Agriculture and Human Values (2024) 41:863–882
https://doi.org/10.1007/s10460-023-10515-6

What is culturally appropriate food consumption? A systematic literature review exploring six conceptual themes and their implications for sustainable food system transformation

Jonas House[1,2] · Anke Brons[3] · Sigrid Wertheim-Heck[1] · Hilje van der Horst[2]

Accepted: 25 September 2023 / Published online: 25 October 2023

Abstract

There is increasing recognition that sustainable diets need to be 'culturally appropriate'. In relation to food consumption, however, it is often unclear what cultural appropriateness–or related terms, such as cultural or social acceptability–actually means. Often these terms go undefined, and where definitions are present, they vary widely. Based on a systematic literature review this paper explores how cultural appropriateness of food consumption is conceptualised across different research literatures, identifying six main themes in how cultural appropriateness is understood and applied. The paper then critically analyses these themes in relation to sustainable food system transformation. We explore how the themes conceptualise change, finding that cultural appropriateness is viewed in two main ways: either as a relatively static obstacle to be overcome, or as a dynamic and negotiated process. Both perspectives, we argue, entail different scientific, practical and political effects. Each perspective offers particular affordances for understanding and governing sustainable food system transition, although between perspectives there is likely to be a trade-off between theoretical sophistication and practical operationalizability. Based on this analysis we argue that researchers, policymakers and practitioners should be explicit about their commitment to a particular understanding of cultural appropriateness, as this will have implications for scientific and societal applications of their work. This is particularly the case, we suggest, in relation to the transdisciplinary collaborations necessary to effectively address the 'wicked problem' of food system sustainability. We conclude by offering a tentative general definition of cultural appropriateness as it relates to food consumption.

Keywords Cultural appropriateness · Cultural acceptability · Social acceptability · Dietary change · Sustainability · Transition

✉ Jonas House
jonas.house@wur.nl

Anke Brons
anke.brons@wur.nl

Sigrid Wertheim-Heck
sigrid.wertheim-heck@wur.nl

Hilje van der Horst
hilje.vanderhorst@wur.nl

[1] Environmental Policy Group, Wageningen University & Research, Hollandseweg 1, 6706 KN Wageningen, The Netherlands

[2] Consumption and Healthy Lifestyles Group, Wageningen University & Research, Hollandseweg 1, 6706 KN Wageningen, The Netherlands

[3] Public Administration and Policy Group, Wageningen University & Research, Hollandseweg 1, 6706 KN Wageningen, The Netherlands

Abbreviations

CA	Cultural appropriateness/acceptability
FAO	Food and Agriculture Organization of the United Nations
SA	Social acceptability/appropriateness

Introduction

A transformation towards a sustainable and healthy food system is urgently needed, as current practices of producing and consuming food contribute significantly to sustainability and health problems (Willett et al. 2019). While some sustainability gains can be achieved through improving production (Herrero et al. 2020), major shifts in consumption are widely deemed necessary to remain within planetary boundaries (Ivanova et al. 2020; Herrero et al. 2023).

Significant shifts in food consumption, however, are difficult to achieve. New foodways cannot simply be imposed: they must easily integrate with people's everyday lives, involving foods that people actually want to eat. Accordingly, the 'sustainability' of diets involves factors beyond the nutritional or environmental characteristics of food, such as the affordability or accessibility of diets (e.g. Blay-Palmer et al. 2016; Alemu 2022). In this context, there is increasing recognition that sustainable diets need to be 'culturally appropriate' (or 'culturally acceptable'–the terms are generally used interchangeably) (Béné et al. 2019; Willett et al. 2019; iPES FOOD 2021). Indeed, the notion of cultural acceptability as a central issue affecting sustainable diets is enshrined within the FAO definition of the latter term (Burlingame and Dernini 2012, 7, emphasis added):

> Sustainable Diets are those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, *culturally acceptable*, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources.

But what exactly does it mean for foods, diets or food consumption (henceforth 'food consumption') to be culturally appropriate? How is cultural appropriateness of food consumption established, maintained and changed? And how might efforts to ensure cultural appropriateness shape sustainable food system transformation? Although there is widespread recognition that sustainable diets must be culturally appropriate, we argue that insufficient attention has been paid to the connection between cultural appropriateness and sustainability, and the place of cultural appropriateness within a transition to a sustainable food system. More fundamentally, however, there is a lack of clarity around what cultural appropriateness–or related terminology, such as 'cultural acceptability', 'social acceptability' and (less frequently) 'social appropriateness'–actually means. Often these terms simply go undefined, whether in research on sustainability (e.g. Gazan et al. 2018a), food security (e.g. Pico et al. 2021), public health (e.g. Kavian et al. 2020), or novel foods (e.g. Toti et al. 2020). Where definitions are present, they often vary widely (e.g. Joassart-Marcelli et al. 2017; Chaudhary and Krishna 2019).

This paper addresses these issues across three main objectives. First, we clarify how cultural appropriateness of food consumption is conceptualised in different fields of literature. Based on a systematic literature review, we identify six main themes in how cultural appropriateness of food consumption is understood and applied.

Second, we critically analyse the six themes in relation to sustainable food system transition. Inspired by Fuchs et al. (2016), we explore how each of the six themes (implicitly) conceptualises change. We identify two overarching perspectives, in which cultural appropriateness is viewed either as a relatively static obstacle to be overcome or as a dynamic and negotiated process.

Third, we consider the implications of this analysis for efforts to understand and accelerate sustainable food system transformation. Building on the sociological idea that concepts and theories shape reality (e.g. Larsen 2020) we argue that the different ways of conceptualising cultural appropriateness identified have different scientific, practical and political effects, and that both perspectives raise challenges and opportunities for efforts towards food system transformation. Rather than adjudicating between approaches we argue that both are potentially valuable, but emphasise that researchers should be explicit about their understanding of cultural appropriateness. This is likely, we suggest, to benefit the transdisciplinary collaborations that successful food system transformation requires.

In line with these objectives, we understand food consumption broadly. Theoretical work on eating (e.g. Warde 2016) suggests that a narrow view of food consumption as equivalent to ingestion elides the influence of acquisition and preparation activities, as well as situational and contextual aspects of eating. As such, our analysis mirrors this broader focus, rather than attending specifically to–for example–the cultural appropriateness of particular foods. We do not, however, include production. While production clearly has a bearing upon cultural appropriateness–for example, in terms of people's values about how food is produced (e.g. Hayes-Conroy and Sweet 2015)–our principal focus here is on consumption. As such our work differs from Hammelman and Hayes-Conroy's (2015) study, which articulated the various ways in which cultural appropriateness is an important part of activities across entire food systems, affecting activities from growing through to final consumption. While these authors' work provides a valuable building block for envisioning just and inclusive food systems, we extend the exploration of cultural appropriateness in a different direction.

In what follows, we first outline our methodology. We then present the results of our literature review, explaining the six key themes in how culturally appropriate food consumption is conceptualised. In the Discussion section we turn to the critical analysis outlined above, exploring how the different themes conceptualise change and the implications of this for sustainable food system transformation. In the Conclusion section we propose a tentative general definition of cultural appropriateness as it relates to food consumption. Given that the terms cultural/social appropriateness/acceptability are generally used interchangeably in the literature, and for the sake of readability, we use only the term 'cultural appropriateness' (henceforth 'CA') in what

follows, other than in cases where a clear distinction between terms is necessary.

Methodology

To explore how CA is conceptualised in food-related scientific literature we conducted a systematic literature review. This method was chosen in light of the aforementioned lack of conceptual clarity around CA and the variable terminology used (i.e. cultural acceptability, social acceptability), which make for scattered and separated bodies of literature. A systematic literature review allows for integrating these literatures to achieve a more complete understanding of what CA means in relation to food consumption.

We focused on peer-reviewed scientific journal articles, book chapters and books (see in- and exclusion criteria, Table 2). We selected Scopus and Web of Science as two scientific databases that complemented each other, as Scopus has a slight European bias and Web of Science an American bias.

Figure 1 shows the data collection process. To develop our search string we first conducted an exploratory search on cultural appropriateness and food in Google Scholar in June 2021. The searches for cultural and social appropriateness were conducted separately, as it emerged throughout scanning the cultural appropriateness literature that social appropriateness was closely related and also relevant. This resulted in the search strings illustrated in Table 1. A large body of literature on cultural appropriation, which was not analytically relevant, was also captured in the first search string. Therefore the search term “NOT "appropriation*" was added in the second search string.

The Scopus search was conducted as the basic search, and duplicates were excluded in the Web of Science search. Together, these searches rendered 2006 publications. These were downloaded into EndNote and assessed on the in- and exclusion criteria based on title, abstract and keywords (for in- and exclusion criteria see Table 2). This reduced the number of publications to 439. Remaining publications were read in full and assessed against the in- and exclusion criteria. This resulted in a final number of 135 publications.

Two researchers (JH and AB) were involved in reviewing the literature. To ensure inter-coder reliability we randomly assessed a small number of publications individually and compared notes, which resulted in further fine-tuning of the

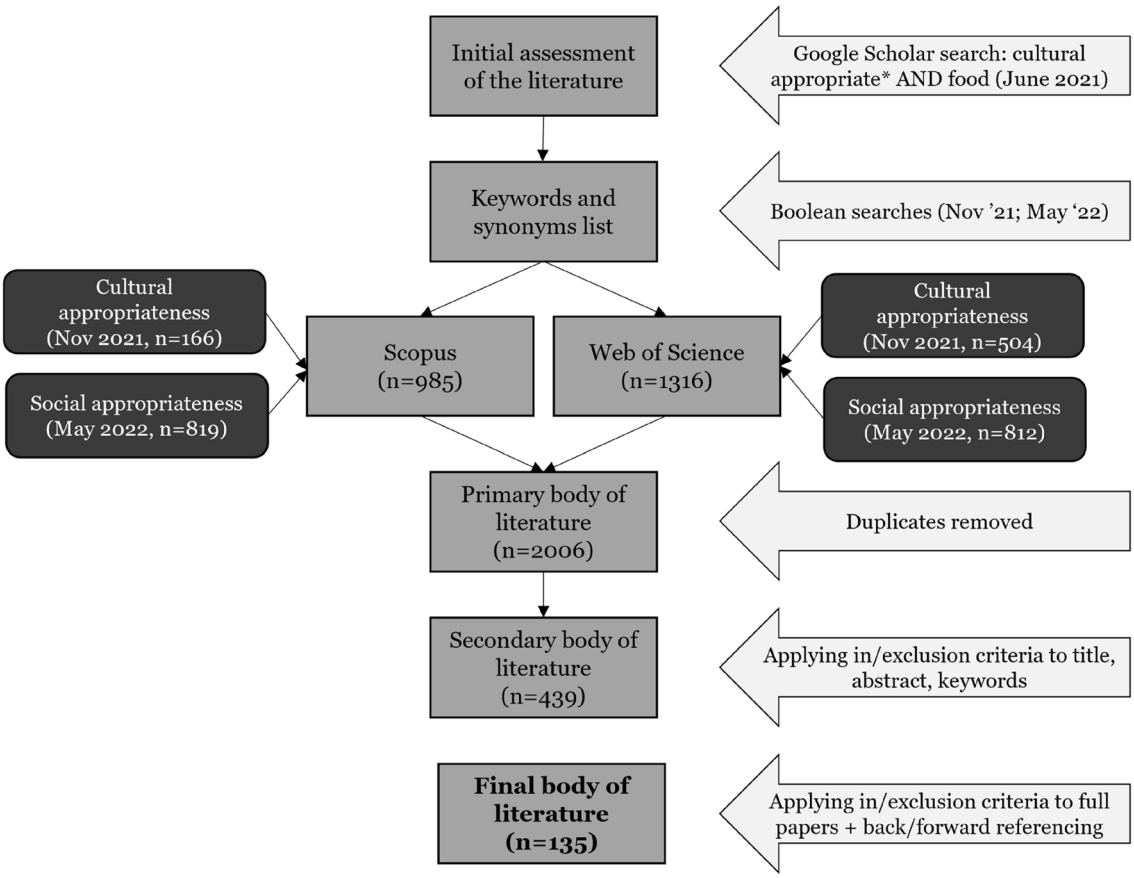

Fig. 1 Data collection process (modelled after Candel 2014)

Table 1 Search strings

	Scopus	Web of science
Cultural appropriateness/ acceptability	TITLE-ABS-KEY ("cultural approp*" OR "cultural accept*" AND food OR diet OR eat*)	TS = ("cultural approp*" NOT "appropriation*" OR "cultural accept*" AND (food OR diet OR eat*))
Social appropriateness/ acceptability	"social* approp*" OR "social* accept*" AND food OR diet OR eat*	TS = ("social* approp*" NOT "appropriation*" OR "social* accept*" AND (food OR diet OR eat*))

Table 2 In- and exclusion criteria

Inclusion criteria	*Language*: English
	Research methods: empirical and theoretical; qualitative and quantitative
	Time-frame: unlimited
	Focus: publications reflecting on and providing insights into cultural/social acceptability/appropriateness of food consumption
	Types of publications: peer-reviewed academic publications, books, book chapters
Exclusion criteria	*Language*: languages other than English
	Focus: publications that do not reflect on and provide insights into cultural or social acceptability or appropriateness of food consumption. This includes:
	Publications about CA/SA of food among infants or children
	Publications about CA/SA of something other than food
	Publications about CA/SA of methodological aspects of food-related research (e.g. dietary recall questionnaire)
	Publications about CA/SA of food production rather than food consumption
	Publications mentioning CA/SA briefly (e.g. in the abstract) but not otherwise engaging with it
	Types of publications: non-peer reviewed articles, grey literature

in- and exclusion criteria. The body of literature was then divided, and papers were discussed together when questions arose.

A data extraction file was developed and filled out to keep track of the main characteristics and arguments of each publication (see Supplementary material). This involved the following categories: author(s), year, discipline, type of publication (empirical or theoretical), geographical focus, method, theory, type of appropriateness (social or cultural), whether a definition was included, how appropriateness was conceptualized, main arguments and insights, and recommendations. Based on these factors, the six themes that will be presented in the next section arose, through an iterative process between the researchers over time in discussing the data extraction table.

Results

This section first discusses general characteristics of the final body of literature, then elaborates six key themes in how CA is conceptualised.

General characteristics of the studies

Out of the final 135 publications, 49 addressed cultural appropriateness/acceptability and 86 social appropriateness/acceptability. Most literature was published after 2013 (see Fig. 2).

Figure 3 shows the geographic focus of countries/levels occurring more than once, with the USA and the global level being most strongly represented. Roughly 1 in 4 publications focused on (countries in) the global South. Methodologically, 30 of the 135 papers were narrative reviews: other common methods were surveys (n = 16), interviews (n = 12), linear programming (n = 11) and a combination of nutritional analysis and sensory testing (n = 10).

Figure 4 shows the disciplines most represented in the final set of publications (i.e. occurring more than twice). The majority of publications came from the social sciences. The discipline most represented among the final publications was public health & nutrition (n = 48). Twenty eight were published in a natural science discipline, most prominently food technology (n = 10) and sustainability science (n = 6).

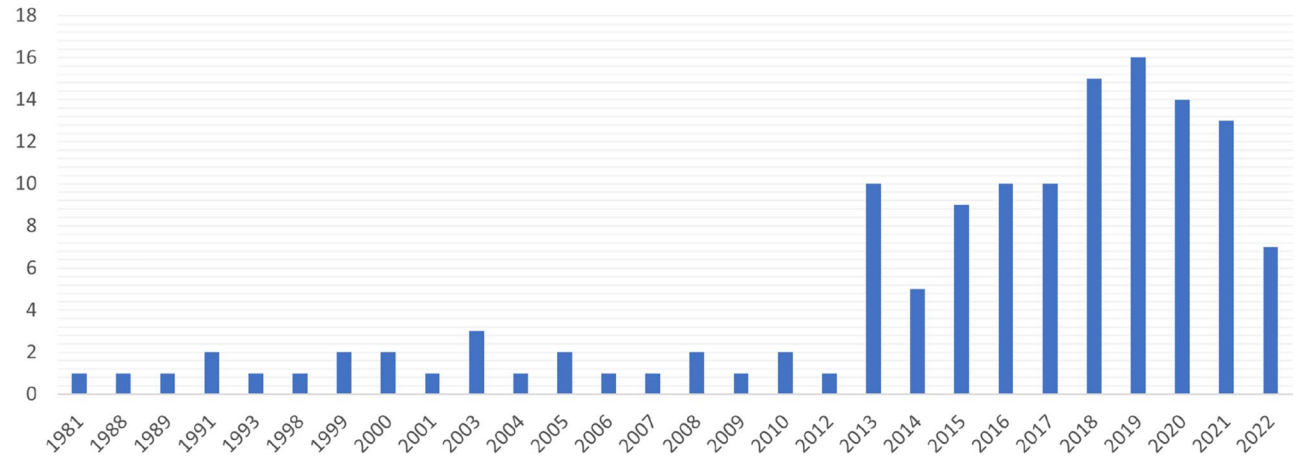

Fig. 2 Year of publication

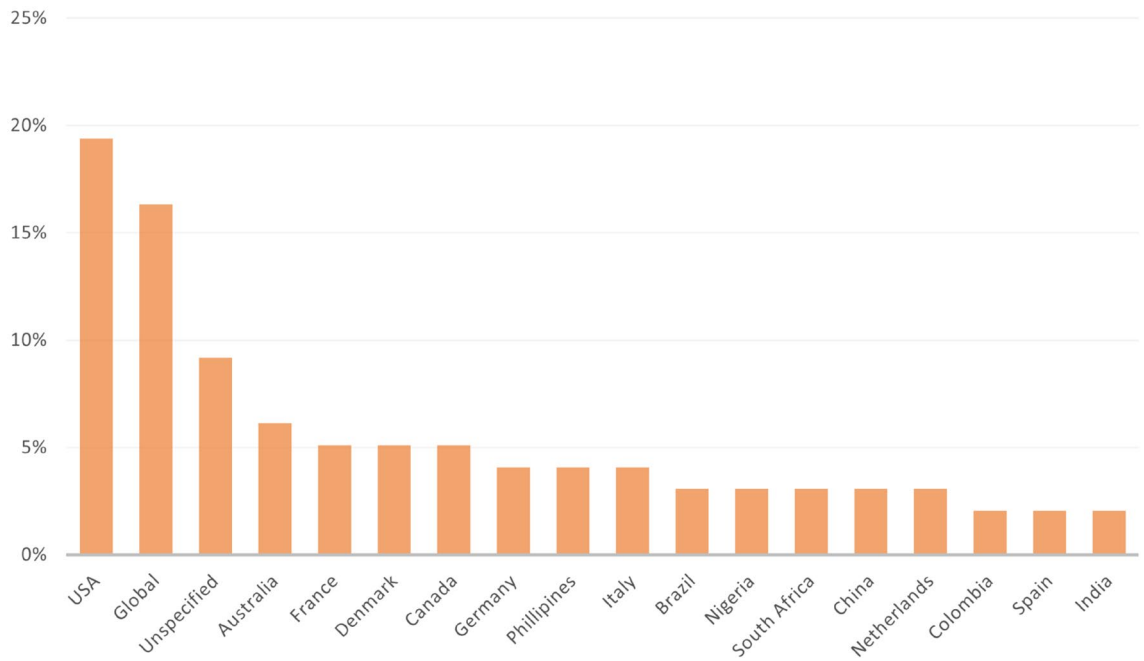

Fig. 3 Geographic focus

Six themes on the cultural appropriateness of food consumption

Our analysis indicated that within academic debates around food, diets and eating, there are six main themes in how CA is conceptualised (see Table 3). These themes are not totally discrete. Researchers may employ two or more conceptualisations of CA within the same study. Despite the flexibility with which individual studies sometimes conceptualise CA, we have nevertheless sought to identify and explain the key themes present across the literature.

Theme 1: Cultural appropriateness as existing diets

In the first theme, CA is equivalent to *conforming with existing dietary customs*. The customary food practices of a particular group of people–typically a (sub-)population–are considered inherently CA. The consumption of particular foods evidences their appropriateness, commonly referred to as 'cultural acceptability'.

The clearest formulation of this idea can be found in research that uses mathematical optimization techniques to identify 'optimized dietary scenarios' for a particular

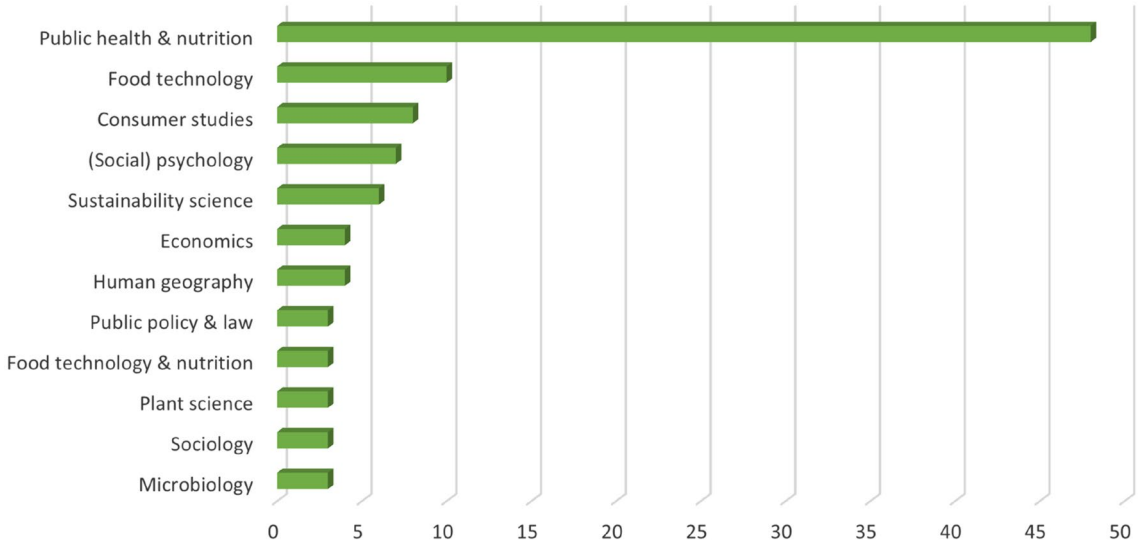

Fig. 4 Most frequently occurring disciplines (n > 2)

location (e.g. a country). This type of research–which mainly focuses on nutrition and public health–builds optimization models using inputs such as national dietary data and budgetary surveys, against which a number of 'constraints' are applied. These typically include factors such as cost, nutritional adequacy and sustainability. The aim is to identify dietary scenarios in which factors such as affordability and healthiness are adequately and simultaneously achieved (e.g. Parlesak et al. 2016; Gurmu et al. 2019; Broekema et al. 2020; Verly et al. 2020; Yin et al. 2020; Chaudhary and Krishna 2021; Yin et al. 2021).

Optimization modelling frequently includes CA as one of the 'constraints' applied. CA, in this sense, is defined as *minimised deviation from current diets*. Current diets are represented by the national dietary data that provides basic input for the model, and minimized deviation is achieved by specifying a set of parameters from which the optimized dietary scenarios may not deviate. The exact parameters used differ between studies, but typically address dietary/portion sizes (the absolute amount eaten must be, for example, between 80 and 120% of that which is currently consumed) and amounts of particular foods eaten (e.g. Perignon et al. 2016; Nykänen et al. 2018; Lauk et al. 2020). Some researchers also include factors–albeit unexplained–that are clearly aimed at cultural norms and proscriptions, such as Chaudhary and Krishna's (2019) decision that alcohol, spices and stimulants must be kept at an equivalent level in various country-specific optimized diets.

Specifying that optimized diets should not deviate from current diets ensures models are sufficiently diverse and close to established eating patterns (Gazan et al. 2018b). Without CA constraints, for example, optimized diets may contain very few different foods, or many things not currently eaten in a given location (e.g. Maillot et al. 2010; Parlesak et al. 2016; Faksová et al. 2019; Verly et al. 2020). Current diets thus offer a proxy for modelling CA diets.

The notion of CA food as 'that which is currently consumed' is also evident elsewhere in research on nutrition and public health, for example in the argument that "self-selected diets can be considered culturally acceptable" (Masset et al. 2014, 1460; see also Gazan et al., 2018a) or that locally-consumed plants are CA (Englberger et al. 2003). More qualitatively-focused work shares this conceptualisation, for example that food aid involving familiar foods is more CA (Slonim et al. 1981), or dietary interventions involving familiar foods in similar portions are more CA (Holm 1993).

Theme 2: Cultural appropriateness as substitutability

The second theme conceptualises CA as *food that provides a satisfactory substitute for a conventional equivalent*: for example, cookies made with vitamin-enriched flour rather than standard flour, which do not disrupt established food practices by tasting substantially different than conventional equivalents (Dourado Gomes Machado et al. 2021). This relates to Theme 1 in that current diets are the primary reference category, but differs in explicitly addressing potential incorporation of new foodstuffs. Research of this type is principally situated within the domains of food and sensory science. It favours the terminology of cultural/social acceptability or acceptance, although these are rarely defined.

In this theme acceptability is empirically tested by providing participants with an 'improved' foodstuff such as reduced sodium bread (McMahon et al. 2016) or nutritionally-enriched porridge (Ntila et al. 2019). Participants must taste this alongside a 'control' foodstuff (i.e. the conventional

Table 3 Six themes in how cultural appropriateness of food consumption is conceptualised

Theme	Disciplinary orientation(s)	Where does CA reside?	(How) is change conceptualised?	Who has agency/responsibility for change?
1. Existing diets	Public health & nutrition, food technology, sustainability science	**Who:** Population (i.e. national), group (e.g. ethnic groups) **What:** Foods **How:** Portion sizes, relative amounts	**Static:** Problem to be solved (supply-side of potential dietary changes)	Policymakers; dieticians; NGOs
2. Substitutability	Public health & nutrition, food technology, food technology & nutrition	**Who:** Population (i.e. national), group (e.g. poor rural communities) **What:** Foods	**Static:** Technical problem to be solved (product design)	Food producers; scientists
3. Acceptability	Food technology, consumer studies, economics, public health & nutrition	**Who:** Consumer attitudes, demographics **What:** Product characteristics	**Static:** Attitudinal or technical problem to be solved (product design, information provision)	Food producers; scientists
4. Preferences	Public health & nutrition, human geography, sociology, psychology	**Who**: Population (i.e. national), group (e.g. ethnic groups; dispositions + identity) **What:** Foods **Why:** Personal + cultural significance	**Dynamic and negotiated**: Evaluation of food	Consumers
5. Shaped by context of eating	(Social) psychology, public health & nutrition, sociology	**Who:** Population (i.e. national), group (e.g. poor people) **What:** Foods **When/where/why/how:** Context of eating	**Dynamic and negotiated**: Part of food-related practices	Consumers; co-eaters (people in immediate environment)
6. Shaped by context of acquisition and preparation	Public health & nutrition, assorted social sciences (shared focus on food security and poverty)	**Who:** Population (i.e. national), group (e.g. welfare recipients) **What:** Foods **When/where/why/how:** Context of acquisition and preparation	**Dynamic and negotiated**: Part of food-related practices	Consumers; co-eaters; relevant societal actors, principally governance of food (aid) and welfare

equivalent that the 'improved' version is intended to replace) and answer questions about the food's hedonic properties, assessing aspects such as appearance, aroma, flavour, texture and 'overall acceptability' (e.g. Aril-dela Cruz et al. 2017; Loong and Wong 2018; Maimanah-Faizah et al. 2020). Although focusing mainly on the Global South and issues such as food security (Hurtada et al. 2020) or malnutrition (e.g. Yusufu et al. 2014; Govender et al. 2019; de Kok et al. 2021), this theme also investigates agricultural innovations in the Global North, such as selenium-enriched apples in Germany (Wortmann et al. 2018) insect-fed rabbit meat in Italy (Gasco et al. 2019), or bread made with industrial by-products in Lithuania (Bartkiene et al. 2021).

Theme 3: Cultural appropriateness as acceptability

This is perhaps the most prominent theme. It understands CA as *the acceptance of specific foods*, whether by individual consumers or a broader group or society. CA is often undefined, but implicitly binary: would you eat this or wouldn't you? Does society accept or reject genetically modified food? While some studies view acceptability as a continuum across which people are more or less inclined to eat particular things (e.g. Ritchie et al. 2018), this approach generally views CA as a yes/no matter. There is some overlap with Theme 2, as the foods considered more or less 'acceptable' are intended to supersede existing alternatives. However, the 'acceptable' theme has a less direct focus on substitution: instead, foods are investigated for potential inclusion in diets more generally.

This theme is also terminologically diverse: across studies the terms 'acceptability' and 'acceptance', with or without any of the modifiers 'social', 'cultural' or 'consumer', are used apparently interchangeably. Often this occurs within the same paper (e.g. Brown et al. 2015; Hartmann et al. 2015; Chee et al. 2019). Literature within this theme falls into two broad sub-themes.

The first sub-theme uses discipline-specific tools to measure the acceptability or acceptance of particular foods. Within more natural-scientific approaches–chiefly food and sensory science–acceptability is measured in hedonic and sensory terms. People are asked to rate food samples in a controlled setting, similar to Theme 2. However in this case the foods are not direct substitutes, but rather experimental vehicles for potential introduction of new ingredients or techniques: for example, an alternative ingredient for a popular Nigerian snack (Adeyeye et al. 2020), and new techniques for fermenting beef snacks in the Philippines (Balmori et al. 2018) or preserving a popular Nigerian drink (Sa`id et al. 2017). More social-scientific work within this theme typically investigates self-reported 'willingness to eat' particular foods in relation to psychological, demographic or product characteristics. Studies investigate similar general variables (e.g. age, gender, neophobia) but differ in specific psychological or product-related focus. For example, three studies on willingness to eat insects focused respectively on Italian people's knowledge about insects and the environmental impact of meat (Simeone and Scarpato 2021), the extent to which German and Chinese people regarded insect consumption as 'primitive' (Hartmann et al. 2015), and the relative acceptability of a range of different insect species for German people (Schäufele et al. 2019).

The second sub-theme conceptualises acceptability more broadly, as abstract acceptance/rejection of particular foods. This is largely implicit, as 'acceptability' or 'acceptance' generally remain undefined. Whereas the previous sub-theme usually does not define this either, research instruments (e.g. 'willingness to pay') demonstrate how acceptability is conceptualised. In the present sub-theme such indications are usually absent. Social-scientific work in this theme measures social acceptance of genetically modified food by surveying both overall acceptability of genetic modification and specific applications in various domains (Veličković et al. 2016; Olynk Widmar et al. 2017; Rousselière and Rousselière 2017), reflecting an abstract notion of CA that is shared by social-scientific review articles. For example, Bimbo et al.'s (2017) review identified patterns in the 'acceptance' of nutrition-modified and functional foods without enquiring how the different studies conceptualised it, and Gjerris et al.'s (2016) review of the 'social acceptability' of insects as food is wide-ranging but undefined, and thus rather abstract. Most of the work in this sub-theme, however, is broadly natural-scientific, encompassing papers in natural science journals (e.g. Sarwar et al. 2020) and in interdisciplinary journals authored by natural scientists (e.g. Fan et al. 2021). It consists mainly of review articles characterised by the idea of a general acceptance of, or rejection of/resistance to, proposed dietary changes, often at the level of 'society' rather than consumers (e.g. Moseley 1999; Anders et al. 2021). Studies typically address the (attempted) introduction of agricultural innovations or biotechnologies, most frequently genetic modification of crops or animals (Araki and Ishii 2015; Ishii 2017; Ishii and Araki 2017; Lassoued et al. 2018; Tyczewska et al. 2018; Fan et al. 2021). Other topics include nanotechnology (He et al. 2019), irradiation (Byun et al. 2009), edible insects (Chee et al. 2019; Toti et al. 2020), seaweed (Nakhate and van der Meer 2021), biofortified food crops (Sarwar et al. 2020), cultured meat (Chen et al. 2022), or an assortment of these (Thavamani et al. 2020).

Theme 4: Cultural appropriateness as alignment with cultural preferences

The fourth theme conceptualises CA as *the alignment of food practices with people's cultural preferences*. We follow

the literature here in using 'cultural preferences' (e.g. Kuhnlein 2000; Haggan et al. 2007) as this theme focuses more on socially and culturally shaped preferences (i.e. tradition) than individual differences (i.e. food neophobia). Although this theme resembles Theme 1 (current diets), it is distinct in two key ways. First, this theme views preferences as *shaping* food consumption as it is negotiated, rather than (as in Theme 1) fundamentally constraining diets. Second, this theme goes beyond Theme 1 in that it addresses the *reasons* for food preferences. Within this theme we identified six key dimensions: preferred food, identity, tradition, norms, knowledges and morality. We discuss each in turn.

The first dimension within this theme refers to foods that are familiar and preferred as a result of an individual's socio-cultural background (Ford and Harris 1988; Violette et al. 2013; McKay and Dunn 2015; Kyeyune and Turner 2016; O'Connor et al. 2016; Tobin et al. 2016; Deng and Chan 2019): for example, specific preferences for typically Latino foods among migrants to the US (Mares 2013). This also applies to culturally *in*appropriate foods, such as the bread, pasta and canned tomatoes that immigrants in Canada did not like or know what to do with (Vahabi and Damba 2013). Culturally-specific preferences are nevertheless dynamic. Immigrants may 'adjust' their preferences to their new environment, for example (Vahabi and Damba 2013), in a process of 'dietary acculturation' (Deng et al. 2013; Barcena et al. 2021).

The second dimension associates CA with people's ability to articulate their social and cultural identity through their food practices, which entails being able to select familiar and preferred foods (Joassart-Marcelli et al. 2017; O'Connell et al. 2019). Pico et al. (2021) argue that one of the main reasons that the diets of Venezuelan migrants in Colombia remain CA is because of their role in the maintenance of ethnic identity, which, in turn, is facilitated by the commonalities between Colombian and Venezuelan foodways.

The third dimension addresses tradition as a prominent aspect of food preference, and thus CA. Fundamentally this refers to foods with a significant history of consumption in a given community, such as the "native plants and terrestrial and aquatic animals that Native Americans have consumed for thousands of years" (Mucioki et al. 2018, 88; see also Diekmann et al. 2020; Kyeyune and Turner 2016; Mishra et al. 2003; Tobin et al. 2016). Like culturally-specific food preferences, the notion of foods as 'traditional' also changes: Mucioki et al. (2018) show that 'Indian fry bread' is a familiar and preferred dish among indigenous American communities, despite its relatively recent development using ingredients supplied through federal food aid.

In the fourth dimension, preferred food accords with cultural norms around 'good food' (Holm et al. 2008; Diekmann et al. 2020), including values around how food is produced (Hammelman and Hayes-Conroy 2015; Hayes-Conroy and Sweet 2015; Capper 2017; Busse et al. 2019; Diekmann et al. 2020), and indeed foods that are seen as normal (Higgs and Thomas 2016; Heise and Theuvsen 2017; Stull et al. 2018; Berkowitz et al. 2020) or necessary, such as milk in Atlantic (and latterly Mediterranean) Europe (Nicolau-Nos et al. 2010; see also Maillot et al. 2010). Likewise this applies to foods with high cultural status and symbolic value, such as meat in Europe and the US (Holm et al. 2008; Nielsen et al. 2008; Sapp 1991; Sapp and Harrod 1989; see also Adams et al. 2000).

The fifth dimension explores how situated cultural knowledges around nutrition, health and the environment make foods (less-)preferred. Joassart-Marcelli et al. (2017) argue that while conventional US food outlets are judged by the standard of white middle-class ideas around food's 'healthiness', part of ethnic markets' CA is their acknowledgement of–and alignment with–multiple, situated knowledges around health and nutrition of foods. Likewise, Tobin et al. (2016) showed how rural Peruvians regard industrially-produced food as less preferred, in large part because of its perceived unhealthiness and nutritional inadequacy (Kuhnlein 2000; see also Diekmann et al. 2020). Reporting similar findings among rural migrants to an urban centre in Colombia, Hayes-Conroy and Sweet (2015) suggest that the notion of cultural (un)acceptability does not capture the complexity of how people "envision respectable relationships between food, bodies, land and community" (2015, 376).

The sixth dimension frames CA as "consistency with the *morality* of a community" (Marcoux et al. 2013, 677 emphasis added). This finds particularly strong expression in negative form: culturally *in*appropriate foods are those for which taboos exist (Wien and Sabaté 2015; see also Regan and Gutierrez 2005) or that are associated with "low cultural status" and thus stigmatising, causing shame and embarrassment (Cruz et al. 2014, 8; Barcena et al. 2021; Coates et al. 2006; Schäufele et al. 2019; Tobin et al. 2016; cf. Meel 2013). It also includes foods that are religiously proscribed, such as pig meat in Islam and Judaism (Kavian et al. 2020).

Theme 5: Cultural appropriateness as shaped by the context of eating

The traditions and values discussed in Theme 4 broadly address two main themes: *what* is eaten and *how* it is eaten. These ideas are elaborated in Theme 5, which suggests that CA is not a fixed, inherent property of foods (cf. Fischer and Van Loo 2021) but rather that *CA is shaped by the context of eating*. The processes through which this is achieved fall into two main dimensions: meal structure and sequence (the what/how of eating) and eating situation (who/where/when/why). Although in practice these are of course related, they are treated to some extent as distinct in the literature. As such we discuss each in turn.

The first dimension is the structure and sequence of meals. In this theme, part of what makes meals CA–and consequently, difficult to change–is their format and structure (Holm et al. 2008; Nielsen et al. 2008), which relates to ideas of what a 'proper meal' is (cf. Mäkelä 1991). For indigenous communities in British Columbia this likely entails a large 'table fish' species such as cod or salmon (Haggan et al. 2007), whereas in places such as Ireland or Denmark 'proper meals' are typically centred around a piece of meat (Holm et al. 2008; Healy 2019). Conversely, meals that do not contain a typical range of ingredients in familiar proportions are likely to be seen as lacking, for example in low-income people's diets in Canada and the Netherlands (e.g. Hamelin et al. 1999; Neter et al. 2020). This point was highlighted as an obstacle to dietary changes such as replacement of meat with legumes in France (Melendrez-Ruiz et al. 2019). It seems, however, principally to be a question of *relative* proportions. Medagama and Widanapathirana's (2015) participants, for example, regarded portion-restricted versions of typical Sri Lankan main meals as appropriate. Beyond a meal's internal structure, CA also includes the pattern or sequence of meals. For example, Campbell (1991, 409) argues that the 'social acceptability' of food is constituted of both "normal meal patterns" and "conventional sources of food" (see also Holm 1993; Kuhnlein 2000).

The second dimension identifies the eating situation as shaping CA. For example, Belon et al. (2016) note that for Canadian participants it was socially accepted to consume unhealthy foods as a reward and to celebrate a special event. The idea that particular occasions shape the CA of food consumption is reflected in a Danish dietary intervention, in which participants experienced difficulty adhering to a modified diet when eating out or eating with family: the normative demands of these "social eating events" lessened the appropriateness of intervention diets (Nielsen et al. 2008, 181). Studies in (social) psychology explore how social context shapes CA through social norms and peer influence: for example, people adjust the amount they eat to match a co-eater, particularly if appropriate portion sizes are ambiguous (Florack et al. 2013). This applies both to people who are physically co-present (Robinson et al. 2013) and people who are not, whose behaviour is inferred through environmental cues such as empty serving plates at a buffet (Raghoebar et al. 2019).

Theme 6: Cultural appropriateness as shaped by the context of food acquisition and preparation

Theme 6 also directs attention to the situated dynamics of CA, but broadens focus from the eating context to the practices prior to consumption. In this view, *CA is shaped by the context of food acquisition and preparation*. Almost all work in this theme focuses on food security, and a large proportion draws on Anderson et al.'s (1990, 1560) definition of the term, which emphasises that CA involves both the *what* ('acceptable food') and the *how* ('socially acceptable ways') of eating. Both are accordingly prominent across the five key dimensions within this theme. Two dimensions relate more to personal factors (ability to choose, psychosocial impacts), and three to more social factors ('normal' acquisition and preparation, gendered norms, social participation). We discuss each in turn.

The first dimension emphasizes that people's (in)ability to *choose* the food they eat is of central relevance to CA (e.g. Campbell 1991). Greater freedom of choice in food acquisition enhances appropriateness, for example in Australian people's preference for supermarket-style food aid rather than food parcels (Booth et al. 2018; see also Arduin and Saïdi-Kabeche 2022). Similarly, North American studies indicate how CA is impeded by lack of access to stores catering to ethnic minorities (Vahabi and Damba 2013; Joassart-Marcelli et al. 2017; Breger Bush 2021), and thus familiar and culturally-preferred foods (see Theme 4). A closely related finding within this dimension is that food people are obliged to eat–typically due to challenging circumstances–is often culturally inappropriate in various ways. It may be of insufficient quality or quantity, such as people receiving large amounts of unhealthy or culinarily incompatible products from a food bank (Neter et al. 2020; see also Beacom et al. 2020), or insufficiently diverse and monotonous (Neter et al. 2020; Arduin and Saïdi-Kabeche 2022). It may also be unfamiliar and thus difficult to prepare and cook (Vahabi and Damba 2013; see also Micheelsen et al. 2014).

The second dimension emphasizes the psychosocial impacts of culturally inappropriate food acquisition. Agency is central, and diminished agency in food acquisition–particularly in Western consumer societies–negatively impacts CA (Campbell 1991; O'Connell et al. 2019). A prominent example of this is how reliance on food aid or unorthodox methods of food acquisition (e.g. obtaining food from bins) jeopardise people's dignity (Arduin and Saïdi-Kabeche 2022; Watson et al. 2022), leading to feelings of shame, stigma and embarrassment (Lentz and Barrett 2013; Vahabi and Damba 2013; Snelling et al. 2014; Tobin et al. 2016; Neter et al. 2020; Tims et al. 2021), or a feeling of "failure to meet personal expectations of self-sufficiency" (Quandt et al. 2001, 372).

The third dimension associates CA with the ability to acquire food in 'normal' ways, i.e. typical in a given social context. This includes conventional sites of food acquisition, such as grocery stores and restaurants in the West (Campbell 1991), as well as food acquisition strategies. In the West this typically involves buying food in a capitalist market exchange, rather than–for example–foraging (Schunko and Brandner 2022). For example, a food aid scheme in Australia where people could eat subsidised

meals at local cafes and restaurants (Doljanin and Olaris 2004) was experienced as more CA than food banks in the Netherlands (Neter et al. 2020). However, the relative 'normalcy' of food acquisition strategies is complex, operating as a kind of continuum. For example, Watson et al. (2022) contrast 'orthodox'–i.e. socially acceptable–means of food acquisition for food insecure people (such as sharing food with or borrowing money from friends and family), with 'unorthodox', less acceptable strategies, such as begging, stealing, or exchanging sex for food or money to buy food (see also Hamelin et al. 1999). As with Themes 4 and 5 above, the relationship between (un)orthodox acquisition practices and CA is dynamic. For example, while obtaining food from bins ('dumpster diving') is used as a coping strategy (Watson et al. 2022), it may also become regarded as more acceptable (Eikenberry and Smith 2005; cf. Lehtonen and Pyyhtinen 2021). Similarly, the (in)appropriateness of food acquisition practices is also culturally relative: what is unacceptable in Bangladesh, for example, may not be in the US (Coates et al. 2006). Indeed, even in the same town, different ethnic and age groups may regard different forms of food aid as socially acceptable (Martin et al. 2003). This differentiation also extends into research. While Campbell (1991, 409) considers "conventional food sources" (in the West) to include government food aid alongside grocery stores and restaurants, Mares (2013) suggests that food aid itself is a fundamentally inappropriate way of making sure people have adequate food (see also Hamelin et al. 1999).

The fourth dimension of CA food acquisition relates to gendered norms around how food is obtained. Mares (2013), for example, shows how food aid for Latinx migrants to the US are more CA for men than for women, due to "gendered expectations about how men and women should interact with food and the social networks that are built and sustained in these kinds of public spaces" (2013, 11). Gendered differences in CA were also observed in Libya (Sehib et al. 2013), where norms around the inappropriateness of traditional markets for women are associated with the growth of supermarkets, which provide an alternative, female-friendly space.

The fifth dimension emphasises that CA food consumption allows for social participation, such as providing a meal for family or friends that accords with aforementioned norms about what, how, when and where things should be eaten (Healy 2019; O'Connell et al. 2019; Beacom et al. 2020). For example, a Dutch food aid recipient regretted being unable to serve a 'proper meal' to her visiting son (Neter et al. 2020, 1652). Forms of food aid resembling 'conventional' food practices (see above) may allow for greater social participation and thus be more CA (Doljanin and Olaris 2004; Lindberg et al. 2019).

Discussion: Cultural appropriateness, conceptualisations of change, and sustainable food system transformation

Having identified six key themes in how CA is conceptualised in relation to food consumption we now critically reflect on our findings, exploring the implications of our analysis for sustainable food system transformation. This section builds on the foregoing discussion of what CA *is*, in the sense of charting its conceptual variability, to ask what CA *does*, in the sense that different ways of conceptualising CA entail different scientific, practical and political effects. In this vein we draw on the idea that theories and concepts are performative artefacts (Larsen 2020) that shape rather than reflect reality (Callon 1998). We examine how the six themes (implicitly) conceptualise *change* in relation to CA (cf. Fuchs et al. 2016), as change is fundamental to societal transformation. Rather than exploring general ideas of how dietary change works, however, we consider specifically how CA itself might change, or–perhaps more importantly–might be *maintained* in the face of changing food practices (e.g. following migration). We also consider who or what drives such change, and thus bears responsibility either for changing CA in food consumption or for maintaining CA as food consumption changes (cf. Díaz-Méndez and Lozano-Cabedo 2020).

Across the six themes, we identified two distinct perspectives on change (see Table 3). Below we explain how each perspective views CA in relation to food consumption. We examine the implications of these perspectives for efforts to understand and accelerate sustainable food system transformation.

Perspective 1: Cultural appropriateness as static, a problem to be solved

In the first perspective, CA is seen as relatively static, and a problem to be solved. This perspective includes Theme 1, in which culturally appropriate foods conform with existing dietary practices; Theme 2, in which CA food provides a satisfactory substitute for a conventional equivalent; and Theme 3, in which CA is the acceptability of food to individuals.

All three themes view CA as a relatively intractable constraint hindering transition from a current (undesirable) state of affairs, where diets are suboptimal in one or more ways–e.g. nutritionally inadequate, environmentally damaging–to a future (desirable) state of affairs, where diets are optimally reconfigured (e.g. healthy, sustainable, affordable). The implicit assumption is that CA is unlikely to change (or cannot change), requiring food system

transformation efforts to work around this constraint: for example, through policy development and dietary guidelines (Theme 1), formulation of new foods (Theme 2), or convincing consumers to adopt new foods (Theme 3). However, while CA is viewed as a rather static phenomenon across all three themes, the extent of its immutability varies. Theme 2 is highly static: its focus on developing 'improved' foods that can easily substitute existing ones implies that current diets cannot change. Themes 1 and 3 are less static, implying dietary changeability through guidelines, product design, and information provision: however, current diets and implied consumer conservatism ultimately remain benchmarks for determining appropriateness.

Within this perspective, consumers are accorded a relatively diminished role, whereas other food system actors are (implicitly or explicitly) framed as responsible for maintaining CA during dietary change. These include policymakers and dieticians (Theme 1), food producers and scientists (Theme 2), and a set of unnamed information-providers (Theme 3). As such this perspective might be termed 'top-down', because responsibility for ensuring CA is imputed to actors associated with the 'supply-side' of food and its governance. Consumers themselves are framed as both a beneficiary of, and a hindrance to, such top-down efforts to ensure the CA of changing foodways.

Consequently, this perspective has particular implications for sustainable food system transformation, opening up certain analytic and practical possibilities and foreclosing others. For example, its prominent focus on individual food products generates insight into potential supply-side changes that could aid sustainability. This focus, however, may overlook the food practices into which new (or modified) products must 'fit', obscuring how consumers negotiate such products into established diets (cf. House 2019). Nevertheless, simplification can also be generative. It enables the development of concrete solutions, for example, such as foods that people may be more likely to want to eat.

This perspective also has implications for the levers or mechanisms available to steer sustainable food system transformation. Given that most research in this vein derives from the individually-focused social sciences, the apparent lack of emphasis on consumer responsibility in food system transformation may seem paradoxical. Consumers are accounted for, however: they are crucial for the success of such transformations, but are not assigned primary responsibility. Consequently, mechanisms for engendering sustainability transformations–such as product development and information campaigns –focus on targeted interventions to steer consumers into making better choices. CA, from this perspective, needs to be ensured by broader food system actors during societal transformation. To be clear, this view of food system governance is not inherently 'good' or 'bad'. However, we emphasise that particular understandings of CA are inextricably bound up with broader understandings of how societal change works and who is responsible.

Relatedly, one might argue that Perspective 1 is relatively politically conservative, as it typically accepts and works with the current state of affairs rather than against it. Researchers focus on solutions–such as developing new foods–that aim to ensure CA without significantly reconfiguring social, economic or political relations (contra Perspective 2). Again, this is not 'good' or 'bad': whether this orientation is appropriate depends on a researcher's objectives. Small steps towards achieving sustainability within the current food system (e.g. fortified yoghurt) are arguably more worthwhile than a focus on more far-reaching systemic change (e.g. universal basic income). As above, we simply emphasise here that an apparently innocuous term like 'cultural appropriateness' has substantial scientific and practical implications.

Perspective 2: Cultural appropriateness as dynamic and negotiated

The second perspective views CA as a dynamic and negotiated process. This includes Theme 4, where CA is alignment of food practices with people's preferences; Theme 5, where CA is shaped by eating context; and Theme 6, where CA is shaped by the context of food acquisition and preparation.

These themes all view CA as simultaneously shaping food consumption and being fundamentally mutable. They differ, however, in focusing on varying manifestations of this phenomenon: people's preferences (Theme 4) or the social context of consumption (Theme 5) and acquisition/preparation (Theme 6). Each theme views CA as a dialectic process: both a determining force on food consumption and something that demonstrably changes over space and time. Despite differences in emphasis regarding how malleable CA is, however, this perspective is nevertheless distinct from Perspective 1, where CA is viewed more as an obstacle to be overcome.

Perspective 2 emphasises consumer agency and creativity in maintaining CA during dietary change. It highlights, for example, the various strategies people employ to ensure the CA of food consumption despite the turbulence of migration, poverty, or illness. The responsibilities of other food system actors, such as policymakers, are not ignored: indeed, the focus of these literatures is often on enhancing inclusivity and effectiveness of public aid schemes, in which responsibility for effective food system governance is frequently ascribed to broader food system actors. But the greater emphasis on consumer agency here than in Perspective 1 shows a greater alignment with more 'bottom-up' approaches to change, in that consumers play a significant

role in ensuring the CA of changing foodways, or of shaping CA itself.

Perspective 2 has distinct implications for sustainable food system transformation. While it emphasises consumer agency–for example, in highlighting the creativity and resilience of people's foodways in straitened circumstances–it is more ambivalent than Perspective 1 about the locus of responsibility for sustainability transformations. Here consumers are accorded a relatively larger share of responsibility for maintaining CA (e.g. creatively integrating unfamiliar foods into familiar or preferred dishes), implying a more 'bottom up' view of sustainable food system governance. As in Perspective 1 this seems paradoxical, because Perspective 2 contains a much larger proportion of work from less individually-focused disciplines (e.g. sociology, geography). This appears, however, to be an expression of the prevailing political tendencies in this work (see below), in which the agency of marginalised groups is recognized and celebrated. Responsibility for food system transformation is ascribed here, as above, to broader food system actors such as policymakers (e.g. reforming food aid, ensuring culturally-preferred foods are available). It is just that consumer agency in maintaining and dynamically shaping CA is also emphasised. So while consumers may not bear ultimate responsibility for maintaining CA in sustainable food system transformations, their role is framed more as something to work with, rather than to overcome.

Whether this approach is 'good' or 'bad', as we suggest above, depends on what researchers hope to achieve. We note, however, that conceptualising CA as dynamic and negotiated may raise difficulties for those wishing to intervene in the food system. It is one thing to emphasise consumer agency, but is it possible, or right, to suggest that consumers have the ultimate power to engender or inhibit food system transformation? In a similar vein, conceptual richness and theoretical complexity may lead to inertia or impotence: if things are so complex, what can we possibly do, other than provide retrospective critique? Where can we intervene–and can we intervene at all? There is arguably a trade-off between theoretical sophistication and practical operationalizability.

In any case, such decisions are unavoidably political. Perspective 2 arguably implies more far-reaching political change than Perspective 1, in that it often advocates more substantial food system reforms to achieve CA (e.g. overhaul of food aid). This does not make it 'right' or 'wrong'. It is however illustrative of the divergent scientific and practical effects generated by different political orientations to food system research, which the often vaguely-defined term 'CA' may obscure.

Having examined both perspectives on CA, we argue that they are both potentially valuable: one is not 'better' than the other. Both, as we have shown, enable or constrain different sets of scientific and societal objectives, bringing particular challenges and opportunities for understanding and accelerating sustainable food system transformation. While we do not wish to adjudicate between these perspectives, we do however wish to emphasise that researchers should be *explicit* about their commitment to a particular understanding of CA, because–as we show above–this has 'downstream' implications for scientific and societal applications of their work.

Conclusion

This paper identified six main themes in how CA is conceptualised in relation to food consumption. We then critically examined these themes, considering their implications for sustainable food system transition. To do so we examined the implicit conceptualisations of change present in the themes, identifying two distinct perspectives on CA. Perspective 1 views CA as relatively static and a problem to be solved, whereas Perspective 2 views CA as a more dynamic, negotiated phenomenon. Both perspectives, we suggested, entail different scientific, practical and political effects, offering particular affordances for understanding and governing sustainable food system transformation. Whereas Perspective 1 focuses on specific, concrete steps, Perspective 2 tends towards more holistic accounts of why food consumption is or is not appropriate. The difference between these perspectives does not make one 'better' than the other. While the understanding of human activity in Perspective 1 could be viewed as less sophisticated than in Perspective 2, for example, Perspective 1 arguably provides a much clearer basis for designing successful food system interventions. There is likely to be a trade-off, we suggest, between theoretical sophistication and practical operationalizability. Such trade-offs are inevitable in the development and application of concepts: they do not render the term useless. However, it is important that the variability of CA is recognised and addressed in future uses of the concept, if only in the sense that researchers, policymakers or practitioners should be clear about what exactly they mean when they use it.

Given the clear need to define CA despite its complexity, we propose a tentative basic definition that we hope will offer a useful starting point for future researchers and practitioners. We define CA as follows:

> Cultural appropriateness is the qualification of particular foods as appropriate to eat, in a particular manner, in a particular context. It is a relational phenomenon, arising through interaction between the embodied, enculturated dispositions of the eater(s) themselves and the socio-material context of consumption (includ-

ing socially-shared standards of normal or suitable conduct, available foodstuffs, and other social actors).

In relation to this basic definition, three key aspects of cultural appropriateness are important to highlight.

First, CA is both stable and dynamic. It is both a conservative force–as food consumers, we won't just eat anything–and a dynamic phenomenon, in that the bounds of CA demonstrably shift over time (e.g. Mucioki et al. 2018). This duality resonates with sociological theorisations of how social life is both essentially provisional, being enacted anew every day, while also being relatively stable, routinised and habitual (e.g. Shove et al. 2012). CA can and does change, but this is likely to be an incremental process.

Second, agency in the achievement of CA is distributed: no single actor is responsible. The two perspectives on CA we identified emphasised the agency of consumers, producers or other food system actors to different extents, relating to the perspectives' different practical and analytic objectives. Clearly, however, actors across the entire food system–including consumers–have some degree of agency in the establishment, maintenance and change of CA (cf. House 2018). The question of who has more or less power in this process, and how such changes work, is an empirical one.

Third, CA is more than just food. Previous research emphasises how CA encompasses diverse aspects such as food production, human rights and decision-making power within the food system (Hammelman and Hayes-Conroy 2015). Building on this, our analysis shows that even within the sphere of consumption alone there are a wide range of factors that shape whether or not CA is achieved. CA is not simply a property of what is eaten, but also where, when, how, with whom and why.

A final point, relating to the above discussion, is worth reiterating: CA is not an inherent property of foods. Its apparent stability is a property of recurrence in eating practices, from people generally eating in similar ways over time. While this stability makes it possible to talk about particular foods as 'being' culturally appropriate (e.g. 'pasta is appropriate for Italian people') in cookbooks, research articles or policy documents, such assertions are ultimately heuristic rather than ontological. Pasta was not 'appropriate' for Italian people, for example, in the centuries before it was recognised as a category of food (Serventi and Sabban 2002). Cultural appropriateness, while 'sticky', is ultimately mutable. However, this does not make it easy to deliberately change.

This point has particular implications for sustainable food system transformation. Although current sustainability challenges may contribute to unsustainable food consumption becoming culturally inappropriate (e.g. van der Horst et al. 2023), for example, this is not an automatic process. Indeed, the CA of proposed shifts in food consumption is a contested issue, as demonstrated by public resistance to meat reduction initiatives (Michielsen and van der Horst 2022) or 'alternative proteins' such as insects (Berenbaum 2023). More abstract dietary propositions such as the EAT Lancet guidelines (Willett et al. 2019) also face challenges around CA, which are particularly evident when applied in practice (Wang et al. 2022). Researchers and practitioners should bear in mind that, when engaging in debates around sustainable food, the issue of CA–and the political implications of attempting to change its boundaries–will never be far away.

Despite the slipperiness and complexity of CA as a concept, it is nevertheless important to be clear about how the term is understood and operationalised. While CA has been frequently invoked in a range of research literatures to date, it generally remains undefined. This makes it difficult to understand, in many cases, what is actually being researched. But it also has more far-reaching implications, for example in relation to sustainable food system transformation. It is clear that sustainable food consumption will–among other things–need to be culturally appropriate too. But work in the area would provide more solid grounds for meaningful change if the question of what exactly CA *is* could be addressed head-on in the design and framing of research. This is particularly the case, we suggest, in relation to the transdisciplinary collaborations necessary to effectively address the 'wicked problem' of food system sustainability.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s10460-023-10515-6.

Acknowledgements We are grateful to two anonymous reviewers for their helpful comments on an earlier draft of this paper.

Funding This work was supported by funding from the Dutch Research Council (NWO) on the National Research Agenda (NWA) project 'Transition to a sustainable food system'.

Declarations

Conflict of interest All authors declare that they have no conflicts of interest.

References

Adams, Charlie R., Linda C. Hoover, Dennis B. Arnett, and Leslie D. Thompson. 2000. Social acceptability's role in an expanded rational expectations model of intention to consume an innovative meat product in a restaurant setting. *Journal of Hospitality & Tourism Research* 24: 252–262. https://doi.org/10.1177/109634800002400208.

Adeyeye, S.A.O., T. Bolaji Olushola, T.A. Abegunde, A.O. Adebayo-Oyetoro, H.K. Tiamiyu, and F. Idowu-Adebayo. 2020. Evaluation of nutritional composition, physico-chemical and sensory properties of 'Robo' (a Nigerian traditional snack) produced from watermelon (Citrullus lanatus (Thunb.) seeds. *Food Research* 4: 216–223. https://doi.org/10.26656/fr.2017.4(1).230.

Alemu, Robel. 2022. The race towards more sustainable food systems. *Nature Food* 3: 679–680.

Anders, Sven, Wallace Cowling, Ashwani Pareek, Kapuganti Jagadis Gupta, Sneh L. Singla-Pareek, and Christine H. Foyer. 2021. Gaining acceptance of novel plant breeding technologies. *Trends in Plant Science* 26: 575–587. https://doi.org/10.1016/j.tplants.2021.03.004.

Anderson, Sue Ann. 1990. Core indicators of nutritional state for difficult-to-sample populations. *The Journal of Nutrition* 120: 1555–1600. https://doi.org/10.1093/jn/120.suppl_11.1555.

Araki, Motoko, and Tetsuya Ishii. 2015. Towards social acceptance of plant breeding by genome editing. *Trends in Plant Science* 20: 145–149. https://doi.org/10.1016/j.tplants.2015.01.010.

Arduin, Pierre-Emmanuel., and Doudja Saïdi-Kabeche. 2022. Dignity in food aid logistics is also a knowledge management and digital matter: Three inspiring initiatives in France. *Sustainability* 14: 1130. https://doi.org/10.3390/su14031130.

Aril-dela Cruz, J.V., M.E. Bungihan, T.E.E. Cruz, and R.S. Sagum. 2017. Canarium ovatum Engl. (Pili) exocarp crude extract as functional food colorant incorporated in yogurt developed product. *Food Research* 2: 89–98. https://doi.org/10.26656/fr.2017.2(1).173.

Balmori, V.L., E.I. Dizon, A.S.A. Barrion, and F.B. Elegado. 2018. Effect of adjunct inoculation of Lactobacillus plantarum BS and Pediococcus acidilactici 3G3 on the microbiological, physicochemical and sensory properties of fermented carabeef (pindang damulag). *Food Research* 3: 70–78. https://doi.org/10.26656/fr.2017.3(1).221.

Barcena, Mark Spencer K., Anna Teresa O. Orillo, Clarissa B. Juanico, and Arvin Paul P. Tuaño. 2021. Acculturation-related factors of dietary pattern changes among indigenous adolescents in Mt. Arayat, Philippines. *Jurnal Gizi Dan Pangan* 16: 21–30.

Bartkiene, Elena, Vadims Bartkevics, Iveta Pugajeva, Anastasija Borisova, Egle Zokaityte, Vita Lele, Vytaute Starkute, et al. 2021. The quality of wheat bread with ultrasonicated and fermented by-products from plant drinks production. *Frontiers in Microbiology* 12: 652548. https://doi.org/10.3389/fmicb.2021.652548.

Beacom, Emma, Sinéad Furey, Lynsey Elizabeth Hollywood, and Paul Humphreys. 2020. Stakeholder-informed considerations for a food poverty definition. *British Food Journal* 123: 441–454. https://doi.org/10.1108/BFJ-03-2020-0237.

Belon, Ana Paula, Laura M. Nieuwendyk, Helen Vallianatos, and Candace I.J.. Nykiforuk. 2016. Perceived community environmental influences on eating behaviors: A photovoice analysis. *Social Science & Medicine* 171: 18–29. https://doi.org/10.1016/j.socscimed.2016.11.004.

Béné, Christophe, Peter Oosterveer, Lea Lamotte, Inge D. Brouwer, Stef de Haan, Steve D. Prager, Elise F. Talsma, and Colin K. Khoury. 2019. When food systems meet sustainability–current narratives and implications for actions. *World Development* 113: 116–130.

Berenbaum, May R. 2023. "Debugging" insect-related conspiracy theories. *Annals of the Entomological Society of America* 116: 239–240. https://doi.org/10.1093/aesa/saad018.

Berkowitz, Seth A., Naysha N. Shahid, Jean Terranova, Barbara Steiner, Melanie P. Ruazol, Roshni Singh, Linda M. Delahanty, and Deborah J. Wexler. 2020. "I was able to eat what I am supposed to eat"– patient reflections on a medically-tailored meal intervention: A qualitative analysis. *BMC Endocrine Disorders* 20: 10. https://doi.org/10.1186/s12902-020-0491-z.

Bimbo, Francesco, Alessandro Bonanno, Giuseppe Nocella, Rosaria Viscecchia, Gianluca Nardone, Biagia De Devitiis, and Domenico Carlucci. 2017. Consumers' acceptance and preferences for nutrition-modified and functional dairy products: A systematic review. *Appetite* 113: 141–154. https://doi.org/10.1016/j.appet.2017.02.031.

Blay-Palmer, Alison, Roberta Sonnino, and Julien Custot. 2016. A food politics of the possible? Growing sustainable food systems through networks of knowledge. *Agriculture and Human Values* 33: 27–43.

Booth, Sue, Christina Pollard, John Coveney, and Ian Goodwin-Smith. 2018. 'Sustainable' rather than 'subsistence' food assistance solutions to food insecurity: South Australian recipients' perspectives on traditional and social enterprise models. *International Journal of Environmental Research and Public Health* 15: 2086. https://doi.org/10.3390/ijerph15102086.

Breger Bush, Sasha. 2021. Food deserts and supermarket culture in Denver, Colorado. *Journal of Economic Issues* 55: 697–716. https://doi.org/10.1080/00213624.2021.1945888.

Broekema, Roline, Marcelo Tyszler, Pieter van't Veer, Frans J. Kok, Agnès Martin, Anne Lluch, and Hans T J. Blonk. 2020. Future-proof and sustainable healthy diets based on current eating patterns in the Netherlands. *The American Journal of Clinical Nutrition* 112: 1338–1347. https://doi.org/10.1093/ajcn/nqaa217.

Brown, J., L. Fatehi, and J. Kuzma. 2015. Altruism and skepticism in public attitudes toward food nanotechnologies. *Journal of Nanoparticle Research* 17: 122. https://doi.org/10.1007/s11051-015-2926-4.

Burlingame, Barbara, and Sandro Dernini, eds. 2012. *Sustainable diets and biodiversity: Directions and solutions for policy, research and action*. Rome: Food and Agriculture Organization of the United Nations (FAO).

Busse, Maria, Maria Lee Kernecker, Jana Zscheischler, Felix Zoll, and Rosemarie Siebert. 2019. Ethical concerns in poultry production: A German consumer survey about dual purpose chickens. *Journal of Agricultural and Environmental Ethics* 32: 905–925.

Byun, Myung-Woo., Oh. Sang-Hee, Jae-Hun. Kim, Yohan Yoon, Seong-Cheol. Park, Hak-Soo. Kim, Soon-Bok. Kim, Sang-Bae. Han, and Ju-Woon. Lee. 2009. Information channel effects on women intention to purchase irradiated food in Korea. *Radiation Physics and Chemistry* 78: 675–677. https://doi.org/10.1016/j.radphyschem.2009.03.018.

Callon, Michel. 1998. Introduction: The embeddedness of economic markets in economics. *The Sociological Review* 46(1_suppl): 1–57. https://doi.org/10.1111/j.1467-954X.1998.tb03468.x.

Campbell, Cathy C. 1991. Food insecurity: A nutritional outcome or a predictor variable? *The Journal of Nutrition* 121: 408–415. https://doi.org/10.1093/jn/121.3.408.

Candel, Jeroen J. L. 2014. Food security governance: A systematic literature review. *Food Security* 6: 585–601.

Capper, J.L. 2017. Looking forward to a sustainable future—how do livestock productivity, health, efficiency and consumer perceptions interact? *Cattle Practice* 25: 179–193.

Chaudhary, Abhishek, and Vaibhav Krishna. 2019. Country-specific sustainable diets using optimization algorithm. *Environmental Science & Technology* 53: 7694–7703. https://doi.org/10.1021/acs.est.8b06923.

Chaudhary, Abhishek, and Vaibhav Krishna. 2021. Region-specific nutritious, environmentally friendly, and affordable diets in India. *One Earth* 4: 531–544. https://doi.org/10.1016/j.oneear.2021.03.006.

Chee, Jiun Yee, Manoj Lakshmanan, Iffa Farahin Jeepery, Nabila Husna Mohamad. Hairudin, and Kumar Sudesh. 2019. The potential application of Cupriavidus necator as polyhydroxyalkanoates producer and single cell protein: A review on scientific, cultural and religious perspectives. *Applied Food Biotechnology* 6: 19–34.

Chen, Lu., Donovan Guttieres, Andrea Koenigsberg, Paul W. Barone, Anthony J. Sinskey, and Stacy L. Springs. 2022. Large-scale cultured meat production: Trends, challenges and promising biomanufacturing technologies. *Biomaterials* 280: 121274. https://doi.org/10.1016/j.biomaterials.2021.121274.

Coates, Jennifer, Edward A. Frongillo, Beatrice Lorge Rogers, Patrick Webb, Parke E. Wilde, and Robert Houser. 2006. Commonalities in the experience of household food insecurity across cultures: What are measures missing? *The Journal of Nutrition* 136: 1438S-1448S.

Cruz, Margarita Paloma, Patrícia Muniz. Medeiros, Iván. Sarmiento-Combariza, Nivaldo Peroni, and Ulysses Paulino Albuquerque. 2014. "I eat the manofê so it is not forgotten": Local perceptions and consumption of native wild edible plants from seasonal dry forests in Brazil. *Journal of Ethnobiology and Ethnomedicine* 10: 45. https://doi.org/10.1186/1746-4269-10-45.

de Kok, Brenda, Katie Moore, Leslie Jones, Katrien Vanslambrouck, Laeticia Celine Toe, Moctar Ouédraogo, Rasmané Ganaba, et al. 2021. Home consumption of two fortified balanced energy protein supplements by pregnant women in Burkina Faso. *Maternal & Child Nutrition*. https://doi.org/10.1111/mcn.13134.

Deng, Feiyue, and Catherine B. Chan. 2019. Defining modifiable barriers to uptake of dietary recommendations in Chinese immigrants with type 2 diabetes: A qualitative study. *FACETS* 4: 551–565. https://doi.org/10.1139/facets-2019-0001.

Deng, Feiyue, Anran Zhang, and Catherine B. Chan. 2013. Acculturation, dietary acceptability, and diabetes management among Chinese in North America. *Frontiers in Endocrinology*. https://doi.org/10.3389/fendo.2013.00108.

Díaz-Méndez, Cecilia, and Carmen Lozano-Cabedo. 2020. Food governance and healthy diet an analysis of the conflicting relationships among the actors of the agri-food system. *Trends in Food Science & Technology* 105: 449–453. https://doi.org/10.1016/j.tifs.2019.08.025.

Diekmann, Lucy O., Leslie C. Gray, and Gregory A. Baker. 2020. Growing 'good food': Urban gardens, culturally acceptable produce and food security. *Renewable Agriculture and Food Systems* 35: 169–181. https://doi.org/10.1017/S1742170518000388.

Doljanin, Katrina, and Kristine Olaris. 2004. Subsidised Café Meals Program: More than just "a cheap meal." *Australian Journal of Primary Health* 10: 54. https://doi.org/10.1071/PY04047.

Eikenberry, Nicole, and Chery Smith. 2005. Attitudes, beliefs, and prevalence of dumpster diving as a means to obtain food by Midwestern, low-income, urban dwellers. *Agriculture and Human Values* 22: 187–202. https://doi.org/10.1007/s10460-004-8278-9.

Emma, McMahon, Rozlynne Clarke, Rachael Jaenke, and Julie Brimblecombe. 2016. Detection of 12.5% and 25% salt reduction in bread in a remote indigenous Australian community. *Nutrients* 8: 169. https://doi.org/10.3390/nu8030169.

Englberger, Lois, William Aalbersberg, Praveen Ravi, Evelyn Bonnin, Geoffrey C. Marks, Maureen H. Fitzgerald, and Jane Elymore. 2003. Further analyses on Micronesian banana, taro, breadfruit and other foods for provitamin A carotenoids and minerals. *Journal of Food Composition and Analysis* 16: 219–236. https://doi.org/10.1016/S0889-1575(02)00171-0.

Faksová, Kristyna, Zuzana Derflerová Brázdová, Aileen Robertson, and Alexandr Parlesak. 2019. Nutritionally adequate food baskets optimised for cultural acceptability as basis for dietary guidelines for low-income Czech families. *Nutrition Journal* 18: 84. https://doi.org/10.1186/s12937-019-0510-y.

Fan, Ziyao, Mu. Yulian, Tad Sonstegard, Xiaomei Zhai, Kui Li, Perry B. Hackett, and Zuoyan Zhu. 2021. Social acceptance for commercialization of genetically modified food animals. *National Science Review* 8: nwab067. https://doi.org/10.1093/nsr/nwab067.

Fischer, Arnout R.H., and Ellen J. Van Loo. 2021. Social acceptability of radical food innovations. In *Food Technology Disruptions*, ed. C.M. Galanakis, 325–361. Elsevier. https://doi.org/10.1016/B978-0-12-821470-1.00002-1.

Florack, Arnd, Johanna Palcu, and Malte Friese. 2013. The moderating role of regulatory focus on the social modeling of food intake. *Appetite* 69: 114–122. https://doi.org/10.1016/j.appet.2013.05.012.

Ford, Valerie L., and Mary B. Harris. 1988. Planning a nutrition curriculum: Assessing availability, affordability, and cultural appropriateness of recommended foods. *Health Education* 19: 26–30. https://doi.org/10.1080/00970050.1988.10614533.

Fuchs, Doris, Antonietta Di Giulio, Katharina Glaab, Sylvia Lorek, Michael Maniates, Thomas Princen, and Inge Røpke. 2016. Power: the missing element in sustainable consumption and absolute reductions research and action. *Journal of Cleaner Production* 132: 298–307.

Gasco, Laura, Sihem Dabbou, Francesco Gai, Alberto Brugiapaglia, Achille Schiavone, Marco Birolo, Gerolamo Xiccato, and Angela Trocino. 2019. Quality and consumer acceptance of meat from rabbits fed diets in which soybean oil is replaced with black soldier fly and yellow mealworm fats. *Animals* 9: 629. https://doi.org/10.3390/ani9090629.

Gazan, Rozenn, Tangui Barré, Marlène Perignon, Matthieu Maillot, Nicole Darmon, and Florent Vieux. 2018a. A methodology to compile food metrics related to diet sustainability into a single food database: Application to the French case. *Food Chemistry* 238: 125–133. https://doi.org/10.1016/j.foodchem.2016.11.083.

Gazan, Rozenn, Chloé MC. Brouzes, Florent Vieux, Matthieu Maillot, Anne Lluch, and Nicole Darmon. 2018b. Mathematical optimization to explore tomorrow's sustainable diets: A narrative review. *Advances in Nutrition* 9: 602–616.

Gjerris, Mickey, Christian Gamborg, and Helena Röcklinsberg. 2016. Ethical aspects of insect production for food and feed. *Journal of Insects as Food and Feed* 2: 101–110.

Govender, Laurencia, Kirthee Pillay, Muthulisi Siwela, Albert Thembinkosi Modi, and Tafadzwanashe Mabhaudhi. 2019. Consumer perceptions and acceptability of traditional dishes prepared with provitamin A-biofortified maize and sweet potato. *Nutrients* 11: 1577. https://doi.org/10.3390/nu11071577.

Gurmu, Abdi Bekele, Esa-Pekka A. Nykänen, Fikadu Reta Alemayehu, Aileen Robertson, and Alexandr Parlesak. 2019. Cost-minimized nutritionally adequate food baskets as basis for culturally adapted dietary guidelines for Ethiopians. *Nutrients* 11: 2159. https://doi.org/10.3390/nu11092159.

Haggan, Nigel, T.J. Cameron Ainsworth, and Pitcher, and J. J. Heymans. 2007. Life in the fast food chain: Où sont les poissons d'antan? In *Resetting the kitchen table: Food security, culture, health and resilience in coastal communities*, ed. C.C. Parrish, N.J. Turner, and S.M. Solberg, 51–74. New York: Nova Science Publishers.

Hamelin, Anne-Marie., Jean-Pierre. Habicht, and Micheline Beaudry. 1999. Food insecurity: Consequences for the household and broader social implications. *The Journal of Nutrition* 129: 525S-528S. https://doi.org/10.1093/jn/129.2.525S.

Hammelman, Colleen, and Allison Hayes-Conroy. 2015. Understanding cultural acceptability for urban food policy. *Journal of Planning Literature* 30: 37–48. https://doi.org/10.1177/0885412214555433.

Hartmann, Christina, Jing Shi, Alice Giusto, and Michael Siegrist. 2015. The psychology of eating insects: A cross-cultural comparison between Germany and China. *Food Quality and Preference* 44: 148–156.

Hayes-Conroy, Allison, and Elizabeth L. Sweet. 2015. Whose adequacy? (Re)imagining food security with displaced women in Medellín, Colombia. *Agriculture and Human Values* 32: 373–384. https://doi.org/10.1007/s10460-014-9546-y.

He, Xiaojia, Hua Deng, and Huey-min Hwang. 2019. The current application of nanotechnology in food and agriculture. *Journal of Food and Drug Analysis* 27: 1–21. https://doi.org/10.1016/j.jfda.2018.12.002.

Healy, Amy Erbe. 2019. Measuring food poverty in Ireland: The importance of including exclusion. *Irish Journal of Sociology* 27: 105–127. https://doi.org/10.1177/0791603519828313.

Heinke, Heise, and Ludwig Theuvsen. 2017. What do consumers think about farm animal welfare in modern agriculture? Attitudes and shopping behaviour. *International Food and Agribusiness Management Review* 20: 379–399. https://doi.org/10.22434/IFAMR2016.0115.

Herrero, Mario, Philip K. Thornton, Daniel Mason-D'Croz, Jeda Palmer, Tim G. Benton, Benjamin L.. Bodirsky, Jessica R. Bogard, et al. 2020. Innovation can accelerate the transition towards a sustainable food system. *Nature Food* 1: 266–272. https://doi.org/10.1038/s43016-020-0074-1.

Herrero, Mario, Marta Hugas, Uma Lele, Aman Wirakartakusumah, and Maximo Torero. 2023. A shift to healthy and sustainable consumption patterns. In *Science and innovations for food systems transformation*, ed. Joachim von Braun, Kaosar Afsana, Louise O. Fresco, and Mohamed Hag Ali. Hassan, 59–85. Cham: Springer. https://doi.org/10.1007/978-3-031-15703-5_5.

Higgs, Suzanne, and Jason Thomas. 2016. Social influences on eating. *Current Opinion in Behavioral Sciences* 9: 1–6. https://doi.org/10.1016/j.cobeha.2015.10.005.

Holm, Lotte. 1993. Cultural and social acceptability of a healthy diet. *European Journal of Clinical Nutrition* 47: 592–599.

Holm, Lotte, Anders Hoff, Lars Erichsen, Mette Møhl, Søren Toubro, and Arne Astrup. 2008. Social and cultural acceptability of fat reduced diets among Danish overweight subjects: High-protein versus high-carbohydrate diets. *Food Quality and Preference* 19: 43–50. https://doi.org/10.1016/j.foodqual.2007.06.001.

House, Jonas. 2018. Insects as food in the Netherlands: Production networks and the geographies of edibility. *Geoforum* 94: 82–93. https://doi.org/10.1016/j.geoforum.2018.05.011.

House, Jonas. 2019. Modes of eating and phased routinisation: Insect-based food practices in the Netherlands. *Sociology* 53: 451–467. https://doi.org/10.1177/0038038518797498.

Hurtada, W.A., A.S.A. Barrion, M.F.R. Nguyen-Orca, A.T.O. Orillo, R.L.J. Magpantay, G.D. Geronimo, and F.M. Rodriguez. 2020. Physicochemical properties, nutritional value, and sensory quality of cassava (Manihot esculenta Crantz) rice-like grains. *Food Research* 4: 1623–1629. https://doi.org/10.26656/fr.2017.4(5).082.

iPES FOOD. 2021. *A unifying framework for food systems transformation: a call for governments, private companies & civil society to adopt 13 key principles*. https://www.ipes-food.org/_img/upload/files/sfsENhq.pdf

Ishii, Tetsuya. 2017. Genome-edited livestock: Ethics and social acceptance. *Animal Frontiers* 7: 24–32. https://doi.org/10.2527/af.2017.0115.

Ishii, Tetsuya, and Motoko Araki. 2017. A future scenario of the global regulatory landscape regarding genome-edited crops. *GM Crops & Food* 8: 44–56. https://doi.org/10.1080/21645698.2016.1261787.

Ivanova, Diana, John Barrett, Dominik Wiedenhofer, Biljana Macura, Max Callaghan, and Felix Creutzig. 2020. Quantifying the potential for climate change mitigation of consumption options. *Environmental Research Letters* 15: 093001. https://doi.org/10.1088/1748-9326/ab8589.

Joassart-Marcelli, Pascale, Jaime S. Rossiter, and Fernando J. Bosco. 2017. Ethnic markets and community food security in an urban "food desert." *Environment and Planning A: Economy and Space* 49: 1642–1663. https://doi.org/10.1177/0308518X17700394.

Kavian, Foorough, Kaye Mehta, Eileen Willis, Lillian Mwanri, Paul Ward, and Sue Booth. 2020. Migration, stress and the challenges of accessing food: An exploratory study of the experience of recent Afghan women refugees in Adelaide, Australia. *International Journal of Environmental Research and Public Health* 17: 1379. https://doi.org/10.3390/ijerph17041379.

Kuhnlein, Harriet V. 2000. Finding food sources of vitamin A and provitamin A. *Food and Nutrition Bulletin* 21: 130–134. https://doi.org/10.1177/156482650002100204.

Kyeyune, Victoria, and Sarah Turner. 2016. Yielding to high yields? Critiquing food security definitions and policy implications for ethnic minority livelihoods in upland Vietnam. *Geoforum* 71: 33–43. https://doi.org/10.1016/j.geoforum.2016.03.001.

Larsen, Henrik. 2020. Normative power Europe or capability–expectations gap? The performativity of concepts in the study of European foreign policy. *JCMS Journal of Common Market Studies* 58: 962–977.

Lassoued, Rim, Stuart J. Smyth, Peter W. B. Phillips, and Hayley Hesseln. 2018. Regulatory uncertainty around new breeding techniques. *Frontiers in Plant Science* 9: 1291. https://doi.org/10.3389/fpls.2018.01291.

Lauk, Janne, Eha Nurk, Aileen Robertson, and Alexandr Parlesak. 2020. Culturally optimised nutritionally adequate food baskets for dietary guidelines for minimum wage Estonian families. *Nutrients* 12: 2613. https://doi.org/10.3390/nu12092613.

Lehtonen, Turo-Kimmo., and Olli Pyyhtinen. 2021. Living on the margins: dumpster diving for food as a critical practice. *Distinktion Journal of Social Theory* 22: 441–463.

Lentz, Erin C., and Christopher B. Barrett. 2013. The economics and nutritional impacts of food assistance policies and programs. *Food Policy* 42: 151–163. https://doi.org/10.1016/j.foodpol.2013.06.011.

Lindberg, Rebecca, Julia McCartan, Alexandra Stone, Ashleigh Gale, Alice Mika, Marina Nguyen, and Sue Kleve. 2019. The impact of social enterprise on food insecurity–an Australian case study. *Health & Social Care in the Community*. https://doi.org/10.1111/hsc.12737.

Loong, C.Y.L., and C.Y.H. Wong. 2018. Chinese steamed bread fortified with green banana flour. *Food Research* 2: 320–330. https://doi.org/10.26656/fr.2017.2(4).058.

Machado, Dourado Gomes, Tamires Alcântara, Maria Teresa Bertoldo. Pacheco, Rita Cássia Ramos Egypto. de do Queiroga, Letícia Medeiros. Cavalcante, Fabrícia França. Bezerril, Rita de Cássia, Salvucci Celeste Ormenese, Aline de Oliveira, Elizabeth Harumi Garcia, Maria Manuela Nabeshima, Estevez Pintado, Maria Elieidy Gomes, and de Oliveira. 2021. Nutritional, physicochemical and sensorial acceptance of functional cookies enriched with xiquexique (Pilosocereus gounellei) flour. *PLoS ONE* 16: e0255287. https://doi.org/10.1371/journal.pone.0255287.

Maillot, Matthieu, Nicole Darmon, and Adam Drewnowski. 2010. Are the lowest-cost healthful food plans culturally and socially acceptable? *Public Health Nutrition* 13: 1178–1185. https://doi.org/10.1017/S1368980009993028.

Maimanah-Faizah, I., M.R. Ismail-Fitry, M.R. Umi Hartina, and A. Rozzamri. 2020. Physicochemical and sensory properties of traditional baked cake (kuih baker) with coconut milk and soy milk. *Food Research* 4: 1435–1443. https://doi.org/10.26656/fr.2017.4(5).068.

Mäkelä, Johanna. 1991. Defining a meal. In *Palatable worlds*, ed. Elisabeth L. Fürst, Ritva Prättälä, Marianne Ekström, Lotte Holm, and Unni Kjærnes, 87–95. Solum: Skøyen.

Marcoux, Jean-Michel., Olga Carolina Cardenas. Gomez, and Lyne Létourneau. 2013. The inclusion of nonsafety criteria within the regulatory framework of agricultural biotechnology: Exploring factors that are likely to influence policy transfer: Agricultural biotechnology regulation and policy transfer. *Review of Policy Research* 30: 657–684. https://doi.org/10.1111/ropr.12053.

Mares, Teresa M. 2013. "Here we have the food bank": Latino/a immigration and the contradictions of emergency food. *Food and Foodways* 21: 1–21. https://doi.org/10.1080/07409710.2013.764783.

Martin, Katie S., John T. Cook, Beatrice L. Rogers, and Hugh M. Joseph. 2003. Public versus private food assistance: Barriers to participation differ by age and ethnicity. *Journal of Nutrition Education and Behavior* 35: 249–254. https://doi.org/10.1016/S1499-4046(06)60055-9.

Masset, Gabriel, Florent Vieux, Eric Olivier Verger, Louis-Georges. Soler, Djilali Touazi, and Nicole Darmon. 2014. Reducing energy intake and energy density for a sustainable diet: A study based on self-selected diets in French adults. *The American Journal of Clinical Nutrition* 99: 1460–1469. https://doi.org/10.3945/ajcn.113.077958.

McKay, Fiona H., and Matthew Dunn. 2015. Food security among asylum seekers in Melbourne. *Australian and New Zealand Journal of Public Health* 39: 344–349. https://doi.org/10.1111/1753-6405.12368.

Medagama, Arjuna, and Heshan Widanapathirana. 2015. A traditional Asian diet modified to meet nutritional requirements of diabetes, has anything changed? *A Cross-Sectional Dietary Survey. BMC Nutrition* 1: 8. https://doi.org/10.1186/s40795-015-0001-2.

Meel, B.L. 2013. Geophagia in Transkei region of South Africa: Case reports. *African Health Sciences* 12: 566–568. https://doi.org/10.4314/ahs.v12i4.27.

Melendrez-Ruiz, Juliana, Stéphanie. Chambaron, Quentin Buatois, Sandrine Monnery-Patris, and Gaëlle. Arvisenet. 2019. A central place for meat, but what about pulses? Studying French consumers' representations of main dish structure, using an indirect approach. *Food Research International* 123: 790–800. https://doi.org/10.1016/j.foodres.2019.06.004.

Micheelsen, Arun, Lotte Holm, and Katherine O'Doherty. Jensen. 2014. Living with the New Nordic Diet. *British Food Journal* 116: 1247–1258.

Michielsen, Yolie J.E., and Hilje M. van der Horst. 2022. Backlash against meat curtailment policies in online discourse: populism as a missing link. *Appetite* 171: 105931. https://doi.org/10.1016/j.appet.2022.105931.

Mishra, N., N.C. Hazarika, K. Narain, and J. Mahanta. 2003. Nutritive value of non-mulberry and mulberry silkworm pupae and consumption pattern in Assam, India. *Nutrition Research* 23: 1303–1311. https://doi.org/10.1016/S0271-5317(03)00132-5.

Moseley, B. 1999. The safety and social acceptance of novel foods. *International Journal of Food Microbiology* 50: 25–31. https://doi.org/10.1016/S0168-1605(99)00074-4.

Mucioki, Megan, Jennifer Sowerwine, and Daniel Sarna-Wojcicki. 2018. Thinking inside and outside the box: Local and national considerations of the Food Distribution Program on Indian Reservations (FDPIR). *Journal of Rural Studies* 57: 88–98. https://doi.org/10.1016/j.jrurstud.2017.11.002.

Nakhate, Pranav, and Yvonne van der Meer. 2021. A systematic review on seaweed functionality: A sustainable bio-based material. *Sustainability* 13: 6174. https://doi.org/10.3390/su13116174.

Neter, Judith E., S. Coosje Dijkstra, Mary Nicolaou, Marjolein Visser, and Ingeborg A. Brouwer. 2020. The role of food parcel use on dietary intake: Perception of Dutch food bank recipients - a focus group study. *Public Health Nutrition* 23: 1647–1656. https://doi.org/10.1017/S1368980019003823.

Nicolau-Nos, Roser, Josep Pujol-Andreu, and Ismael Hernández. 2010. Milk, social acceptance of a new food in Europe: Catalonia, 19th-20th centuries. *Dynamis* 30: 119–139. https://doi.org/10.4321/S0211-95362010000100005.

Nielsen, A., S. Korzen, and L. Holm. 2008. Inverting the food pyramid? *Appetite* 51: 178–186. https://doi.org/10.1016/j.appet.2008.02.011.

Ntila, Sithandiwe, Ashwell R. Ndhlala, Unathi Kolanisi, Hafiz Abdelgadir, and Muthulisi Siwela. 2019. Acceptability of a moringa-added complementary soft porridge to caregivers in Hammanskraal, Gauteng province and Lebowakgomo, Limpopo province, South Africa. *South African Journal of Clinical Nutrition* 32: 51–57. https://doi.org/10.1080/16070658.2018.1449377.

Nykänen, Esa-Pekka., Hanna Dunning, Richmond Aryeetey, Aileen Robertson, and Alexandr Parlesak. 2018. Nutritionally optimized, culturally acceptable, cost-minimized diets for low income Ghanaian families using linear programming. *Nutrients* 10: 461. https://doi.org/10.3390/nu10040461.

O'Connell, Rebecca, Charlie Owen, Matt Padley, Antonia Simon, and Julia Brannen. 2019. Which types of family are at risk of food poverty in the UK? A relative deprivation approach. *Social Policy and Society* 18: 1–18. https://doi.org/10.1017/S1474746418000015.

O'Connor, Niamh, Karim Farag, and Richard Baines. 2016. What is food poverty? A conceptual framework. *British Food Journal* 118: 429–449. https://doi.org/10.1108/BFJ-06-2015-0222.

Parlesak, Alexandr, Inge Tetens, Jørgen Dejgård. Jensen, Sinne Smed, Mojca Gabrijelčič Blenkuš, Mike Rayner, Nicole Darmon, and Aileen Robertson. 2016. Use of linear programming to develop cost-minimized nutritionally adequate health promoting food baskets. *PLoS ONE* 11: e0163411. https://doi.org/10.1371/journal.pone.0163411.

Perignon, Marlène, Gabriel Masset, Gaël. Ferrari, Tangui Barré, Florent Vieux, Matthieu Maillot, Marie-Josèphe. Amiot, and Nicole Darmon. 2016. How low can dietary greenhouse gas emissions be reduced without impairing nutritional adequacy, affordability and acceptability of the diet? A modelling study to guide sustainable food choices. *Public Health Nutrition* 19: 2662–2674. https://doi.org/10.1017/S1368980016000653.

Pico, Rocio, Sara del Castillo Matamoros, and Jennifer Bernal. 2021. Food and nutrition insecurity in Venezuelan migrant families in Bogotá. *Colombia. Frontiers in Sustainable Food Systems* 5: 634817. https://doi.org/10.3389/fsufs.2021.634817.

Quandt, Sara A., Thomas A. Arcury, Juliana McDonald, Ronny A. Bell, and Mara Z. Vitolins. 2001. Meaning and management of food security among rural elders. *Journal of Applied Gerontology* 20: 356–376. https://doi.org/10.1177/073346480102000307.

Raghoebar, Sanne, Sofie van Rongen, Rico Lie, and Emely de Vet. 2019. Identifying social norms in physical aspects of food environments: A photo study. *Appetite* 143: 104414. https://doi.org/10.1016/j.appet.2019.104414.

Regan, Pamela C., and Delia M. Gutierrez. 2005. Effects of participants' sex and targets' perceived need on supermarket helping behavior. *Perceptual and Motor Skills* 101: 617–620. https://doi.org/10.2466/pms.101.2.617-620.

Ritchie, Hannah, David S. Reay, and Peter Higgins. 2018. Potential of meat substitutes for climate change mitigation and improved human health in high-income markets. *Frontiers in Sustainable Food Systems* 2: 16. https://doi.org/10.3389/fsufs.2018.00016.

Robinson, Eric, Jackie Blissett, and Suzanne Higgs. 2013. Social influences on eating: Implications for nutritional interventions. *Nutrition Research Reviews* 26: 166–176. https://doi.org/10.1017/S0954422413000127.

Rousselière, Damien, and Samira Rousselière. 2017. Decomposing the effects of time on the social acceptability of biotechnology using age-period-cohort-country models. *Public Understanding of Science* 26: 650–670. https://doi.org/10.1177/0963662515622394.

Sa`id, A.M., H. Abubakar, and B. Bello. 2017. Sensory and microbiological analysis of tiger nut (cyperus esculentus) beverage. *Pakistan Journal of Nutrition* 16: 731–737. https://doi.org/10.3923/pjn.2017.731.737.

Sapp, Stephen G. 1991. Impact of nutritional knowledge within an expanded rational expectations model of beef consumption. *Journal of Nutrition Education* 23: 214–222. https://doi.org/10.1016/S0022-3182(12)81250-7.

Sapp, Stephen G., and Wendy J. Harrod. 1989. Social acceptability and intentions to eat beef: an expansion of the Fishbein-Ajzen model using reference group theory. *Rural Sociology* 54: 420.

Sarwar, Nadeem, Muhammad Akhtar, Muhammad Asif Kamran, Muhammad Imran, Muhammad Atif Riaz, Kashif Kamran, and Saddam Hussain. 2020. Selenium biofortification in food crops: Key mechanisms and future perspectives. *Journal of Food Composition and Analysis* 93: 103615. https://doi.org/10.1016/j.jfca.2020.103615.

Schäufele, Isabel, Eric Barrera Albores, and Ulrich Hamm. 2019. The role of species for the acceptance of edible insects: Evidence from a consumer survey. *British Food Journal* 121: 2190–2204. https://doi.org/10.1108/BFJ-01-2019-0017.

Schunko, Christoph, and Anjoulie Brandner. 2022. Urban nature at the fingertips: Investigating wild food foraging to enable nature interactions of urban dwellers. *Ambio* 51: 1168–1178. https://doi.org/10.1007/s13280-021-01648-1.

Sehib, Khairia, Elizabeth Jackson, and Matthew Gorton. 2013. Gender, social acceptability and the adoption of supermarkets: Evidence from Libya: Retail shopping in Libya. *International Journal of Consumer Studies* 37: 379–386. https://doi.org/10.1111/j.1470-6431.2012.01135.x.

Shove, Elizabeth, Mika Pantzar, and Matt Watson. 2012. *The Dynamics of Social Practice: Everyday Life and How It Changes*. London: Sage.

Silvano, Serventi, and Françoise Sabban. 2002. *Pasta: the story of a universal food*. Translated by Anthony Shugaar. New York: Columbia University Press.

Simeone, Mariarosaria, and Debora Scarpato. 2021. Consumer perception and attitude toward insects for a sustainable diet. *InSects* 13: 39. https://doi.org/10.3390/insects13010039.

Slonim, A.B., K.M. Kolasa, and M.A. Bass. 1981. The cultural appropriateness of the WIC Program in Cherokee, North Carolina. *Journal of the American Dietetic Association* 79: 164–168.

Snelling, Anastasia, Maya Maroto, Alison Jacknowitz, and Elaine Waxman. 2014. Key factors for school-based food pantries: Perspectives from food bank and school pantry personnel. *Journal of Hunger & Environmental Nutrition* 9: 350–361. https://doi.org/10.1080/19320248.2014.929549.

Stull, Valerie J., Mukata Wamulume, Mwangala I. Mwalukanga, Alisad Banda, Rachel S. Bergmans, and Michael M. Bell. 2018. "We like insects here": Entomophagy and society in a Zambian village. *Agriculture and Human Values* 35: 867–883. https://doi.org/10.1007/s10460-018-9878-0.

Thavamani, Aravind, Thomas J. Sferra, and Senthilkumar Sankararaman. 2020. Meet the meat alternatives: The value of alternative protein sources. *Current Nutrition Reports* 9: 346–355. https://doi.org/10.1007/s13668-020-00341-1.

Tims, Kathleen, Mark Haggerty, John Jemison, Melissa Ladenheim, Sarah Mullis, and Elizabeth Damon. 2021. Gardening for change: Community giving gardens and senior food insecurity. *Journal of Agriculture, Food Systems, and Community Development* 10: 85–101.

Tobin, Daniel, Mark Brennan, and Rama Radhakrishna. 2016. Food access and pro-poor value chains: A community case study in the central highlands of Peru. *Agriculture and Human Values* 33: 895–909. https://doi.org/10.1007/s10460-015-9676-x.

Toti, Elisabetta, Luca Massaro, Aisha Kais, Paola Aiello, Maura Palmery, and Ilaria Peluso. 2020. Entomophagy: A narrative review on nutritional value, safety, cultural acceptance and a focus on the role of food neophobia in Italy. *European Journal of Investigation in Health, Psychology and Education* 10: 628–643. https://doi.org/10.3390/ejihpe10020046.

Tyczewska, Agata, Ewa Woźniak, Joanna Gracz, Jakub Kuczyński, and Tomasz Twardowski. 2018. Towards food security: Current state and future prospects of agrobiotechnology. *Trends in Biotechnology* 36: 1219–1229. https://doi.org/10.1016/j.tibtech.2018.07.008.

Vahabi, Mandana, and Cynthia Damba. 2013. Perceived barriers in accessing food among recent Latin American immigrants in Toronto. *International Journal for Equity in Health*. https://doi.org/10.1186/1475-9276-12-1.

van der Horst, Hilje, Annie Sällylä, and Yolie Michielsen. 2023. Game changers for meat and masculinity? Male athletes' perspectives on mixed and plant-based diets. *Appetite* 187: 106585. https://doi.org/10.1016/j.appet.2023.106585

Veličković, Vladica, Marko Jović, Ena Nalić, Aleksandar Višnjić, Olivera Radulović, Čedomir Šagrić, and Milan Ćirić. 2016. Knowledge, attitudes toward, and acceptability of genetic modification among Western Balkan University students of life sciences (AGREE study). *Journal of the American College of Nutrition* 35: 150–162. https://doi.org/10.1080/07315724.2014.1003115.

Verly, Eliseu, Nicole Darmon, Rosely Sichieri, and Flavia Mori Sarti. 2020. Reaching culturally acceptable and adequate diets at the lowest cost increment according to income level in Brazilian households. *PLoS ONE* 15: e0229439. https://doi.org/10.1371/journal.pone.0229439.

Violette, William J., Aurélie P. Harou, Joanna B. Upton, Samuel D. Bell, Christopher B. Barrett, Miguel I. Gómez, and Erin C. Lentz. 2013. Recipients' satisfaction with locally procured food aid rations: Comparative evidence from a three country matched survey. *World Development* 49: 30–43.

Wang, Vivian Hsing-Chun., Victoria Foster, and S. Yi Stella. 2022. Are recommended dietary patterns equitable? *Public Health Nutrition* 25: 464–470.

Warde, Alan. 2016. *The practice of eating*. Cambridge: Polity Press.

Watson, Michelle, Sue Booth, Stefania Velardo, and John Coveney. 2022. The orthodox and unorthodox food acquisition practices and coping strategies used by food insecure adults: a scoping review. *Journal of Hunger & Environmental Nutrition*. https://doi.org/10.1080/19320248.2021.2021121.

Widmar, Olynk, J. Nicole, S.R. Dominick, Wallace E. Tyner, and Audrey Ruple. 2017. When is genetic modification socially acceptable? When used to advance human health through avenues other than food. *PLoS ONE* 12: e0178227. https://doi.org/10.1371/journal.pone.0178227.

Wien, Michelle, and Joan Sabaté. 2015. Food selection criteria for disaster response planning in urban societies. *Nutrition Journal* 14: 47. https://doi.org/10.1186/s12937-015-0033-0.

Willett, Walter, Johan Rockström, Brent Loken, Marco Springmann, Tim Lang, Sonja Vermeulen, Tara Garnett, et al. 2019. Food in

the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. *The Lancet* 393: 447–492. https://doi.org/10.1016/S0140-6736(18)31788-4.

Wortmann, Lena, Ulrich Enneking, and Diemo Daum. 2018. German consumers' attitude towards selenium-biofortified apples and acceptance of related nutrition and health claims. *Nutrients* 10: 190. https://doi.org/10.3390/nu10020190.

Yin, Jingjing, Degang Yang, Xinhuan Zhang, Yufang Zhang, Tianyi Cai, Yun Hao, Shenghui Cui, and Yaning Chen. 2020. Diet shift: Considering environment, health and food culture. *Science of the Total Environment* 719: 137484. https://doi.org/10.1016/j.scitotenv.2020.137484.

Yin, Jingjing, Xinhuan Zhang, Wei Huang, Lingxuan Liu, Yufang Zhang, Degang Yang, Yun Hao, and Yaning Chen. 2021. The potential benefits of dietary shift in China: Synergies among acceptability, health, and environmental sustainability. *Science of the Total Environment* 779: 146497. https://doi.org/10.1016/j.scitotenv.2021.146497.

Yusufu, P.A., S.I.D. Egwujeh, A. Damak, and J. Netala. 2014. Enrichment of 'apula'- a roasted maize meal with African yam bean and plantain fruit flour. *Pakistan Journal of Nutrition* 13: 377–380. https://doi.org/10.3923/pjn.2014.377.380.

Jonas House is a postdoctoral researcher in the Environmental Policy group and a lecturer in the Consumption and Healthy Lifestyles group, Wageningen University & Research. His research explores how food practices are established, maintained and changed, with a particular focus on shifts in food consumption: for example, novel foods becoming established, foods travelling to new places, shifting public tastes, or changing notions of what 'food' actually is.

Anke Brons is a postdoctoral researcher at the Public Administration and Policy group, Wageningen University & Research. Her research focuses on the governance of healthy and sustainable food consumption in the EU.

Sigrid Wertheim-Heck is associate professor at the Environmental Policy Group, Wageningen University & Research. Her interest in advancing global food system sustainability informs her research on the relationship between urbanization, food provisioning and food consumption, focusing on sociological processes of transformation and normalization.

Hilje van der Horst is an assistant professor in the Consumption and Healthy Lifestyles group, Wageningen University & Research. Her research seeks to understand how major societal issues, including sustainability challenges and health inequalities are generated in, but also manifest themselves in everyday consumption practices.