

Where is means-end chain theory most usefully applied in food choice research?

A systematic literature review

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Received 24 October 2025

Revised 4 April 2026

Accepted 21 July 2026

Abstract

Purpose – The means–end chain (MEC) framework (Gutman, 1982) links product attributes to personal values, helping explain consumers’ underlying motivations. This study reviews the state-of-the-art of MEC applications in agri-food research within global food markets shaped by rapid innovation and increasingly complex choice architectures, and identifies the contexts in which the approach remains most useful.

Design/methodology/approach – We performed a systematic PRISMA literature review of 124 peer-reviewed MEC studies in agri-food contexts (2000–2024). Bibliometric analyses map research patterns and time trends, and a qualitative content analysis examines how MEC is applied to explain consumer decision-making and producer adoption.

Findings – MEC studies in agri-food research increased over time but have fluctuated considerably since their peak. The focus of MEC studies has also shifted from individual-level concerns to wider global and ethical issues. We find that recent applications of MEC are most useful when involving products or processes that are (1) unfamiliar or new, (2) politically controversial and/or (3) understood differently across regions. MEC also helps uncover hidden producer motivations behind economically irrational behaviour. Overall, we find MEC most useful as a complementary framework that adds interpretive depth to food choice research.

Originality/value – We review 24 applications of MEC to food research questions over a 24-year period and provide a novel chronological analysis of previously unobserved trends in MEC applications over the course of the past 2 decades. We synthesise our findings with an original assessment of the usefulness of MEC (or lack thereof) across a wide variety of agri-food research applications.

Keywords Means-end chain, Food consumption, Consumer behaviour, Systematic literature review, PRISMA

Paper type Literature review

1. Introduction and motivation

A ten-year-old child walks through a night market in northern Thailand, happily eating crickets, grasshoppers, water beetles, and silkworm cocoons as an evening snack. A few thousand miles away in France, his ten-year-old pen pal eats snails and frog legs, while in Germany another child eats blood sausage. To each child, the others’ food appears unfamiliar and unappealing. Yet research on human taste perception suggests that there are no meaningful biological or structural differences in the sensory capacities associated with these reactions. What psychological factors, then, could explain such marked differences in consumer food preferences?

This paper reviews a 25-year corpus of literature that applies a consumer research method deriving from cognitive psychology, the Means-End Chain (MEC) framework, pioneered by

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Research funding: Funded by the European Union under Grant Agreement 101119480. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.



British Food Journal

Vol. 128 No. 13, 2026

pp. 769-791

Emerald Publishing Limited

e-ISSN: 1758-4108

p-ISSN: 0007-070X

DOI 10.1108/BFJ-10-2025-1450

Gutman (1982), to food market research. The aim of MEC is to connect product attributes with personal values to help understand the underlying motivations, and affective influences such as disgust or pleasure that help explain consumers' choices to buy, avoid or consume particular food.

In a global food market with an increasingly complex technological landscape of ingredients and techniques, MEC might be expected to find useful applications. The purpose of this research is to review the MEC literature over the past 3 decades, and to investigate which particular food contexts it may still be usefully applied in food choice and product development research.

Prior literature has offered valuable foundations, including conceptual overviews of MEC for food product design (e.g. Costa *et al.*, 2004) and broader critical reviews of MEC theory across domains (e.g. Borgardt, 2020). However, none of these reviews focuses on applications of MEC to food, and more broadly, none connects methodological choices and evolving research themes and technological developments to specific challenges.

To fill this gap, this study provides a systematic, data-driven, PRISMA-guided overview of MEC applications across the broad spectrum of agri-food research. We integrate bibliometric patterning and analysis of trends over time, and present a detailed overview of MEC literature on food research from 2000 to 2024. We synthesise these results to clarify what MEC can (and cannot) explain as food innovation accelerates, and assess the usefulness of the MEC method as applied to several specific categories of food market research, particularly where meanings are unfamiliar, contested, affectively charged, or culturally divergent. We name and differentiate the categories of research topics where we find that MEC is most useful, and we discuss some potential pitfalls and drawbacks of the method.

The remainder of the paper is structured as follows. Section 2 (Background) provides a concise overview, history, and background of MEC theory. Section 3 (Methodology and Data Set) details the methods we use, the corpus of articles we collect, and the instruments we use to analyse this data set, including our systematic review protocol. Section 4 (Results) presents bibliometric trends and a structured synthesis of findings, and gives a detailed overview of the current state of the literature. Sections 5 and 6 (Implications and Discussion) interpret our results and present our findings on the present and future usefulness of the MEC method as applied to food market research, naming and differentiating categories of research topics where MEC is most useful, and discussing some potential pitfalls and drawbacks of the method. Section 7 (Limitations) discusses the limitations of our systematic literature review and findings. Finally, Section 8 (Conclusion) offers some concluding remarks and suggests directions for future research.

2. The means-end chain framework: from attributes to values

The psychologist Milton Rokeach (1918–1988) contributed significantly to consumer behaviour research by advancing the understanding of how personal values influence decision-making (Rokeach, 1973). He defined a value as “an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to its opposite or converse” (Reynolds and Olson, 2001, p. 13).

Building on Rokeach's research, Jonathan Gutman and Thomas Reynolds first introduced the MEC model in marketing and consumer research in the late 1970s (Gutman and Reynolds, 1979). Gutman's seminal work on MEC, a paper in the *Journal of Marketing* (Gutman, 1982), linked consumer behaviour to cognitive structures, explaining how product attributes connect to personal values through consequences. In this paper, Gutman proposed two fundamental assumptions: values significantly guide behaviour, and consumers group attributes to simplify complex choices and consciously choose between alternatives.

Reynolds expanded upon this foundational knowledge in a 2001 book co-authored with Jerry Olson, *Understanding Consumer Decision Making: The Means-End Approach to Marketing and Advertising Strategy*, which remains the most comprehensive and widely cited

reference on MEC (Reynolds and Olson, 2001). Initially, the model proposed was a simple associated network with three levels of product-related knowledge with increasing abstraction: Attributes, Consequences, and Values (Gutman and Reynolds, 1979). This cognitive chain of association represents the organisation of knowledge and experience in memory. Later, Olson and Reynolds (1983) proposed a more complex model divided into six sub-levels of abstraction, dividing each step in the chain into two sub-levels: Attributes (A) into Concrete and Abstract, Consequences (C) into Functional and Psychosocial, and Values (V) into Terminal and Instrumental.

To move from this conceptual structure to an empirical method, MEC research typically combines a model of cognitive associations with a standardised analytic workflow. Figure 1 provides a schematic illustration of the method. Part A of Figure 1 summarises the MEC knowledge structure ($A \rightarrow C \rightarrow V$) and its refinement to the six levels of abstraction. To make these theoretical concepts clearer, we include three illustrative examples of MEC ladders in Part B, showing how a single product cue (we choose the example of insect proteins, i.e. protein-rich food ingredients or products derived wholly or partly from edible insects, used as alternatives to conventional animal or plant protein sources) can be translated into higher-order meaning using MEC theory. Part C of Figure 1 outlines the practical steps used to elicit, code, and aggregate ladders into interpretable outputs.

Following the structure presented in Figure 1, the MEC procedure can be described as five sequential stages:

- (1) *Defining the decision context and alternatives.* This stage sets the frame for the entire MEC exercise by clearly specifying the decision situation, the stimulus set, and the comparison alternatives participants will evaluate (Reynolds and Olson, 2001). Participants are then recruited according to the study's sampling logic (e.g. target n , country/market, and key demographics) to ensure the data reflect the intended consumer segment(s). Finally, the evaluation materials—such as products, labels, scenarios, or concept descriptions—are prepared and finalised so every respondent assesses the same set of alternatives within a consistent context.
- (2) *Eliciting salient attributes.* Relevant attributes are collected based on participants' perceived meaningful distinctions between alternatives in a given context (Reynolds and Olson, 2001). Various elicitation techniques can be employed, including triadic sorting, free sorting, direct elicitation, ranking tasks, and attribute selection from

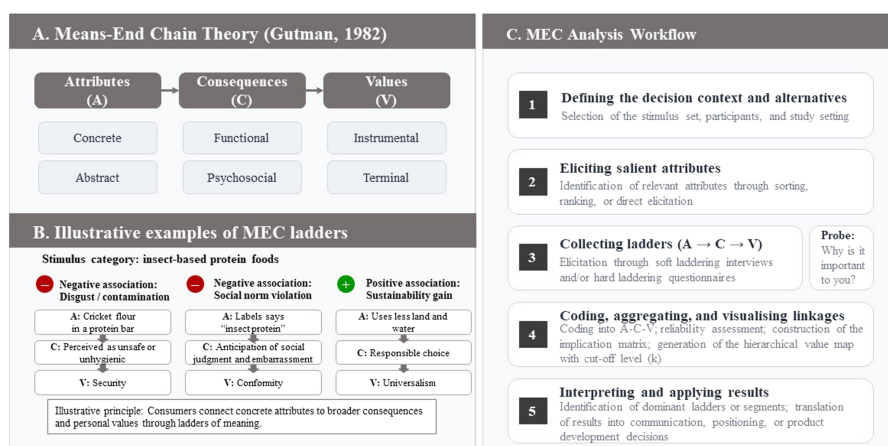


Figure 1. Means-End Chain (MEC) theory, illustrative examples of MEC ladders and analysis workflow

predefined lists. Some studies have assessed the effectiveness of these techniques, evaluating their strengths and limitations in specific research contexts (Bech-Larsen and Nielsen, 1999; Steenkamp and van Trijp, 1997).

- (3) *Collecting ladders* ($A \rightarrow C \rightarrow V$). Once salient attributes are identified, laddering is the preferred method for eliciting higher-level responses and understanding their linkages (Reynolds and Olson, 2001). The elicited attributes serve as starting points for the laddering technique. Through repeated probing with the question, “Why is this important to you?” the technique systematically uncovers the associated consequences and values until the respondent can provide no further answers (Reynolds and Gutman, 1988). Two techniques can be used independently or combined to collect MEC data: “soft-laddering” and “hard-laddering”. Soft-laddering, used in personal in-depth interviews, enables respondents to express themselves freely to uncover novel insights (Reynolds and Gutman, 1988). In contrast, hard-laddering employs structured questionnaires to validate and quantify the attributes, benefits, and values identified during soft-laddering or by a systematic literature review of consumption motives (Reynolds and Gutman, 1988). The goal is to identify patterns and correlations among variables representing the general population.
- (4) *Coding, aggregating, and visualising linkages*. The collected data will then be coded and aggregated in a Summary Implication Matrix (SIM) to represent the number of connections between elements, with cross-checking by a second interviewer to ensure accuracy and reliability (Reynolds and Olson, 2001). Ultimately, results will be plotted in a tree diagram called Hierarchical Value Maps (HVMs) to illustrate the relationship between what consumers want and why they value it (Reynolds and Gutman, 1988).
- (5) *Interpreting and applying results*. This stage translates MEC outputs into both marketing action and broader theoretical and managerial implications. Practically, the resulting value ladders can support value-based segmentation and the development of targeted advertising strategies (Reynolds and Olson, 2001). The MECCAS (Means–End Conceptualisation of the Components of Advertising Strategy) model operationalises brand “image” through MEC by linking attributes to the meanings consumers attach to them, and converting these linkages into actionable communication and positioning elements; it can also inform new product development by aligning product design with consumer expectations (Reynolds and Olson, 1983). Finally, interpreting dominant pathways enables researchers and practitioners to derive clear theoretical contributions and concrete managerial recommendations.

Given these diverse applications, a systematic assessment of how MEC has been used in food market research is appropriate. The following section outlines the methodology adopted to identify, select, and synthesise the relevant literature.

3. Methodology and data set

Our study aimed to systematically search for, select, and synthesise research evidence of the application of the MEC in food market research. Systematic reviews produce holistic conclusions by employing precise and methodical methods to address a specific research question and evaluate a given body of literature (Paul *et al.*, 2021; Snyder, 2019; Tranfield *et al.*, 2003). For this review, we employed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) protocol, which enhances review quality by ensuring consistent documentation and adherence to structured guidelines, thereby ensuring greater transparency and reproducibility (Moher *et al.*, 2009).

At the initial stage of the review, we developed a search strategy. We established explicit inclusion and exclusion criteria to ensure the selection of the most relevant studies while reducing potential biases. Articles were included if they (1) reported empirical research written in English and published in peer-reviewed journals, and (2) explicitly used MEC models in food-related contexts. We excluded “grey literature” published outside of ordinary academic channels (e.g. non-peer-reviewed conference proceedings, government reports, working papers, etc.). After finalising the criteria, we defined the search mechanisms, period, and keywords.

Our methodology involved a database-driven approach on Scopus and Web of Science (WoS) for their extensive coverage of high-impact, peer-reviewed journals. Our search utilised the *Title*, *Abstract*, and *Keyword* fields in Scopus and the *Topic* field in WoS. Our search strings were formulated based on our central theme, the MEC, Boolean operators (“AND”) and relevant topics such as the agri-food sector, agriculture, beverages, or related. We focused on studies published from 2000 onward because the literature between 1984 and 1999 was too limited to support a meaningful systematic analysis, with only six studies identified during that period.

The systematic literature review (SLR) process and review steps are illustrated in Figure 2.

The Identification and Acquisition Phase resulted in a final corpus of 124 publications in WoS and 117 in Scopus. We arrived at this corpus as follows. First, we used Citavi (version 6) for the Screening and Eligibility Phase. After removing 80 duplicates, we identified 161 potentially relevant titles. Title and abstract screening narrowed the selection to 140 articles (21 excluded as irrelevant). Full-text screening reduced the count to 124 articles (16 failed inclusion). Finally, we systematically extracted predefined data from the final 124 articles using a coding protocol [1].

4. Results: the big picture of food consumer research using MEC theory

Our framework-based review used content analysis and descriptive statistics to assess research trends and bibliometric features.

In this section, we report results on publication trajectories (section 4.1), innovations in MEC methodologies over that time period (4.2), and the evolution of MEC studies by topic (4.3).

4.1 Publication trends, 2000–2024

From the 124 articles we selected, we categorised them by publication year and country, an interesting step in monitoring the model’s rising interest over time and global reach.

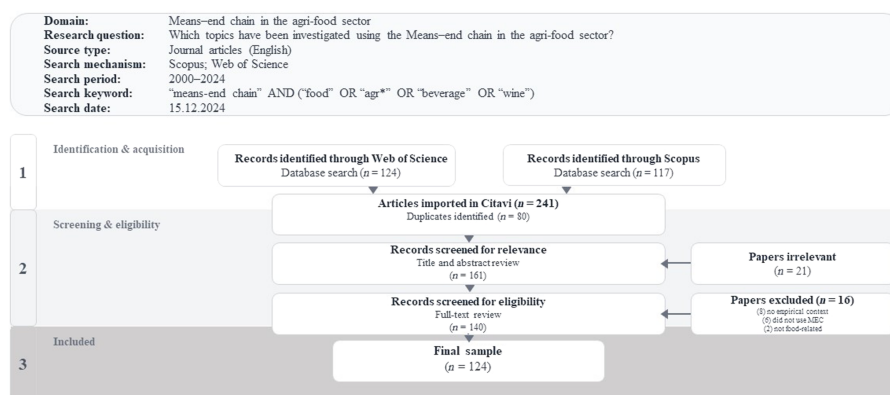


Figure 2. Literature search and screening workflow

Trends in number of publications per year. We focused on studies published from 2000 onward, as only six studies were identified between 1984 and 1999. These early works are therefore treated as a formative stage in the development of MEC research on agri-food topics, rather than as part of the main review corpus. Our results show considerable year-to-year variation in the number of MEC studies published on agri-food topics; however, the overall trend is upward, reflecting the growing importance of consumer behaviour research in shaping business strategy. As illustrated in the graphical representation in [Figure 3](#), a notable increase in publications occurred in 2001, when five new MEC studies on agri-food topics were published alongside the release of [Reynolds and Olson’s \(2001\)](#) book.

[Grunert \(2010\)](#) openly acknowledged several criticisms and methodological limitations of MEC. As a result, Grunert’s reassessment functioned as a form of intellectual validation that lowered publication barriers and contributed to the increased and more mainstream use of MEC in the literature in the following year, approximately doubled by 2011 and reached a maximum of 11 publications in 2016. In 2024, publication output returned to this level, again reaching 11 studies.

In light of the above trends, and for the purposes of our more detailed analysis below ([sections 4.2, 4.3](#), and beyond) of the geographical and methodological distribution and evolution of publications, we divide the overall time span into two distinct periods: the development stage, which we call “Phase 1” (2000–2011, with 34 publications) and the more mature stage, which we call “Phase 2” (2012–2024, with 90 publications). In Phase 1, publication activity remained relatively low and uneven, averaging 2.8 studies per year, which reflects an early stage of development in the application of MEC to agri-food research. From 2012 onward, the field entered a more sustained growth phase. In Phase 2, the average increased to 6.9 studies per year, indicating a substantial expansion in publication output and suggesting that MEC became more firmly established as an analytical approach in agri-food and consumer research over time.

It is important to note that a small group of authors, led by Ramo Barrena Figueroa and colleagues at the Universities of Pamplona and Navarra, account for 13 (10.5%) of the total corpus of 124 publications. The scholarly output of [Barrena et al. \(2015a, b\)](#) was concentrated between 2009 and 2015. It is therefore not surprising that this cluster of studies may have influenced the publication trends described above. To assess the extent of this influence, we

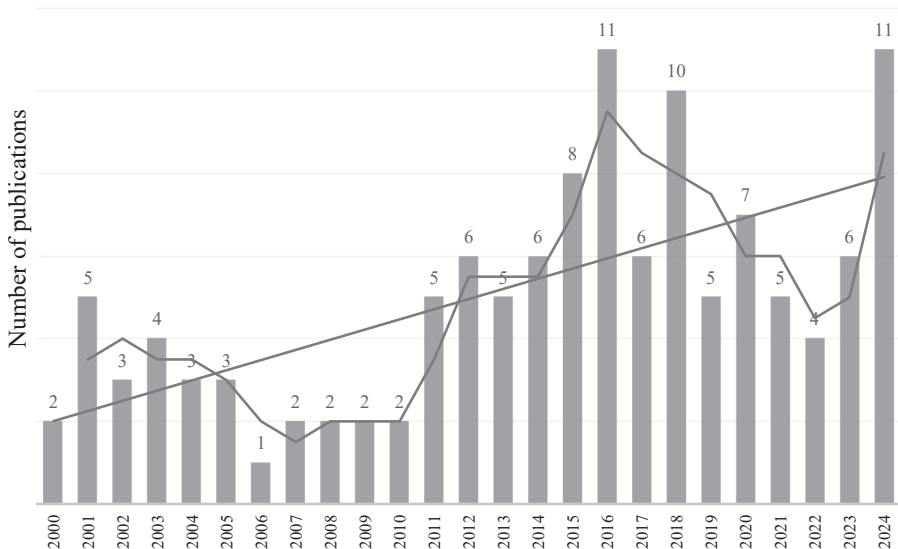


Figure 3. Annual publication trends of MEC studies in the agri-food industry

conducted a robustness test by re-examining the same trends after excluding the publications by Barrena *et al.* (2015a, b). The results, presented in Appendix (Table A1 and Figure A1), were broadly similar. The main difference was that the number of studies plateaued between 2011 and 2015 rather than showing a gradual increase.

Geographical distribution of subjects and authors. Publications in the corpus studied subject pools in 33 different countries. We observed that 13 (10.5%) of the 124 studies were cross-cultural, meaning that they studied subject pools from more than one country.

Regarding the nationality of the lead author's affiliated institution, Spain was the most represented ($n = 15$, 12%), followed by the United States ($n = 12$, 10%) and Australia ($n = 9$, 8%). The prominence of Spain is explained by the concentration of publications produced by Barrena and colleagues (as discussed above and in Appendix). Additionally, several other countries, such as Taiwan ($n = 7$), Brazil ($n = 6$), and Indonesia ($n = 5$), were relatively well represented in the subject pools.

Distribution of journals. Publications in the corpus were distributed across 56 journals, but publication activity was clustered in a small number of outlets, as shown in Table 1. The top two journals accounted for about 30% of all publications.

This concentration suggests that scholars in this field often rely on a few well-established journals to disseminate their work, while the remaining studies are largely dispersed across journals with single contributions, frequently aligned with niche or specialised topics.

4.2 Methodological trends

As discussed in Section 2 above, MEC studies use two main interview techniques: soft laddering and hard laddering. We categorised publications in the corpus by interview technique. The majority of studies used a soft-laddering approach ($n = 68$), with fewer using a hard-laddering approach ($n = 33$) and a small number employing a combination of both soft and hard laddering ($n = 7$) [2].

We observe that soft-laddering approaches have increased significantly in recent decades, from 42% in Phase 1 of the time span covered by our corpus (2000–2011) to 65% in Phase 2 (2012–2024). The combination of soft and hard laddering remains underrepresented in the corpus, consistent with previous findings (Borgardt, 2020), with their use reaching 14% in Phase 2 compared to 12% in Phase 1.

Beyond the simple division of studies by laddering category, we also find that recent studies demonstrate growing methodological innovation (Miaris *et al.*, 2024). For example, MEC has been integrated with other psychological frameworks, such as regulatory focus theory and self-construal theory (Chen *et al.*, 2015).

In some cases, MEC serves as an initial qualitative phase, with factorial designs validated through confirmatory factor analysis (CFA), demonstrating robust statistical performance in large-scale studies across multiple EU countries (Krystallis *et al.*, 2012). In some cases, focus group settings were employed to broaden the sample, diverging from the traditional one-on-one format (Barrena and Sánchez, 2012, 2013a; Lee *et al.*, 2014; Mandolesi *et al.*, 2024).

4.3 Evolution of research topics

Next, we examine how topics studied in the publications evolved throughout the MEC model's progression, supported by a few illustrative examples.

Table 1. Top 3 journals publishing MEC studies on agri-food topics, 2000–2024

Rank	Journal name	No. of articles (pct. of total corpus)
1	<i>British Food Journal</i>	21 (16.9%)
2	<i>Food Quality and Preference</i>	16 (12.9%)
3	<i>Appetite</i>	6 (4.8%)

In order to better understand the evolution of the literature reviewed over time, we decided to classify publications by what we call the “main topic studied,” by which we mean the stimulus presented to subjects, rather than the outcome of the laddering procedure. For example, if the stimulus was an organic product, the publication would be classified as “organic,” and not “health-oriented,” even if the paper also investigated attitudes toward health. We assigned one main topic to each publication in the corpus according to the criteria shown in Table 2.

We acknowledge that there is some overlap between topics in the nature of the stimuli, and in some cases, judgement calls were necessary in the coding procedure.

In Table 3, we summarise and compare the number of publications by main topic in Phase 1 (2000–2011) and Phase 2 (2012–2024), and show the change in distribution of topics between the two phases.

Although the number of studies in the total corpus, and especially within topics, does not give us the power to perform statistical significance tests comparing the two phases, we can

Table 2. Main topic categories of MEC studies and examples of stimuli studied

Main topic category	Examples of stimuli
Organic	Organic products, organic labels, pesticide-free products
Branding/labelling/origin cues	Brands, labels, appellations, PDO/PGI, national or regional origin cues
Functional and health-oriented	Functional foods, health or well-being claims, nutritional benefits
Cultural or regional influences	Regional customs, religious practices, meal-sharing habits, peer influences, ethnic products
Unfamiliar or new	New or unfamiliar foods, ingredients, or processing or packaging technologies
Ethical and sustainable	Environmental claims, fair trade, sustainability, animal welfare, responsible consumption, ecological impact
Other determinants of demand	Affordability, perceived value, economic trade-offs, willingness to pay, cost sensitivity
Local	Local sourcing, short supply chains, proximity of food to sales location, small or local producers
Food safety/traceability	Food safety certification, risk reduction cues, traceability systems, quality guarantees

Table 3. Summary of articles in corpus by main topic and time phase

Main topic	Phase 1 (2000–2011)		Phase 2 (2012–2024)		Total (2000–2024)		Changes from Phase 1 to Phase 2 Change in percentage points	Ratio (Ph. 1/ Ph. 2)
	Pubs.	Pct of pubs.	Pubs.	Pct of pubs.	Pubs.	Pct of pubs.		
Branding/labelling/origin cues	5	15%	7	8%	12	10%	–6.9	0.53
Cultural or regional influences	5	15%	22	24%	27	22%	9.7	1.66
Ethical and sustainable	0	0%	11	12%	11	9%	12.2	–
Food safety/traceability	4	12%	4	4%	8	6%	–7.3	0.38
Functional and health-oriented	8	24%	7	8%	15	12%	–15.8	0.33
Local	1	3%	8	9%	9	7%	5.9	3.02
Organic	3	9%	9	10%	12	10%	1.2	1.13
Other determinants of demand	4	12%	5	6%	9	7%	–6.2	0.47
Unfamiliar or new	4	12%	17	19%	21	17%	7.1	1.61
Total	34	100%	90	100%	124	100%		

nonetheless observe some important aspects of how the distribution of topics has evolved over time. For instance, in the “ethical and sustainable” category, publications increased from none in Phase 1 to 11 in Phase 2 (12% of the Phase 2 corpus), publications in the “local” category increased from 3% to 10%, publications in the “cultural or regional influences” category increased from 15% to 24%, and publications in the “unfamiliar or new” category increased from 12% to 19%.

On the other hand, between Phases 1 and 2, the proportion of publications *decreased* substantially in the categories “functional and health-oriented” (from 24% to 8%), “food safety/traceability” (from 12% to 4%), and “branding/labelling” (from 15% to 8%) and other determinants of demand (from 12% to 6%).

Next we identify two larger trends driving the increases and decreases in topic focus we observe above.

Trend 1. Shift from personal and individualistic concerns to global and ethical concerns: In the context of our analysis of the corpus as a whole, we find that the above trends point toward a larger shift in the choices of topics for researchers to apply the MEC method. The overall evolution in research focus has been from what we call “individualistic concerns” (e.g. personal health, safety, lifestyle) to what we call more “global concerns” (e.g. food security, the resilience of food systems, the fight against hunger). This evolution mirrors shifts in both consumer behaviour and industry dynamics.

One-quarter of all Phase 1 publications fell within a single category: “functional and health-oriented.” MEC studies during that phase, for instance, explored the balance between health-driven and hedonic motivations in food choices (Roininen *et al.*, 2000); health and convenience as dual drivers of functional food adoption (Urala and Lähteenmäki, 2003; Krystallis *et al.*, 2008); the influence of health claims on acceptance of functional foods (Bitzios *et al.*, 2011); the effect of children in the household on functional food choices (Barrena and Sánchez, 2010b); or the importance of trust and transparency in fostering consumer confidence in functional foods (Barrena and Sánchez, 2010a).

In Phase 2, by comparison, research focussing on sustainability and ethics gained considerable importance. Behavioural studies covered food waste (Miroso *et al.*, 2016; Richter and Bokelmann, 2018) and low-carbon diets (Lin and Lin, 2014). Ethical and welfare-related topics were explored, such as the perception of animal well-being in Swedish dairy farms (Hansson and Lagerkvist, 2015) and the role of farm animal welfare in pork purchasing decisions (Humble *et al.*, 2021). The influence of personal ethical values on dietary choices was explored in studies on vegetarianism (Kim *et al.*, 2023), bread made with heritage cereals (Wang *et al.*, 2024), plant-based substitutes (McCarthy *et al.*, 2017; Haas *et al.*, 2019), how green values shape perceptions of sustainable restaurants (Jeng and Yeh, 2016).

Trend 2. Growing focus on unfamiliarity and novelty: In Phase 1, only a small number of studies (four, according to our “main topic” classifications) investigate consumer perceptions of unfamiliar, new, or technologically advanced foods. Two studies found that safety, naturalness, and ethical concerns often acted as barriers to acceptance of food products involving genetic modification, with proponents focussing on functional benefits and detractors prioritising trust and naturalness (Grunert *et al.*, 2001; Boecker *et al.*, 2008). One study on high-pressure processing (HPP) revealed consumer appreciation for extending shelf life and preserving freshness while noting hesitation toward unfamiliar technologies and perceived food safety risks (Sorenson and Henthion, 2011).

Phase 2 saw large growth in the study of unfamiliar or new foods using MEC, but the corpus suggests that “novelty” operates through distinct emotional pathways depending on the innovation category. Early in Phase 2, for instance, studies by Barrena *et al.* (2015a, b) found that neophobic consumers exhibit more complex and reluctant decision-making (Barrena and Sánchez, 2013a), and consumer innovativeness predicts willingness to adopt new products (Barrena and García, 2013); some studies investigated sociodemographic moderators of novel foods such as gender differences (Barrena and Sánchez, 2013b) and age-related variation (Barrena *et al.*, 2015a). MEC research also expanded to the study of technological trust in

processing innovations and perceived risk–benefit trade-offs (Sonne *et al.*, 2012), acceptance of edible insects under unfamiliarity (Pambo *et al.*, 2017), and snack foods derived from brewing waste (Crofton and Scannell, 2020).

5. Where MEC is most useful in food research

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Above, we have summarised and described the corpus we reviewed, and identified some broad patterns of topics and trends over time in the use of MEC in agri-food research. Beyond the basic results we have reported, we find a number of interesting implications for the present and future usefulness of MEC as applied to food market research, in the context of historical trends and the current state of food markets. In this section, we outline and categorise those implications.

First, we must define what we mean by “useful.” By the “usefulness” of a method, we mean the extent to which its application improves understanding or prediction in some applied business or policy context. “Useful” applications of MEC must help explain the deeper motivations of some group of subjects (consumers or producers) and provide findings that can concretely inform decision-making by firms, such as choices about communication, segmentation, branding, sales, marketing, or product development; or decision-making by policymakers in support of their public objectives.

In this section, we name and discuss three specific sub-categories of food research where we find MEC to be most usefully applied. Below, we compare and differentiate these three partially overlapping categories, provide specific examples from the corpus we reviewed, explain why MEC is particularly well tailored to understanding each, and discuss the unique research challenges specific to each category.

We find that recent applications of MEC to food research are most useful when choices concern foods, ingredients, or processes that are (1) unfamiliar or new (section 5.1); (2) politically controversial (section 5.2); and/or (3) understood differently in different regions or cultures (Section 5.3). Beyond these three consumer categories, we also find that MEC is useful for understanding producer motivations (Section 5.4). Broader methodological implications, limitations, and practical applications of MEC in consumer and market research are discussed separately in Section 6.

5.1 Applications of MEC to unfamiliar or new foods, ingredients, or processes

The food landscape is undergoing a profound transformation as a raft of innovations enter mainstream markets and policy agendas. While these innovations promise benefits in terms of sustainability, nutrition, and efficiency, they also raise consumer concerns related to safety, ethics, naturalness, and trust (Fischer and Reinders, 2022). At the same time, consumer acceptance is shaped by individual-level factors such as food neophobia, disgust sensitivity, and culturally embedded values (Siegrist and Hartmann, 2020). Trust is also important, but its effect can vary across technologies and consumer groups, and it may act more as a mental shortcut than as a stable factor shaping acceptance (Siegrist, 2021).

In this context, it is important to clarify how the present review defines “new” foods. Here, when we use the term “new,” we are not referring to the narrow EU definition of “novel foods [3].” Rather, we use “new” more expansively to include a broader category of products that may be familiar yet still trigger high uncertainty because of limited knowledge, technological complexity or credence claims. Table 4 shows a sub-classification of the 21 publications in the corpus that we classified as “unfamiliar and new” (see Tables 2 and 3 for details on the overall classification).

Because some categories in Table 4 overlap substantially with Sections 5.2 and 5.3, we focus here on those forms of novelty that are primarily characterised by unfamiliarity and evaluative uncertainty. Our findings suggest that MEC is well suited to unpack affectively complex responses in contexts where acceptance hinges on category-specific hurdles such as

Table 4. Unfamiliar or new categories represented in the review corpus, with illustrative example and number of related studies

New food category	Examples	Number of related studies in corpus
1. Novel proteins ^a	Insect-based protein	2
2. Processing innovations	Innovative nonthermal food processing technologies	3
3. Fortified/functional products	Bioactives	4
4. Biotechnologies/GM ^b	Proxy for gene editing	3
5. Eco-innovations/circular foods	Brewing waste snacks	1
6. Traditional food from third countries ^a	Baobab; açai; algae	3
7. Packaging-based innovations ^b	Coffee capsules; edible coatings; active packaging; smart packaging; refill systems	5

Note(s): ^aItems 1 and 6, novel proteins and traditional food from third countries, significantly overlap with the “foods understood differently in different regions” category, ^bItems 4 and 7, biotechnologies/GM and packaging-based innovations, significantly overlap with the “politically controversial” category

uncertainty, trust, scepticism, and perceived risk. This is consistent with evidence that even consumers with strong sustainability concerns may reject shelf-life extension technologies when innovation itself is perceived as inherently risky, suggesting that pro-sustainability values do not automatically translate into acceptance of food technologies (Cavaliere and Ventura, 2018). MEC can provide a more holistic assessment that helps brands address misconceptions, reduce consumer hesitancy, and communicate more effectively (Barrena and Sánchez, 2013b).

At the same time, the very characteristics that make new foods difficult to evaluate—uncertainty, unfamiliarity, and uneven knowledge—also pose challenges for MEC application and interpretation. Here we analyse how MEC has been applied in food contexts where choices are high in uncertainty and where consumers may struggle to articulate stable value chains.

To synthesise the 21 studies reviewed under the new food category, we developed a conceptual matrix that provides a structured way to compare studies addressing different types of innovations, consumer concerns, and conditions of MEC application [4].

As shown in Figure 4, MEC appears to be particularly valuable in new food categories characterised by both novelty and high affective intensity. The matrix was developed to identify broader patterns across a variety of studies, with particular attention to the dominant psychological barriers these categories evoke and the conditions under which MEC proves more or less informative. The matrix positions each category according to two dimensions: affective intensity and the apparent usefulness of MEC. Categories in the upper-right quadrant combine strong emotional responses with high methodological usefulness, suggesting contexts in which MEC appears especially effective. The coloured markers indicate the dominant psychological barrier associated with each category. The matrix is therefore intended as a conceptual synthesis of the patterns observed across the reviewed studies.

The discussion below illustrates how the categories represented in the matrix differ in the kinds of barriers they evoke and in the conditions under which MEC appears more or less useful.

Processing innovations, defined here as new or improved food processing methods designed to enhance preservation, safety, quality, or efficiency, provide one clear illustration of this pattern. They activate a configuration of responses typically involving trust, perceived risks and benefits, and inferences about freshness and naturalness. Here, MEC appears highly useful even in more structured laddering formats, largely because participants can generally articulate and connect attributes and consequences with relative ease.



Figure 4. Usefulness of MEC as applied to unfamiliar and new categories by affective intensity

Fortified and functional products, understood here as foods enhanced with added nutrients, bioactive compounds, or health-related benefits, also generate informative ladders, although these tend to be less affectively charged. Responses in this category typically focus on efficacy scepticism, the evaluation of credence claims, and perceived health-related risks and benefits. MEC appears moderately to highly effective in this context, provided that participants possess sufficient familiarity to articulate meaningful associations.

Eco-innovations and circular foods, which aim to reduce environmental impact through resource efficiency, waste reduction, and by-product reuse, offer a particularly useful example of unfamiliarity without strong political controversy. Products such as snacks produced from brewing waste are characterised by uncertainty, waste stigma, purity concerns, and contamination sensitivity. In this context, MEC appears moderately to highly useful because it can identify tensions between environmental benefits on the one hand and perceptions of cleanliness, quality, and edibility on the other. Careful framing is nevertheless required to avoid shallow ladders driven by abstract approval or uncertainty rather than more elaborated evaluations.

Traditional foods from third countries, understood here as culturally specific foods originating outside the consumer's usual market context, also illustrate a form of novelty that is not necessarily politically controversial, but may still be unfamiliar in particular markets. In these cases, MEC can help uncover how consumers interpret unfamiliar ingredients or culturally distant food products through lenses of curiosity, authenticity, taste expectation, and perceived fit with existing eating habits. Relative to more affectively charged categories, however, these products often evoke lower uncertainty and less elaborated value conflict.

Taken together, these patterns suggest that MEC is especially effective not simply in relation to novelty *per se*, but in contexts where unfamiliarity creates uncertainty about how products should be evaluated.

5.2 Applications of MEC to politically controversial food issues

Some food-related topics become publicly debated and morally charged even when they are no longer especially “new”, and consumer responses are shaped by legitimacy concerns, ethics, regulation, and trust. In these cases, products are not simply difficult to evaluate; they are also embedded in broader public debates around moral acceptability and acceptable futures for food.

This category partly overlaps with the unfamiliar and new topics discussed in [Section 5.1](#). For example, biotechnologies such as genetically modified foods (item #4 in [Table 4](#) and [Figure 4](#)) and packaging innovations such as single-use coffee capsules (item #7) have attracted sustained public attention and activism, making them not only novel market objects but also politically contested ones.

Biotechnologies are perhaps the clearest example of such controversy. In the MEC literature we reviewed on biotechnologies, dominant affective responses centre on ethical concerns, perceived illegitimacy, and unnaturalness. In this context, MEC appears especially valuable when open-ended laddering allows respondents to articulate tensions, ambivalence, and underlying value structures. MEC's usefulness appears to diminish when respondents moralise early, reject trade-offs, or produce only short ladders, unless indirect elicitation techniques are introduced to sustain reflection.

Packaging innovations show that political controversy can also extend beyond the food itself. Single-use coffee capsules, edible coatings, active packaging, smart packaging, and refill systems become symbols of broader debates about waste, convenience, sustainability, contamination, and excess. In these cases, MEC is particularly useful for revealing how consumers navigate tensions between practicality and environmental responsibility, as well as between product protection and perceptions of unnecessary packaging.

Research on genetically modified foods suggests that opposition may be driven not only by perceived risks and benefits, but also by disgust-based rejection ([Scott et al., 2016](#)). For example, although not based on MEC analysis, [Moon and Balasubramanian \(2003\)](#) found that UK consumers were significantly more willing to pay a premium to avoid GM foods than US consumers. MEC could be useful to understand the motivations behind this difference by mapping the distinct meaning structures consumers attach to such a divisive issue and showing how these structures shape willingness to pay in ways that conventional attitudinal measures may not fully capture.

5.3 Applications of MEC to topics that are understood differently in different regions or cultures

In some publications, the key issue is not primarily unfamiliarity or controversy, but variation in meaning across cultural contexts. The same food can carry very different associations, values, and degrees of acceptability across countries, regions, or religious settings, as consumption patterns are shaped by culturally specific value structures ([Rewerts and Hanf, 2009](#)).

Cultures high in so-called “uncertainty avoidance” ([Hofstede, 1980](#)), for instance, may prioritise safety, health, and social acceptability, whereas low-uncertainty-avoidance cultures may emphasise curiosity and experimentation. Values shape cultural norms and play a central role in cross-cultural marketing by influencing purchasing behaviours through family, education, and socialisation ([Engel et al., 1990](#); [Hofstede and Hofstede, 2005](#)). Frameworks such as Hofstede's cultural dimensions provide a systematic way to assess how societal-level values shape individual decision-making ([Hofstede, 1980](#)).

In parallel, research on personal values using instruments such as Schwartz's Value Survey demonstrates that these societal-level dimensions are reflected in the hierarchy of individual motivations, linking broad cultural tendencies to specific purchase behaviours and lifestyle choices ([Schwartz, 1992](#)). The MEC methodology aggregates these differing cultural values into HVMs, making it effective for cross-cultural comparison. MEC can therefore show whether rejection in one country is driven mainly by affective norm violations (ladders terminating in purity/tradition values), as opposed to appraisal concerns (ladders terminating in security/control) or legitimacy concerns (ladders terminating in moral responsibility).

Evidence from emerging-protein research shows that consumers make sense of unfamiliar foods in culturally specific ways. Attitudes toward cultured meat, for example, differ across Belgium, Portugal, and the UK, reflecting variations in trust, expectations, and perceived fit

with everyday eating norms (Verbeke *et al.*, 2015). More generally, acceptance of cultured meat is shaped by ethical concerns, perceived naturalness, and food-related risk (Bekker *et al.*, 2017). A similar pattern emerges in research on insects as a meat substitute, where willingness to adopt unfamiliar proteins is influenced by environmental motives, familiarity, and neophobia (Verbeke, 2015). Fischer and Steenbekkers (2018) suggest that consumer responses to edible insects are shaped not only by general attitudes toward entomophagy, but also by species-specific perceptions.

This broader literature helps explain why novel proteins emerge in our corpus as one of the clearest cases in which MEC is especially informative. As shown in the conceptual matrix discussed above, novel proteins in our corpus provide one of the clearest illustrations of this broader pattern. They occupy the high-impact zone because they elicit rich and often competing consumer meanings. In this category, particularly in relation to insect-based proteins, dominant affective responses include disgust, perceived norm and identity misfit, and social discomfort. MEC appears especially effective here when soft laddering and in-depth probing are employed, as these approaches allow researchers to uncover taboo-related meanings, disgust responses, and identity tensions. By contrast, the effectiveness of MEC seems to decline when highly structured hard laddering is used, as respondents may disengage or provide socially desirable answers.

Further, our corpus shows that these culturally variable meaning structures also extend to food choices shaped by religion, social practice, and intercultural experience. We found that MEC application was particularly useful in revealing the influence of social and experiential factors, such as meal-sharing behaviours (Heo and Kim, 2024) and religious influences. For example, research on white meat consumption among Muslims and Christians suggests that marketing strategies should reinforce halal certification trust in the UK while focussing on feelings of security and happiness in Turkey (Öztürk, 2024). Similarly, Arsil *et al.* (2018) highlighted personal values such as spiritual fulfilment and tradition in shaping halal food consumption in Indonesia and Malaysia. Studies on ethnic food choices—such as Japanese cuisine (Tey *et al.*, 2018), Padang food (Arsil *et al.*, 2022), couscous (Barrena *et al.*, 2015b), or Chinese souvenirs (Chang *et al.*, 2022)—demonstrate how food selections can serve as a bridge in intercultural relations, illustrating how ethnic communities balance local and traditional cultural values.

These cross-cultural differences in values and consumption behaviours not only shape individual purchasing decisions, but also present strategic challenges for multinational brands seeking to maintain global consistency while responding to local expectations. While standardisation offers economies of scale, brand consistency, and transnational communication, it is limited when underlying consumer values diverge across markets. Conversely, excessive adaptation can compromise global brand coherence and increase operational complexity. MEC analysis provides a strategic framework to address these challenges by empirically identifying which motivations are universal and which are market-specific. For example, a European study on the “Euro-consumer” concept (Valli *et al.*, 2000) examined yoghurt consumption to assess the feasibility of a pan-European brand strategy and found that cultural factors constrained the effectiveness of a uniform branding approach.

Although only 10% of the MEC studies in our corpus involved cross-cultural comparisons, our review suggests that the methodology has particular strengths for this type of research because it helps reveal how similar food cues may acquire different meanings across contexts.

5.4 Applications of MEC in understanding producer choices

Although MEC was originally developed and has most often been applied to understand consumer decision-making, we find that MEC has recently been successful in helping uncover hidden producer motivations. This is a notable development in the more recent stage of the literature. We found that the share of studies in the corpus focusing on producers increased from 3% in Phase 1 (1 of 34) to 14% in Phase 2 (13 of 90).

Food systems are not shaped only by consumption choices; they are also shaped by adoption decisions made upstream. In our review, MEC proved particularly useful in understanding whether farmers, manufacturers, and supply-chain actors accept or resist new planting material production methods (e.g. [Okello et al., 2018](#)), vertical farming technologies ([Jaeger et al., 2023](#)), good agricultural practices ([Rahman and Luomala, 2021](#)), climate-smart techniques ([Ngigi et al., 2018](#)). [Kilwinger et al. \(2020\)](#) explored farmers' perceptions of formal and informal sources of banana planting material, highlighting financial gains, food security, and household development as key drivers across different farmer groups ([Kilwinger et al., 2020](#)).

Recent research has also shifted focus to farmers' decision-making, particularly when choosing between organic and conventional agriculture ([Lagerkvist et al., 2012](#); [Naspetti et al., 2016](#)).

Unlike consumers, who are often guided by emotional associations, producers are typically assumed to act more rationally, basing their decisions on economic efficiency, risk management, and long-term viability. Yet, these considerations are rarely isolated from broader value commitments. For instance, studies on farmers' acceptance of climate-smart practices show that attributes such as drought-resistant crops or precision irrigation systems can translate into reduced vulnerability and resource efficiency, ultimately serving values like safeguarding livelihoods and intergenerational farm survival ([Ngigi et al., 2018](#)). In this context, MEC is particularly suited to uncover the motivational "black box" behind decision-making.

6. Methodological implications and practical applications of MEC

Within the broader repertoire of qualitative and mixed methods used in consumer research, MEC is not unique in being grounded in theory, but it is more explicitly organised and interpreted around a predefined cognitive model than many exploratory qualitative approaches commonly used in consumer and market research. Unlike focus groups or unstructured interviews, which often generate broad but fragmented accounts of attitudes and opinions, MEC employs transparent, codable A–C–V pathways, supporting clearer comparison and interpretation.

Conventional surveys and choice models can estimate willingness to pay, perceived risks, or stated acceptance, but they are less well suited to uncovering the value structures that organise those evaluations. MEC is particularly useful when a single negative response may mask very different underlying pathways, for example disgust, distrust, legitimacy concerns, or identity-threat, each of which implies different communication and policy strategies. MEC can clarify why the same observable preference may reflect very different motivational pathways across consumer groups, and why similar products may succeed or fail depending on which values they activate. As shown in [section 4.2](#), MEC also increasingly functions as a flexible methodological framework rather than remaining a niche qualitative methodology, including unconventional and immersive research settings that contextualise decision-making within natural environments and capture the influence of social cues, cultural norms, and situational constraints ([Quest, 2023](#)).

At the same time, we encourage researchers to exercise particular caution when applying MEC. MEC's usefulness depends on recognising the conditions under which its outputs can be interpreted with confidence. The method has long attracted criticism for subjectivity, limited causal inference, and the risk of mechanical or overly formulaic application. [Grunert \(2010\)](#) played an important role in re-legitimising the method by openly addressing these concerns and gave authors a credible way to justify their methodological choices and signalled to reviewers and editors that MEC could still be used responsibly in contemporary research.

MEC's structured outputs should not be mistaken for fully standardised or directly commensurable findings across studies since comparability is constrained by considerable variation in data collection modes, elicitation procedures, prompting depth, sampling frames, coding decisions, and HVMs construction rules ([Reynolds and Gutman, 1988](#); [Borgardt, 2020](#)).

One particularly important source of variation concerns laddering format. Across the corpus, soft laddering predominates ($n = 68$), followed by hard laddering ($n = 33$), while the combined use of both approaches remains limited. Comparative studies have shown that different laddering formats can produce systematically different HVMs structures (Russell *et al.*, 2004; Leppard *et al.*, 2004; Wang *et al.*, 2024), while the assumptions built into highly structured formats have been the subject of sustained methodological debate (Phillips and Reynolds, 2009).

Even given these limitations, we found that MEC remains useful, as an exploratory and diagnostic tool. It is most valuable when researchers seek to understand how meanings are structured within a given population or context, but it is less suited to claims that require strict standardisation, causal certainty, or direct comparability across differently designed studies. In this sense, MEC is especially powerful not as a substitute for quantitative methods, but as a complementary framework that adds interpretive depth to preference data.

MEC is also useful in segmentation. Traditional segmentation approaches often rely on demographics, purchase frequency, or stated intentions, but these categories may obscure the deeper reasons why different groups respond differently to the same food product or innovation. MEC can produce more strategically meaningful segments, especially in food markets where the same product can carry very different meanings across audiences.

7. Limitations of the review

We restricted the corpus of literature to English-language peer-reviewed journal articles in order to ensure consistent quality appraisal and replicability. However, restricting the corpus to English may under-represent evidence from emerging regions, especially considering the multicultural nature of innovative food adoption and practice-based knowledge that is sometimes disseminated via reports, theses, or local-language outlets.

Further, because the purpose of this review was to map applications, methodological evolution, and thematic use contexts of MEC rather than to estimate pooled effects, we did not apply a formal risk-of-bias instrument. Instead, we relied on explicit inclusion criteria and interpretive caution when comparing heterogeneous study designs.

8. Conclusion

This article examined how Means-End Chain theory has been applied in agri-food research over the past 25 years and where it remains most useful today. Based on a PRISMA-guided systematic review of 124 peer-reviewed studies, we find that MEC is especially valuable for understanding food choices where food meanings are unfamiliar or new, politically controversial, or culturally divergent; it is less distinctive where evaluations are primarily functional, familiar, or weakly affective. We also found that MEC is increasingly useful for uncovering producer motivations.

Taken together, the results show that MEC still has an important role to play in food research as a complementary method that brings interpretive depth to rapidly changing markets and increasingly complex food choices.

Table A1. Robustness test of potentially biasing effect of Barrena *et al.*

Year	Number of studies per year in the corpus		Total without Barrena <i>et al.</i>
	Total	Barrena <i>et al.</i>	
2000	2	0	2
2001	5	0	5
2002	3	0	3
2003	4	0	4
2004	3	0	3
2005	2	0	2
2006	1	0	1
2007	2	0	2
2008	3	0	3
2009	2	2	0
2010	2	2	0
2011	5	1	4
2012	6	1	5
2013	5	3	2
2014	6	0	6
2015	8	2	6
2016	11	0	11
2017	6	1	5
2018	10	0	10
2019	5	0	5
2020	7	0	7
2021	5	1	4
2022	4	0	4
2023	6	0	6
2024	11	0	11
Totals	124	13	111

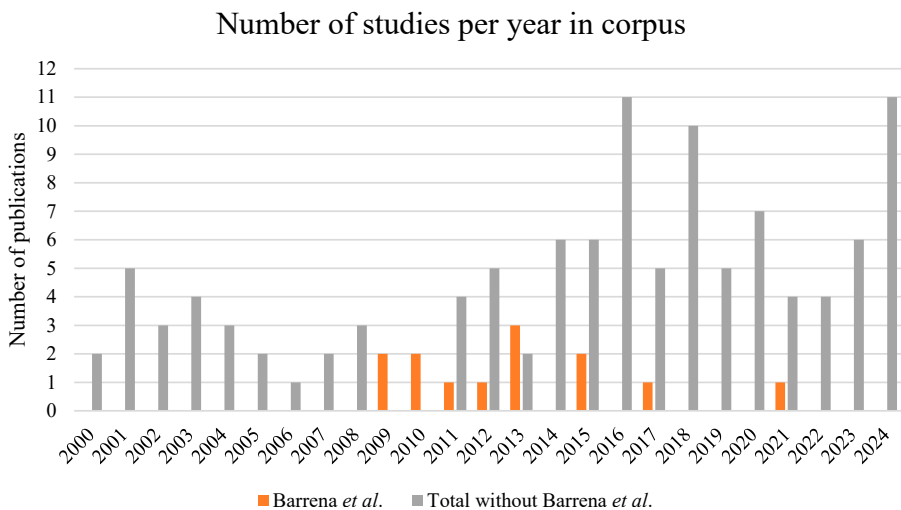


Figure A1. Number of studies per year in the corpus by Barrena et al. and excluding Barrena et al.

Notes

1. The complete coding protocol is available upon request.
2. The other studies did not clarify whether soft or hard laddering techniques were employed.
3. We note, first, that the term “novel foods” has been used in different ways in the literature. In academic literature, especially consumer behaviour, sensory, and sustainability transitions, “novel foods” is frequently used more loosely as a catch-all for foods that are *unfamiliar and new*. In the European Union, “novel foods” are defined more specifically as foods not consumed to a significant degree before May 15, 1997, a category that spans diverse products and production processes (European Commission, 2023).
4. To be clear, some of the subcategories included in this matrix (specifically, items 1, 4, 6, and 7; see Table 4, footnotes 1 and 2, above) are also overlapping with the politically controversial and different-by-region categories discussed in sections 5.2 and 5.3 below.

References

- Arsil, P., Tey, Y.S., Brindal, M., Phua, C.U. and Liana, D. (2018), “Personal values underlying halal food consumption: evidence from Indonesia and Malaysia”, *British Food Journal*, Vol. 120 No. 11, pp. 2524-2538, doi: [10.1108/bfj-09-2017-0519](https://doi.org/10.1108/bfj-09-2017-0519).
- Arsil, P., Li, E. and Bruwer, J. (2022), “Determinants of consumers’ motivation towards ethnic food: evidence from Indonesia”, *British Food Journal*, Vol. 124 No. 10, pp. 3183-3198.
- Barrena, R. and García, T. (2013), “The effect of consumer innovativeness in the acceptance of a new food product: an application for the coffee market in Spain”, *Spanish Journal of Agricultural Research*, Vol. 11 No. 3, pp. 578-592, doi: [10.5424/sjar/2013113-3903](https://doi.org/10.5424/sjar/2013113-3903).
- Barrena, R. and Sánchez, M. (2010a), “Frequency of consumption and changing determinants of purchase decision: from attributes to values in the organic food market”, *Spanish Journal of Agricultural Research*, Vol. 8 No. 2, pp. 251-272, doi: [10.5424/sjar/2010082-1178](https://doi.org/10.5424/sjar/2010082-1178).
- Barrena, R. and Sánchez, M. (2010b), “The link between household structure and the level of abstraction in the purchase decision process: an analysis using a functional food”, *Agribusiness*, Vol. 26 No. 2, pp. 243-264, doi: [10.1002/agr.20244](https://doi.org/10.1002/agr.20244).

- Barrena, R. and Sánchez, M. (2012), "Abstraction and product categories as explanatory variables for food consumption", *Applied Economics*, Vol. 44 No. 30, pp. 3987-4003, doi: [10.1080/00036846.2011.583227](https://doi.org/10.1080/00036846.2011.583227).
- Barrena, R. and Sánchez, M. (2013a), "New food acceptance and effect on the agri-food development by sex", *Agroalimentaria*, Vol. 19 No. 36, pp. 81-95.
- Barrena, R. and Sánchez, M. (2013b), "Neophobia, personal consumer values and novel food acceptance", *Food Quality and Preference*, Vol. 27 No. 1, pp. 72-84, doi: [10.1016/j.foodqual.2012.06.007](https://doi.org/10.1016/j.foodqual.2012.06.007).
- Barrena, R., García, T. and Camarena, D.M. (2015a), "An analysis of the decision structure for food innovation on the basis of consumer age", *International Food and Agribusiness Management Review*, Vol. 18 No. 3, pp. 149-170.
- Barrena, R., García, T. and Sánchez, M. (2015b), "Analysis of personal and cultural values as key determinants of novel food acceptance: application to an ethnic product", *Appetite*, Vol. 87, pp. 205-214, doi: [10.1016/j.appet.2014.12.210](https://doi.org/10.1016/j.appet.2014.12.210).
- Bech-Larsen, T. and Nielsen, N.A. (1999), "A comparison of five elicitation techniques for elicitation of attributes of low involvement products", *Journal of Economic Psychology*, Vol. 20 No. 3, pp. 315-341, doi: [10.1016/S0167-4870\(99\)00011-2](https://doi.org/10.1016/S0167-4870(99)00011-2).
- Bekker, G.A., Fischer, A.R.H., Tobi, H. and van Trijp, H.C.M. (2017), "Explicit and implicit attitude toward an emerging food technology: the case of cultured meat", *Appetite*, Vol. 108, pp. 245-254, doi: [10.1016/j.appet.2016.10.002](https://doi.org/10.1016/j.appet.2016.10.002).
- Bitzios, M., Fraser, I. and Haddock-Flaser, J. (2011), "Functional ingredients and food choice: results from a dual-mode study employing means-end chain analysis and a choice experiment", *Food Policy*, Vol. 36 No. 5, pp. 715-725, doi: [10.1016/j.foodpol.2011.06.004](https://doi.org/10.1016/j.foodpol.2011.06.004).
- Boecker, A., Hartl, J. and Nocella, G. (2008), "How different are GM food accepters and rejecters really? A means-end chain application to yogurt in Germany", *Food Quality and Preference*, Vol. 19 No. 4, pp. 383-394, doi: [10.1016/j.foodqual.2007.11.006](https://doi.org/10.1016/j.foodqual.2007.11.006).
- Borgardt, E. (2020), "Means-end chain theory: a critical review of literature", *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, Vol. 64 No. 3, pp. 141-160, doi: [10.15611/pn.2020.3.12](https://doi.org/10.15611/pn.2020.3.12).
- Cavaliere, A. and Ventura, V. (2018), "Mismatch between food sustainability and consumer acceptance toward innovation technologies among millennial students: the case of shelf life extension", *Journal of Cleaner Production*, Vol. 175, pp. 641-650, doi: [10.1016/j.jclepro.2017.12.087](https://doi.org/10.1016/j.jclepro.2017.12.087).
- Chang, T.Y., Hung, S.F. and Tang, S. (2022), "Seek common ground in local culture while reserving difference: exploring types of souvenir attributes by ethnic Chinese people", *Tourist Studies*, Vol. 22 No. 1, pp. 21-41, doi: [10.1177/14687976211035961](https://doi.org/10.1177/14687976211035961).
- Chen, N.H., Lee, C.H. and Huang, C.T. (2015), "Why buy organic rice? Genetic algorithm-based fuzzy association mining rules for means-end chain data", *International Journal of Consumer Studies*, Vol. 39 No. 6, pp. 692-707, doi: [10.1111/ijcs.12210](https://doi.org/10.1111/ijcs.12210).
- Costa, A.I., Dekker, M. and Jongen, W.M. (2004), "An overview of means-end theory: potential application in consumer-oriented food product design", *Trends in Food Science and Technology*, Vol. 15 Nos 7-8, pp. 403-415, doi: [10.1016/j.tifs.2004.02.005](https://doi.org/10.1016/j.tifs.2004.02.005).
- Crofton, E.C. and Scannell, A.G. (2020), "Snack foods from brewing waste: consumer-led approach to developing sustainable snack options", *British Food Journal*, Vol. 122 No. 12, pp. 3899-3916, doi: [10.1108/bfj-08-2018-0527](https://doi.org/10.1108/bfj-08-2018-0527).
- Engel, J.F., Blackwell, R.D. and Miniard, P.W. (1990), *Consumer Behavior*, Dryden Press, Chicago, IL.
- European Commission (2023), "What is novel food?", available at: https://food.ec.europa.eu/safety/novel-food_en (accessed 24 October 2025).
- Fischer, A.R.H. and Reinders, M.J. (2022), "Consumer acceptance of novel foods", in Galanakis, C.M. (Ed.), *Innovation Strategies in the Food Industry: Tools for Implementation*, 2nd ed., Elsevier, pp. 307-333.

- Fischer, A.R.H. and Steenbekkers, L.P.A. (2018), "All insects are equal, but some insects are more equal than others", *British Food Journal*, Vol. 120 No. 4, pp. 852-863, doi: [10.1108/bfj-05-2017-0267](https://doi.org/10.1108/bfj-05-2017-0267).
- Grunert, K.G. (2010), "Means-end chains – a means to which end?", *Marketing ZFP – Journal of Research and Management*, Vol. 32 No. 1, pp. 30-38, doi: [10.15358/0344-1369-2010-jrm-1-30](https://doi.org/10.15358/0344-1369-2010-jrm-1-30).
- Grunert, K.G., Lähteenmäki, L., Nielsen, N.A., Poulsen, J.B., Ueland, O. and Åström, A. (2001), "Consumer perceptions of food products involving genetic modification: results from a qualitative study in four Nordic countries", *Food Quality and Preference*, Vol. 12 No. 8, pp. 527-542, doi: [10.1016/s0950-3293\(01\)00049-0](https://doi.org/10.1016/s0950-3293(01)00049-0).
- Gutman, J. (1982), "A means-end chain model based on consumer categorization processes", *Journal of Marketing*, Vol. 46 No. 2, pp. 60-72, doi: [10.1177/002224298204600207](https://doi.org/10.1177/002224298204600207).
- Gutman, J. and Reynolds, T.J. (1979), "An investigation of the levels of cognitive abstraction utilized by consumers in product differentiation", in Maloney, J.C. and Silverman, B. (Eds), *Attitude Research Under the Sun*, American Marketing Association, Chicago, IL, pp. 128-135.
- Haas, R., Schnepps, A., Pichler, A. and Meixner, O. (2019), "Cow milk versus plant-based milk substitutes: a comparison of product image and motivational structure of consumption", *Sustainability*, Vol. 11 No. 18, p. 5046, doi: [10.3390/su11185046](https://doi.org/10.3390/su11185046).
- Hansson, H. and Lagerkvist, C.J. (2015), "Identifying use and non-use values of animal welfare: evidence from Swedish dairy agriculture", *Food Policy*, Vol. 50, pp. 35-42, doi: [10.1016/j.foodpol.2014.10.012](https://doi.org/10.1016/j.foodpol.2014.10.012).
- Heo, C.Y. and Kim, B. (2024), "Beyond the plate: exploring the experiential values of meal sharing", *Journal of Hospitality and Tourism Research*, Vol. 48 No. 8, pp. 1287-1301, doi: [10.1177/10963480241230951](https://doi.org/10.1177/10963480241230951).
- Hofstede, G. (1980), *Culture's Consequences: International Differences in Work-Related Values*, Sage Publications, Beverly Hills, CA.
- Hofstede, G.H. and Hofstede, G.J. (2005), *Cultures and Organizations: Software of the Mind*, McGraw-Hill, New York, NY.
- Humble, M., Palmér, M. and Hansson, H. (2021), "Internalisation of farm animal welfare in consumers' purchasing decisions: a study of pork fillet at point of purchase using the means-end-chain and laddering approach", *Animal Welfare*, Vol. 30 No. 3, pp. 313-325, doi: [10.7120/09627286.30.3.013](https://doi.org/10.7120/09627286.30.3.013).
- Jaeger, S.R., Chheang, S.L. and Bredahl, L. (2023), "Means-end chain generation with online laddering: a study on vertical farming with consumers in Singapore and Germany", *Food Quality and Preference*, Vol. 106, 104794, doi: [10.1016/j.foodqual.2022.104794](https://doi.org/10.1016/j.foodqual.2022.104794).
- Jeng, M.Y. and Yeh, T.M. (2016), "The effect of consumer values on the brand position of green restaurants by means-end chain and laddering interviews", *Service Business*, Vol. 10 No. 1, pp. 223-238, doi: [10.1007/s11628-015-0266-1](https://doi.org/10.1007/s11628-015-0266-1).
- Kilwinger, F.B., Marimo, P., am Rietveld, A., Almekinders, C.J.M. and van Dam, Y.K. (2020), "Not only the seed matters: farmers' perceptions of sources for banana planting materials in Uganda", *Outlook on Agriculture*, Vol. 49 No. 2, pp. 119-132, doi: [10.1177/0030727020930731](https://doi.org/10.1177/0030727020930731).
- Kim, G., Oh, J. and Cho, M.S. (2023), "Korean vegetarian values: ethics, sustainability and quality of life", *British Food Journal*, Vol. 125 No. 6, pp. 2294-2314, doi: [10.1108/bfj-07-2021-0750](https://doi.org/10.1108/bfj-07-2021-0750).
- Krystallis, A., Maglaras, G. and Mamalis, S. (2008), "Motivations and cognitive structures of consumers in their purchasing of functional foods", *Food Quality and Preference*, Vol. 19 No. 6, pp. 525-538, doi: [10.1016/j.foodqual.2007.12.005](https://doi.org/10.1016/j.foodqual.2007.12.005).
- Krystallis, A., Vassallo, M. and Chrysosoidis, G. (2012), "The usefulness of Schwartz's 'values theory' in understanding consumer behaviour towards differentiated products", *Journal of Marketing Management*, Vol. 28 Nos 11-12, pp. 1438-1463, doi: [10.1080/0267257x.2012.715091](https://doi.org/10.1080/0267257x.2012.715091).
- Lagerkvist, C.J., Ngigi, M., Okello, J.J. and Karanja, N. (2012), "Means-end chain approach to understanding farmers' motivations for pesticide use in leafy vegetables: the case of kale in peri-urban Nairobi, Kenya", *Crop Protection*, Vol. 39, pp. 72-80, doi: [10.1016/j.cropro.2012.03.018](https://doi.org/10.1016/j.cropro.2012.03.018).

- Lee, P.Y., Lusk, K., Miroso, M. and Oey, I. (2014), "The role of personal values in Chinese consumers' food consumption decisions. A case study of healthy drinks", *Appetite*, Vol. 73, pp. 95-104, doi: [10.1016/j.appet.2013.11.001](https://doi.org/10.1016/j.appet.2013.11.001).
- Leppard, P., Russell, C.G. and Cox, D.N. (2004), "Improving means-end-chain studies by using a ranking method to construct hierarchical value maps", *Food Quality and Preference*, Vol. 15 No. 5, pp. 489-497, doi: [10.1016/j.foodqual.2003.09.001](https://doi.org/10.1016/j.foodqual.2003.09.001).
- Lin, Y.-L. and Lin, H.-W. (2014), "Have you switched to a low-carbon diet? The ultimate value of low-carbon consumerism", *Administrative Sciences*, Vol. 4 No. 2, pp. 105-119, doi: [10.3390/admsci4020105](https://doi.org/10.3390/admsci4020105).
- Mandolesi, S., Naspetti, S., Arsenos, G., Caramelle-Holtz, E., Latvala, T., Martin-Collado, D., Orsini, S., Ozturk, E. and Zanolì, R. (2024), "Consumer attitudes, motivations and barriers towards sheep and goat dairy products", *International Journal of Gastronomy and Food Science*, Vol. 36, 100917, doi: [10.1016/j.ijgfs.2024.100917](https://doi.org/10.1016/j.ijgfs.2024.100917).
- McCarthy, K.S., Parker, M., Ameerally, A., Drake, S.L. and Drake, M.A. (2017), "Drivers of choice for fluid milk versus plant-based alternatives: what are consumer perceptions of fluid milk?", *Journal of Dairy Science*, Vol. 100 No. 8, pp. 6125-6138, doi: [10.3168/jds.2016-12519](https://doi.org/10.3168/jds.2016-12519).
- Miaris, G., Löfgren, S. and Hansson, H. (2024), "Values underlying farmers' business development decisions: evidence from Swedish agriculture using Zaltman metaphor elicitation technique", *Journal of Agricultural Education and Extension*, Vol. 30 No. 1, pp. 21-42, doi: [10.1080/1389224x.2022.2143828](https://doi.org/10.1080/1389224x.2022.2143828).
- Miroso, M., Munro, H., Mangan-Walker, E. and Pearson, D. (2016), "Reducing waste of food left on plates: interventions based on means-end chain analysis of customers in foodservice sector", *British Food Journal*, Vol. 118 No. 9, pp. 2326-2343, doi: [10.1108/bfj-12-2015-0460](https://doi.org/10.1108/bfj-12-2015-0460).
- Moher, D., Liberati, A., Tetzlaff, J. and Altman, D.G. (2009), "Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement", *BMJ*, Vol. 339 No. jul21 1, b2535, doi: [10.1136/bmj.b2535](https://doi.org/10.1136/bmj.b2535).
- Moon, W. and Balasubramanian, S.K. (2003), "Willingness to pay for non-biotech foods in the U.S. and U.K.", *Journal of Consumer Affairs*, Vol. 37 No. 2, pp. 317-339, doi: [10.1111/j.1745-6606.2003.tb00456.x](https://doi.org/10.1111/j.1745-6606.2003.tb00456.x).
- Naspetti, S., Bteich, P., Pugliese, P. and Salame, N. (2016), "Motivation and values of farmers in Lebanon: a comparison between organic and conventional agricultural producers", *New Medit*, Vol. 15 No. 2, pp. 70-80.
- Ngigi, M.W., Müller, U. and Birner, R. (2018), "Farmers' intrinsic values for adopting climate-smart practices in Kenya: empirical evidence from a means-end chain analysis", *Climate and Development*, Vol. 10 No. 7, pp. 614-624, doi: [10.1080/17565529.2018.1442786](https://doi.org/10.1080/17565529.2018.1442786).
- Okello, J.J., Lagerkvist, C.J., Kakuhenzire, R., Parker, M. and Schulte-Geldermann, E. (2018), "Combining means-end chain analysis and goal-priming to analyze Tanzanian farmers' motivations to invest in quality seed of new potato varieties", *British Food Journal*, Vol. 120 No. 7, pp. 1430-1445, doi: [10.1108/bfj-11-2017-0612](https://doi.org/10.1108/bfj-11-2017-0612).
- Olson, J.C. and Reynolds, T.J. (1983), "Understanding consumers' cognitive structures: implications for advertising strategy", in Percy, L. and Woodside, A.G. (Eds), *Advertising and Consumer Psychology*, Lexington Books, Lexington, MA, pp. 77-90.
- Öztürk, B.N. (2024), "Reasons for Muslim and Christian white meat consumption: examples of England and Turkey", *Journal of Islamic Marketing*, Vol. 15 No. 5, pp. 1203-1231, doi: [10.1108/jima-02-2023-0058](https://doi.org/10.1108/jima-02-2023-0058).
- Pambo, K.O., Okello, J.J., Mbeche, R.M. and Kinyuru, J.N. (2017), "Exploring the influence of differentiated nutrition information on consumers' mental models regarding foods from edible insects: a means-end chain analysis", *Ecology of Food and Nutrition*, Vol. 56 No. 6, pp. 530-551, doi: [10.1080/03670244.2017.1392944](https://doi.org/10.1080/03670244.2017.1392944).
- Paul, J., Lim, W.M., O'Cass, A., Hao, A.W. and Bresciani, S. (2021), "Scientific procedures and rationales for systematic literature reviews (SPAR-4-SLR)", *International Journal of Consumer Studies*, Vol. 45 No. 4, doi: [10.1111/ijcs.12695](https://doi.org/10.1111/ijcs.12695).

- Phillips, J.M. and Reynolds, T.J. (2009), "A hard look at hard laddering: a comparison of studies examining the hierarchical structure of means-end theory", *Qualitative Market Research: An International Journal*, Vol. 12 No. 1, pp. 83-99, doi: [10.1108/13522750910927232](https://doi.org/10.1108/13522750910927232).
- Quest, J. (2023), "Developing brand meaning theory: the interplay of tangible attributes and intangible associations in relation to local food brands", *European Journal of Marketing*, Vol. 57 No. 9, pp. 2459-2485, doi: [10.1108/ejm-07-2021-0529](https://doi.org/10.1108/ejm-07-2021-0529).
- Rahman, S.U. and Luomala, H. (2021), "A comparison of motivational patterns in sustainable food consumption between Pakistan and Finland: duties or self-reliance?", *Journal of International Food and Agribusiness Marketing*, Vol. 33 No. 5, pp. 459-486, doi: [10.1080/08974438.2020.1816243](https://doi.org/10.1080/08974438.2020.1816243).
- Rewerts, A.L. and Hanf, J.H. (2009), "Values as driving forces of culture-specific consumption patterns: an empirical investigation of wine consumers", *2009 Conference, August 16-22, 2009, Beijing, China, International Association of Agricultural Economists*.
- Reynolds, T.J. and Gutman, J. (1988), "Laddering theory, method, analysis, and interpretation", *Journal of Advertising Research*, Vol. 28 No. 1, pp. 11-31, doi: [10.1080/00218499.1988.12467766](https://doi.org/10.1080/00218499.1988.12467766).
- Reynolds, T.J. and Olson, J.C. (2001), *Understanding Consumer Decision Making*, Psychology Press, New York, NY.
- Richter, B. and Bokelmann, W. (2018), "The significance of avoiding household food waste – a means-end-chain approach", *Waste Management*, Vol. 74, pp. 34-42, doi: [10.1016/j.wasman.2017.12.012](https://doi.org/10.1016/j.wasman.2017.12.012).
- Roininen, K., Lähteenmäki, L. and Tuorila, H. (2000), "An application of means-end chain approach to consumers' orientation to health and hedonic characteristics of foods", *Ecology of Food and Nutrition*, Vol. 39 No. 1, pp. 61-81, doi: [10.1080/03670244.2000.9991605](https://doi.org/10.1080/03670244.2000.9991605).
- Rokeach, M. (1973), *The Nature of Human Values*, Free Press, New York, NY.
- Russell, C.G., Busson, A., Flight, I., Cox, D.N. and van Lawick van Pabst, J. (2004), "A comparison of three laddering techniques applied to an example of a complex food choice", *Food Quality and Preference*, Vol. 15 No. 6, pp. 569-583, doi: [10.1016/j.foodqual.2003.11.007](https://doi.org/10.1016/j.foodqual.2003.11.007).
- Schwartz, S.H. (1992), "Universals in the content and structure of values: theoretical advances and empirical tests in 20 countries", in Zanna, M.P. (Ed.), *Advances in Experimental Social Psychology*, Academic Press, New York, NY, Vol. 25, pp. 1-65.
- Scott, S.E., Inbar, Y. and Rozin, P. (2016), "Evidence for absolute moral opposition to genetically modified food in the United States", *Perspectives on Psychological Science*, Vol. 11 No. 3, pp. 315-324, doi: [10.1177/1745691615621275](https://doi.org/10.1177/1745691615621275).
- Siegrist, M. (2021), "Trust and risk perception: a critical review of the literature", *Risk Analysis*, Vol. 41 No. 3, pp. 480-490, doi: [10.1111/risa.13325](https://doi.org/10.1111/risa.13325).
- Siegrist, M. and Hartmann, C. (2020), "Consumer acceptance of novel food technologies", *Nature Food*, Vol. 1 No. 6, pp. 343-350, doi: [10.1038/s43016-020-0094-x](https://doi.org/10.1038/s43016-020-0094-x).
- Snyder, H. (2019), "Literature review as a research methodology: an overview and guidelines", *Journal of Business Research*, Vol. 104, pp. 333-339, doi: [10.1016/j.jbusres.2019.07.039](https://doi.org/10.1016/j.jbusres.2019.07.039).
- Sonne, A.M., Grunert, K.G., Olsen, N.V., Granli, B.S., Szabó, E. and Banati, D. (2012), "Consumers' perceptions of HPP and PEF food products", *British Food Journal*, Vol. 114 No. 1, pp. 85-107, doi: [10.1108/00070701211197383](https://doi.org/10.1108/00070701211197383).
- Sorenson, D. and Henthion, M. (2011), "Understanding consumers' cognitive structures with regard to high pressure processing: a means-end chain application to the chilled ready meals category", *Food Quality and Preference*, Vol. 22 No. 3, pp. 271-280, doi: [10.1016/j.foodqual.2010.11.003](https://doi.org/10.1016/j.foodqual.2010.11.003).
- Steenkamp, J.-B. and van Trijp, H. (1997), "Attribute elicitation in marketing research: a comparison of three techniques", *Marketing Letters*, Vol. 8 No. 2, pp. 153-165, doi: [10.1023/a:1007975518638](https://doi.org/10.1023/a:1007975518638).
- Tey, Y.S., Arsil, P., Brindal, M., Liew, S.Y., Teoh, C.T. and Terano, R. (2018), "Personal values underlying ethnic food choice: means-end evidence for Japanese food", *Journal of Ethnic Foods*, Vol. 5 No. 1, pp. 33-39, doi: [10.1016/j.jef.2017.12.003](https://doi.org/10.1016/j.jef.2017.12.003).

- Tranfield, D., Denyer, D. and Smart, P. (2003), "Towards a methodology for developing evidence-informed management knowledge by means of systematic review", *British Journal of Management*, Vol. 14 No. 3, pp. 207-222, doi: [10.1111/1467-8551.00375](https://doi.org/10.1111/1467-8551.00375).
- Urala, N. and Lähteenmäki, L. (2003), "Reasons behind consumers' functional food choices", *Nutrition and Food Science*, Vol. 33 No. 4, pp. 148-158, doi: [10.1108/00346650310488499](https://doi.org/10.1108/00346650310488499).
- Valli, C., Loader, R.J. and Traill, W.B. (2000), "Pan-European food market segmentation: an application to the yoghurt market in the EU", *Journal of International Food and Agribusiness Marketing*, Vol. 10 No. 4, pp. 77-99, doi: [10.1300/j047v10n04_06](https://doi.org/10.1300/j047v10n04_06).
- Verbeke, W. (2015), "Profiling consumers who are ready to adopt insects as a meat substitute in a Western society", *Food Quality and Preference*, Vol. 39, pp. 147-155, doi: [10.1016/j.foodqual.2014.07.008](https://doi.org/10.1016/j.foodqual.2014.07.008).
- Verbeke, W., Marcu, A., Rutsaert, P., Gaspar, R., Seibt, B., Fletcher, D. and Barnett, J. (2015), "Would you eat cultured meat?": consumers' reactions and attitude formation in Belgium, Portugal and the United Kingdom", *Meat Science*, Vol. 102, pp. 49-58, doi: [10.1016/j.meatsci.2014.11.013](https://doi.org/10.1016/j.meatsci.2014.11.013).
- Wang, W.X., Hempel, C. and Roosen, J. (2024), "A means-end chain approach to investigate consumer motives for the choice of bread made from heritage cereals", *Journal of Food Products Marketing*, Vol. 30 No. 2, pp. 31-47, doi: [10.1080/10454446.2024.2309585](https://doi.org/10.1080/10454446.2024.2309585).

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