct time allocation studies; however, one might also examine how individuals perceive time, or lack thereof. Since the 1990s, the spot-check observational method has emerged as the primary method for conducting time allocation studies [53]. During spot-checks, over a series of randomly selected times, the observer appears at randomly selected places and records people’s activities when they are first encountered; ideally, frequent, visible behaviors. Overall, to generate a useful quantity of data, a large number of visits will be made per unit of observation. In a brief narrative review, Fiese argues that time allocation studies should be conducted with a socio-ecological approach for better understanding dietary habits and their potential relationship with nutrition-related health outcomes [54].

### Use in Public Health Practice

Of the methods outlined in this section, time allocation studies have historically been utilized with greater frequency within

public health applications. More recently, given the high prevalence of obesity and nutrition-related diseases, researchers have utilized time-use studies to examine how much time people, at present, spend on food preparation versus eating out [55].

## **Focus Groups and Community Workshops: to Gather in-Depth Knowledge About Attitudes, Beliefs and Perceptions Related to a Given Food Culture; and Directly Generate Public Health Intervention Strategies and Materials**

### **The Method**

Since the late twentieth century, focus groups have become a very common method in public health research. Focus groups, or community workshops, can be done as a standalone method, supplementary data source, or as part of a multi-method study that combines two or more qualitative methods. Focus groups generates data directly related to the research topic through concentrated insights often about phenomena that are unobservable, such as past events, which is different from the data obtained from the aforementioned observational methods obtained in natural settings. An effective focus group will generate a range of information through personal experiences and context, while still allowing for new ideas. In addition to sole qualitative research purposes, focus groups can also be used in quantitative research to explain survey results or aid survey development. Community workshops are similar to focus groups in that they also consist of a moderated small group discussion. However, the primary aim of community workshops is to directly generate public health intervention strategies and materials. As it relates to the study of food culture, ideally, community workshops will be used to develop culturally acceptable nutrition intervention programs.

### **Use in Public Health Practice**

An example of how community workshops were used to develop culturally acceptable nutrition intervention programs is that of Gittelsohn et al. in Inuit communities in Canada. Whereby, the investigators conducted two 2-day community workshops to convene all the research project stakeholders to select the key foods and behaviors, media, and key messages to be used in the development of intervention materials [56]. Examples of types of cultural knowledge gained from the community workshops in this study included food items specific to the local context and culture, such as musk ox, caribou, char, trout, whitefish, and culturally specific cooking preparation methods (e.g., deep-fried, pan fried in own fat) that the investigators subsequently incorporated into study materials.

Kanter and León Villagra used community workshops for the collection of food culture data around the recall of traditional Chilean culinary preparations that were still remembered and consumed in the Chilean population for a subsequent healthy and sustainable diet intervention design [37••].

## **Focus on the Household: a Lens into Food Culture**

### **The Method**

Even though some of the aforementioned methodological approaches can and should be conducted within a household setting, the focus on the household as a means for studying food culture merits its own, separate methodological overview. In this context, the household takes on the anthropological meaning of a household; whereby, the household is its own unique level of analysis as an “intermediate between the individual and the society/culture [3].” Since the 1970s, intra-household bargaining, or household decision-making power, has emerged as an important mediator in child nutrition as well as nutrition programming [57, 58]. However, the study of household decision-making has also been used to study food culture and nutrition amongst adults. For example, Amugsi et al. found that adult women in Ghana who participated in the decision-making around household purchases had higher dietary diversity than those who did not [59]. Another focus on the household as a lens into food culture is through utilizing methods to understand the factors that affect the intra-household allocation of food. Harris-Fry et al. completed a recent systematic review on determinants of intra-household food allocation among adults in South Asia, and found that among those in Bangladesh, India, and Nepal, intra-household food allocation was driven by many socioeconomic and seasonal factors that included various food-specific factors, including food behaviors (e.g., when women are discouraged or encouraged to eat certain foods), food tastes, and food preferences [60]. Thus, Harris-Fry et al. conclude that a sound understanding of the determinants of intra-household food allocation will enable a better understanding of how to design targeted nutrition programs.

### **Use in Public Health Practice**

Household studies are longstanding in public health practice, especially regarding how to better understand maternal and child health through data collection around maternal caregiver dynamics within a household. In a 2017 review of the relationship between global food system dynamics and the global nutrition transition, Popkin elucidates myriad household factors as being dynamic since the post-World War II era and thus contributors to the still occurring global nutrition

transition, including at the household level: cooking practices, food procurement sources, food supply, and purchasing patterns; further suggesting that the latter is linked to the former [61]. All of which are household factors that illustrate different sociocultural household characteristics that are related to household food culture.

## Textual Analysis: to Identify Food Culture Through Language

### The Method

The challenge in using textual analysis as a means to study food culture has been recently reiterated by Cavanaugh and Riley in that “Language and food are intertwined not only through their orality, but also because both are signifying media through which humans negotiate their material and social existence. Many studies of language incidentally include data about growing, sharing, cooking, eating, and advertising food; similarly, many studies of food include linguistic data: words and genres representing food, speech acts organizing its production and consumption, texts detailing its preparation and distribution [7].” Riley further defines texts about food texts as “metatexts,” such as food blogs and scholars that “study how humans use taste to construct social categories to identify based on age, gender, class, ethnicity, and nationality [62],” and states that “the goal of textual analysis is to interpret the ways in which texts are understood by and influence those who are exposed to them [63].”

### Use in Public Health Practice

With the advent of the Internet and social media, textual analysis has rapidly increased in use as an application for public health studies. Abbar et al. have taken an innovative approach to the study of food culture, and its subsequent linkages with nutrition and health outcomes, such as obesity and diabetes, through the textual analysis of the social media network, Twitter [64]. As a result of their studies, they are able to predict that areas in the USA with higher education levels tweet about less caloric food than lower educated areas in the USA [64]. While Reeves and colleagues argue that it is time for the human screenome project, which would be a collective effort to build a database to be able to analyze more precisely what humans are both seeing and doing on their screens [65•].

## Limitations of Food Culture Measurement and Possible Solutions

As food culture is defined differently, and varies considerably between cultural settings, encapsulating it into measurement

techniques elicits myriad limitations. The first being that food culture, a latent concept in many ways, cannot be perfectly measured, such as anthropometric measurements like weight or height. While the aim of this paper was to present the aforementioned methods with recent examples in public health practice, it is important to delineate the limitations inherent to food culture measurement, many of which are shared across methods. Firstly, qualitative methods are often quite time-consuming and generate copious amounts of data that is often hard to sort through (i.e., manage), and subsequently, to analyze and draw forth conclusions. Direct and participant observation techniques can require an amount of rapport and trust that may not be present at the beginning of a study. Time allocation studies may rely too much on participant memory, but not so if spot checks are also done.

In cultural domain analysis, free listing activities are prone to a series of limitations. During free listing, people tend to list items based on familiarity, and those who know more about the research subject than other participants may list more items. Cultural consensus analysis, meanwhile, is a misnomer because it does not actually *create* consensus but facilitates understanding of the probable consensus around a, usually, latent, culturally specific concept. In both cultural domain and consensus analyses, the eventual limited selection of particular dimensions or items from a broader selection hinders the broader conclusions, and thus, external validity of the findings. Household studies may purposely or inadvertently leave out food-related activities and consumption away from the home. Textual analysis, like many of the aforementioned mentions, may have limited external validity due to a small sample size.

There are a variety of possible solutions to overcoming some of the challenges of food culture measurement for public health practice. Technological advances offer solutions to some of the challenges of traditional qualitative approaches, while complementing others. Thus, assuming sufficient digital literacy amongst participants, digital approaches, such as basic to advanced video-conferencing software platforms, can replace in-person focus group discussions as well as open-ended or semi-structured interviews. Digital video conferencing methods can also be used for free listing individual or group activities. Furthermore, online pile-sort activities have been found to be a sound alternative to in-person pile sort activities [66•]. Technological advances will only continue to buttress visual methods to collect and analyze visual representations of food culture, such as the aforementioned mobile phone visual ethnography. It might be argued that direct and participant observation can never fully be replaced with digital methods. However, the example we provide by Medin et al. on web-based food records to ultimately replace direct, but unobtrusive, lunch room observations suggests that sound digital alternatives to in-person observations are possible [50]. We also include the work by Monsivais et al. as an

example not only as a time allocation study related to food culture but one that was realized entirely over the telephone, without in-person methods [55]. Finally, the use of digital data, such as that from social media platforms, for textual analysis related to food culture, is an emerging area of study that will continue to grow exponentially. As digital approaches to food culture measurement increase, digital literacy for both researchers and study participants alike is essential. Therefore, it will be important to consider digital literacy in public health intervention planning, and also, as a mediator in studies, especially ones realized through digital approaches, that incorporate food culture measurement.

## Conclusions

Food culture measurement techniques have existed for centuries as inextricably linked to anthropological studies; ultimately merging into nutritional anthropology in the late twentieth century. Yet, it is only recently that food culture measurement techniques have become paramount to public health practice, especially in public health nutrition studies. Despite various methodological challenges, food culture measurement, if done well, is essential for the design and planning of nutrition-related interventions, monitoring and evaluation of diet, and sustainability and dissemination.

**Funding** This research was funded by the Agencia Nacional de Investigación y Desarrollo (AIND)—Fondo Nacional de Desarrollo Científico y Tecnológico (FONDECYT) (R.K., ANID-FONDECYT Initiation Research Project grant number 11170225). The Agencia Nacional de Investigación y Desarrollo—Fondo Nacional de Desarrollo Científico y Tecnológico had no role in the design, analysis or writing of this article.

## References

Papers of particular interest, published recently, have been highlighted as:

- Of importance
- Of major importance

1. Long LM. Meaning-centered food research. In: Chrzan J, Brett J, editors. Food culture: anthropology, linguistics and food studies, 2019. 1st ed. New York: Berghahn Books; 2017. p. 208.
2. Long LM. Meaning-centered food research. In: Chrzan J, Brett J (eds) Food culture: anthropology, linguistics and food studies, 2019. 1st edn. New York: Berghahn Books; 2017. p. 212.
3. Messer E. Anthropological perspectives on diet. *Annu Rev Anthropol*. 1984;13:205–49.
4. Fischler C. Food habits, social change and the nature/culture dilemma. *Information (International Social Science Council)*. 1980;19: 937–53.
5. Peltó GH, Peltó PJ, Messer E, editors. Research methods in nutritional anthropology. Tokyo: The United Nations University; 1989.
6. Chrzan J, Brett J, editors. Food culture: anthropology, linguistics and food studies, 2019. 1st edn. New York: Berghahn Books; 2017. **This recent academic text fills a methodological gap between the fields of nutritional anthropology and food studies. It also includes both seminal works in these respective fields as well as suggestions for future directions in the conduct of food culture research.**
7. Cavanaugh JR, Riley KC. Introduction to Linguistic Anthropology Food Research Methods. In: Introduction to linguistic anthropology food research methods. In: Chrzan J, Brett J (eds) Food culture: anthropology, linguistics and food studies, 2019. 1st edn. New York: Berghahn Books; 2017. p. 131.
8. Gittelsohn J, Vastine AE. Sociocultural and household factors impacting on the selection, allocation and consumption of animal source foods: current knowledge and application. *J Nutr*. 2003;133: 4036S–41S.
9. Peltó PJ. Qualitative research guidelines: RAP, PRA, RRA, FES and others. In: Applied ethnography: guidelines for field research. London: Routledge; 2016. p. 267–80.
10. Renzaho AM, Halliday JA, Mellor D, Green J. The healthy migrant families initiative: development of a culturally competent obesity prevention intervention for African migrants. *BMC Public Health*. 2015;15:272.
11. Baker P, Friel S. Processed foods and the nutrition transition: evidence from Asia. *Obes Rev*. 2014;15:564–77.
12. Sanou D, O'Reilly E, Ngnie-Teta I, Batal M, Mondain N, Andrew C, et al. Acculturation and nutritional health of immigrants in Canada: a scoping review. *J Immigrant Minority Health*. 2014;16: 24–34.
13. Marmot MG, Syme SL. Acculturation and coronary heart disease in Japanese-Americans. *Am J Epidemiol*. 1976;104:225–47.
14. Zorbas C, Reeve E, Naughton S, Batis C, Whelan J, Waqa G, et al. The relationship between feasting periods and weight gain: a systematic scoping review. *Curr Obes Rep*. 2020;9:39–62.
15. Shediach-Rizkallah MC, Bone LR. Planning for the sustainability of community-based health programs: conceptual frameworks and future directions for research, practice and policy. *Health Educ Res*. 1998;13:87–108.
16. Ammerman A, Washington C, Jackson B, et al. The Praise! Project: A church-based nutrition intervention designed for cultural appropriateness, sustainability, and diffusion. *Health Promot Pract*. 2002;3:286–301.
17. Moreno-Black G. The anthropology of food and food anthropology: a sociocultural perspective. In: Chrzan J, Brett J, editors. Food culture: anthropology, linguistics and food studies, 2019. 1st edn. New York: Berghahn Books; 2017. p. 31–46.
18. Warren CAB. Qualitative interviewing. In: Handbook of Interview Research. 2455 Teller Road, Thousand Oaks California 91320 United States of America: SAGE Publications, Inc.; 2001. p. 83–102.
19. Weller SC, Romney AK. Defining a domain and free listing. In: Systematic data collection. 1st ed. United States of America: SAGE Publications, Inc; 1988. p. 9–19.
20. Bernard HR. Interviewing I: unstructured and semistructured. In: Research methods in anthropology: qualitative and quantitative approaches. Lanham: Rowman Altamira; 2011. p. 156–86.
21. Spradley JP. Discovering cultural themes. In: The ethnographic interview. Rinehart and Winston, New York: Holt; 1979. p. 185–203.
22. Pérez RL. Interviewing epistemologies: from life history to kitchen table ethnography. In: Chrzan J, Brett J, editors. Food culture: anthropology, linguistics and food studies, 2019. 1st edn. New York: Berghahn Books; 2017. p. 55.
23. Pérez RL. Las fronteras del sabor: taste as consciousness, kinship, and space in the Mexico–U.S. borderlands. *The J LACA*. 2014;19: 310–30.

- 24.• Zobrist S, Kalra N, Peltó G, Wittenbrink B, Milani P, Diallo AM, et al. Using cognitive mapping to understand Senegalese infant and young child feeding decisions. *Matern Child Nutr.* 2018;14:e12542 **A Focused Ethnographic Study (FES) manual was used to generate a context-specific understanding of the perceptions of mothers in Northern Senegal about dimensions of food-decision making in relation to 38 local food items; that can subsequently be used to inform a culturally-appropriate nutrition intervention.**
25. Cavanaugh JR, Riley KC. Introduction to linguistic anthropology food research methods. In: Chrzan J, Brett J, editors. *Food culture: anthropology, linguistics and food studies*, 2019. 1st New York: Berghahn Books; 2017. p. 136.
26. Weisberg-Shapiro P, Devine C. "Men like to eat more rice and beans and things like that": the influence of childhood experience and life course events on dietary acculturation. *Ecol Food Nutr.* 2019;58:413–29.
27. Tumilowicz A, Neufeld LM, Peltó GH. Using ethnography in implementation research to improve nutrition interventions in populations. *Matern Child Nutr.* 2015;11:55–72.
28. Peltó GH, Thuita FM. Focused ethnographic studies of infant and young child feeding behaviours, beliefs, contexts, and environments in Vihiga, Kitui, Isiolo, Marsabit, and Turkana counties in Kenya. Geneva: GAIN; 2016.
29. Jessri M, Farmer AP, Olson K. A focused ethnographic assessment of Middle Eastern mothers' infant feeding practices in Canada. *Matern Child Nutr.* 2015;11:673–86.
30. Rose D, Meershoek S, Ismael C, McEwan M. Evaluation of a rapid field tool for assessing household diet quality in Mozambique. *Food Nutr Bull.* 2002;23:181–9.
31. F.E.G. The Food Economy Group, Save the Children (2000) The practitioners' guide to the Household Economy Approach 401 pgs.
32. D'Andrade RG. The development of cognitive anthropology. Cambridge New York: Cambridge University Press; 1995.
33. Medley A (2008) Qualitative data analysis: methods in cultural domain analysis.
34. Quinlan MB. The freelist method. In: *Handbook of Research Methods in Health Social Sciences*; 2018. [https://doi.org/10.1007/978-981-10-2779-6\\_12-1](https://doi.org/10.1007/978-981-10-2779-6_12-1).
35. Kuhnlein HV, Smitasiri S, Yesudas S, Bhattacharjee L, Dan L, Ahmed S. Documenting traditional food systems of indigenous peoples: international case studies. In: *Guidelines for Procedures*. Ste. Anne de Bellevue, Quebec: McGill University; 2006.
36. Gittelsohn J, Harris SB, Burris KL, Kakegamic L, Landman LT, Sharma A, et al. Use of ethnographic methods for applied research on diabetes among the Ojibway-Cree in Northern Ontario. *Health Educ Q.* 1996;23:365–82.
- 37.•• Kanter R, León Villagra M. Participatory methods to identify perceived healthy and sustainable traditional culinary preparations across three generations of adults: results from Chile's Metropolitan Region and Region of La Araucanía. *Nutrients.* 2020;12:489 **Amongst two distinct regions in Chile, different participatory methods (key informant interviews with freelist, community workshops, pilesorts) and cultural domain analysis was used to derive a short list of still consumed and liked healthy traditional culinary preparations. The pilesort activities contributed information on the sustainability of each of the traditional culinary preparations on the short list as perceived by the participants. The culturally-specific data from the pilesort activities was used to inform a nutrition intervention on healthy and sustainable diets; in particular, through determining what recipes to include.**
38. Counihan C. Studying food and culture: ethnographic methods in the classroom. In: Chrzan J, Brett J, editors. 1st edn. New York: Berghahn Books; 2017. p. 112–28.
39. Marte L. Foodmaps: tracing boundaries of 'home' through food relations. *Food Foodways.* 2007;15:261–89.
40. Goldner MC, Lescano G, Armada M. Food menus evaluation for most liked products in children from Puna, region of Argentina. *Appetite.* 2013;61:66–76.
41. Black RE. Sensory ethnography : methods and research design for food studies research. In: Chrzan J, Brett J, editors. *Food culture: anthropology, linguistics and food studies*, 2019. 1st edn. New York: Berghahn Books; 2017. p. 228–38.
42. Wentworth C. Good food, bad food, and white Rice: understanding child feeding using visual-narrative elicitation. *Med Anthropol.* 2017;36:602–14.
- 43.• De Berry-Spence B, Ekpo AE, Hogan D. Mobile Phone visual ethnography (MpVE): bridging transformative photography and mobile phone ethnography. *J Public Policy Market.* 2019;38:81–95 **This study harnessed mobile phone proliferation to devise a new methodology called mobile phone visual ethnography (MpVE). MpVE specifically depends on the use of a mobile phone camera and the participant's desire to capture their own behaviors through the use of their mobile phone. Furthermore, this new ethnographic method is based on visual technologies to help overcome limitations related to both reading literacy and digital literacy. MpVE needs to be utilized more in food culture studies.**
44. Bridle-Fitzpatrick S. Food deserts or food swamps?: a mixed-methods study of local food environments in a Mexican city. *Soc Sci Med.* 2015;142:202–13.
45. Menzel P, D'Aluisio F. Hungry planet: what the world eats. Napa and Berkeley: Material World; 2005.
- 46.• Diez J, Conde P, Sandin M, Urtasun M, López R, Carrero JL, et al. Understanding the local food environment: a participatory photovoice project in a low-income area in Madrid, Spain. *Health Place.* 2017;43:95–103 **Participants divided into small-groups took photographs of their local food environment that were subsequently included in a consensus-building process to identify over-arching themes related to their respective food environments that can then be used for intervention planning, monitoring and evaluation, and dissemination and sustainability efforts related to public health nutrition practice.**
47. Bernard HR. Participant observation. In: *Research methods in anthropology: qualitative and quantitative approaches*, 4th edn. Walnut Creek: Rowman Altamira; 2006. p. 342–86.
48. Taylor N, Nichter M. Studying body image and food consumption practices. In: Chrzan J, Brett J, editors. *Food culture: anthropology, linguistics and food studies*, 2019. 1st edn. New York: Berghahn Books; 2017. p. 59–61.
49. Mack N. Module 4 — focus groups. In: *Qualitative research methods: a data collector's field guide*. Research Triangle Park: Family Health International; 2005. p. 51–82.
50. Medin AC, Astrup H, Kåsin BM, Andersen LF. Evaluation of a web-based food record for children using direct unobtrusive lunch observations: a validation study. *J Med Internet Res.* 2015;17:e273.
51. SturtzSreetharan CL, Agostini G, Brewis AA, Wutich A. Fat talk: a citizen sociolinguistic approach. *J Sociolingu.* 2019;23:263–83.
52. Freedman I. Cultural specificity in food choice – the case of ethnography in Japan. *Appetite.* 2016;96:138–46.
53. Ruel MT, Arimond M. Spot-check observational method for assessing hygiene practices: review of experience and implications for programmes. *J Health Popul Nutr.* 2002;20:65–76.
54. Fiese BH. Time allocation and dietary habits in the United States: time for re-evaluation? *Physiol Behav.* 2018;193:205–8.
55. Monsivais P, Aggarwal A, Drewnowski A. Time spent on home food preparation and indicators of healthy eating. *Am J Prev Med.* 2014;47:796–802.

56. Gittelsohn J, Roache C, Kratzmann M, Reid R, Ogina J, Sharma S. Participatory research for chronic disease prevention in Inuit communities. *Info*. 2010. <https://doi.org/10.5993/AJHB.34.4.7>.
57. Richards E, Theobald S, George A, Kim JC, Rudert C, Jehan K, et al. Going beyond the surface: gendered intra-household bargaining as a social determinant of child health and nutrition in low and middle income countries. *Soc Sci Med*. 2013;95:24–33.
58. Ickes SB, Wu M, Mandel MP, Roberts AC. Associations between social support, psychological well-being, decision making, empowerment, infant and young child feeding, and nutritional status in Ugandan children ages 0 to 24 months. *Matern Child Nutr*. 2018;14:e12483.
59. Amugsi DA, Lartey A, Kimani-Murage E, Mberu BU. Women's participation in household decision-making and higher dietary diversity: findings from nationally representative data from Ghana. *J Health Popul Nutr*. 2016;35:16.
60. Harris-Fry H, Shrestha N, Costello A, Saville NM. Determinants of intra-household food allocation between adults in South Asia – a systematic review. *Int J Equity Health*. 2017;16:107.
61. Popkin BM. Relationship between shifts in food system dynamics and acceleration of the global nutrition transition. *Nutr Rev*. 2017;75:73–82.
62. Riley KC. Food and text(ual) analysis. In: Chrzan J, Brett J, editors. *Food culture: anthropology, linguistics and food studies*, 2019. 1st edn. New York: Berghahn Books; 2017. p. 171–2.
63. Riley KC. Food and text(ual) analysis. In: Chrzan J, Brett J, editors. *Food culture: anthropology, linguistics and food studies*, 2019. 1st edn. New York: Berghahn Books; 2017. p. 173.
64. Abbar S, Mejova Y, Weber I. You tweet what you eat: studying food consumption through twitter. In: *Proceedings of the 33rd annual ACM conference on human factors in computing systems*. Association for Computing Machinery: Seoul, Republic of Korea; 2015. p. 3197–206.
- 65.●● Reeves B, Robinson T, Ram N. Time for the human screenome project. *Nature*. 2020;577:314–7 **The human screenome project has the potential to be a future established method to food culture studies to inform public health practice. Given how much time humans, globally, spend in front of a screen it is imperative to move beyond screen time as an indicator of digital use to that of what individuals see and do in front of a screen.**
- 66.● Gravlee CC, Maxwell CR, Jacobsohn A, Bernard HR. Mode effects in cultural domain analysis: comparing pile sort data collected via internet versus face-to-face interviews. *Int J Soc Res Methodol*. 2018;21:165–76 **Pile sorts have been a commonly used method or activity related to cultural domain analysis (CDA). However, pile sorts have been shown to be feasible to conduct through online, rather than in-person, means.**

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.