Self-Efficacy in the Kitchen: Assessing the Role of Cooking Self-Efficacy in Consumer Choices and Evaluation of Protein Foods

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Abstract

Cooking has a complex role in consumer food behaviour. This thesis presents two studies exploring how cooking self-efficacy shapes a consumer's interaction with protein foods. The research employs a mixed-methods approach to study the drivers of cooking behaviours.

The first study involves a qualitative exploration through focus groups with beef consumers to delve into their experiences and perceptions. This study found that consumers place significant importance on the perceived cooking quality of beef, which influences their pre-purchase evaluation. Cooking self-efficacy appears crucial in determining the overall satisfaction with the eating experience. A lack of confidence in cooking skills may lead to a delay in the repeat purchase of beef following a negative eating experience.

The second study used a nationally representative survey with 2,653 participants from across the United Kingdom to explore the relationships between self-efficacy, consumption motives (e.g., health, taste, convenience), and the frequency of cooking and consuming various types of protein sources (meat, fish, alternative proteins). Results indicate that cooking self-efficacy is strongly and significantly associated with personal motives. Self-efficacy also relates to cooking frequency for all protein food types, suggesting that those with higher cooking confidence cook more often. The impact of personal motives on cooking frequency is most evident in beef, less so in pork and meat alternatives, and is not significant for lamb and fish, suggesting diverse motivational influences. Overall, cooking self-efficacy and personal motives emerge as consistent drivers of cooking and consumption behaviours. These studies provide empirical evidence of self-efficacy and personal motives are key factors in both cooking and consumption frequencies across various protein food types. Cooking self-efficacy influences quality expectations, satisfaction, and subsequent behaviour such as complaints and repeat purchasing. These studies highlight the diverse nature of food choice behaviours, influenced by a combination of individual skills, personal preferences, and broader social considerations.

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While I am writing these words, I cannot help but think back to when I first started my PhD. I used to daydream about this moment, thanking all the amazing people who had been there for me.

It has been an incredible journey, marked by both challenges and triumphs, doubts and achievements, and yes, a fair share of procrastination. But, it has also been a time rich in memories, learning, and self-discovery. This chapter has been pivotal in shaping who I am today. I would not be who I am today without this chapter in my life.

So, first of all, a big high-five to myself for diving into this adventure and sticking it out to the end. If given the opportunity to start over, I would choose this path again, and I hope I would approach the challenges with even more courage.

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In memory of Peppa, my beloved furry friend.
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Chapter 1. Introduction

1.1 Introduction

This thesis presents two studies exploring how cooking self-efficacy shapes consumers' interactions with protein foods. Protein-rich foods specifically meat and plant-based meat alternatives, have become increasingly popular in narratives around health and specifically sustainability. However, consumer hesitancy towards adopting plant-based protein options emerge as a critical challenge. There is often a disconnect between consumer perception and actual meat quality, yet consumers are reluctant to shift away from traditional meat-based diets, reflecting a complex landscape of dietary choices and preferences. Part of this behavioural complexity in food provisioning is the significant role of cooking, which is a key element often overlooked in the broader narrative of food consumption. The significance of cooking practices in determining dietary choices is becoming increasingly apparent, pointing to a shift in focus from the end product to the culinary processes themselves. This perspective transforms our understanding of dietary habits, highlighting the kitchen as a crucial arena where food preferences and choices are influenced and manifested. It requires a comprehensive exploration of dietary habits because it considers not only the food on our plates but also the journey it undertakes - from the selection of ingredients to the cooking techniques employed. It brings to the forefront the concept that our eating habits are intimately linked to how we cook, thereby offering a more holistic view of food consumption. Embracing this perspective could lead to innovative strategies that promote healthier and more sustainable eating practices, integrating cooking skills, dietary preferences, and environmental considerations into a cohesive approach towards food consumption.

The research in this thesis employed a mixed-methods approach to study the drivers of cooking behaviours. The first study involved a qualitative exploration through focus groups of beef consumers' experiences and perceptions of steak purchase, cooking and consumption. The second study used a nationally representative survey of United Kingdom participants to explore the relationships between self-efficacy, consumption motives (e.g. health, taste, convenience), and the frequency of cooking and consuming various types of protein foods (meat, fish,

alternative proteins). The thesis begins by contextualising the importance of meat and plant-based meat alternatives from a sustainability and health perspectives, followed by the aims and objectives and structure.

1.2 Towards A Sustainable Healthy Diet

Definitions of sustainability typically include ecological, economic, and social aspects, which can vary depending on the context. A sustainable diet may have different definitions for consumers, farmers, and food manufacturers (Sabaté & Soret, 2014). According to FAO (2018), a sustainable food system ensures food security and nutrition without compromising the economic, social goals and environmental foundations for future generations to meet their needs. To ensure sustainable healthy diets are available, accessible, affordable, safe, and desirable, several key actions are needed (FAO & WHO, 2019). Promoting capacity development strategies for behaviour change is crucial, including empowering consumers and providing effective food and nutrition education. It is also important to quantify and balance potential trade-offs to make these diets appealing to everyone.

Afshin et al. (2019) conducted a systematic evaluation of dietary consumption patterns across 195 countries, revealing the substantial health impacts of poor dietary habits on populations. Their study found that improved diets could potentially prevent one in five deaths worldwide. The research demonstrated that dietary risks affect individuals regardless of age, sex, or socioeconomic status. Notably, the non-optimal intake of whole grains and fruits, coupled with high sodium levels, accounted for over 50% of diet-related deaths and 66% of diet-attributable disability-adjusted life-years. A later review by Yeung et al. (2021) supports the findings of Afshin et al. by suggesting that plant-based dietary patterns generally benefit various domains of healthy aging. These diets typically emphasize high consumption of fruits, vegetables, and whole grains, moderate intake of dairy products, fish, and poultry, and low consumption of sugars, saturated fats, and processed foods. Despite these observed benefits, there is still no consensus on the exact definition of a healthy diet for promoting healthy aging across multiple dimensions.

Adequate protein intake is essential for maintaining muscle mass, with adults requiring 0.8 g/kg body weight, which amounts to approximately 56 g/day

for a 70-kg individual. The quality of protein, determined by its amino acid composition, is generally higher in animal sources compared to most plant sources. High-quality protein is particularly important for the growth of infants and young children, as well as for older adults experiencing muscle mass loss. Major sources of protein include meat, dairy, fish, eggs, legumes, and nuts. These sources often define dietary patterns such as omnivore, vegetarian, pescatarian, or vegan. Research indicates that vegetarian diets can be healthy, with pescatarian diets associated with the lowest mortality risk. Shifting towards plant-based diets can reduce the risks of type 2 diabetes and heart disease (Satija et al., 2017). Conversely, consumption of red meat, particularly processed red meat, is linked to higher mortality and cardiovascular risk, whereas white meat, poultry, and fish do not share these associations (Satija et al., 2017).

Global meat consumption is rising, especially in low- and middle-income countries; while meat production demands more land and water than plant-based foods and has a larger environmental and climate footprint, making high consumption levels unsustainable (Parlasca & Qaim, 2022). While reducing meat consumption is crucial in high-income countries, it is more nuanced in low- and middle-income regions where meat helps address nutritional deficiencies and supports livelihoods. Animal-derived proteins, with their complete amino acid profiles and high bioavailability, are vital for muscle protein synthesis and overall muscle health (Paddon-Jones et al., 2015). In many low- and middle-income countries, improving nutritional status may require focusing on adequate nutrient intake, which often includes increasing the consumption of animal-source foods (Headey et al., 2018). For instance, increased consumption of meat and other animal-sourced foods could help reduce nutritional deficiencies and promote human health, especially among vulnerable groups such as children, adolescents, and pregnant and lactating women (Adesogan et al., 2020).

Although meat is a crucial nutrient source and income provider in many regions, its high consumption levels are unsustainable. To address these challenges, it is crucial to reduce meat intake in high-income countries and enhance production technologies. Westhoek et al. (2014) examined the health and environmental consequences of replacing 25-50% of meat, eggs, and dairy consumption in the EU with plant-based foods may bring a significant potential benefit, including a 25-40% reduction in greenhouse gas emissions and a 40% reduction in reactive nitrogen emissions. However, the model also suggested that the livestock sector is likely to

face significant challenges if consumer preferences change rapidly. Another study modelled the effect of a 50% reduction in livestock product consumption reduces the UK farm-gate value of livestock products from £7.6 to 3.5 billion (Audsley et al., 2013). Therefore, sustainable development requires balancing reductions in some areas with modest increases in others (Çakmakçı et al., 2023).

The review by Yeung et al. (2021) highlights that the understanding of what constitutes a healthy diet can vary significantly depending on the region and the methods used to define dietary patterns. Factors such as cultural, ethnic, geographical, and cooking differences play substantial roles in influencing dietary outcomes, indicating the need for a more nuanced approach to defining and promoting healthy diets tailored to diverse populations. Low to moderate meat consumption levels align with climate targets and broader sustainable development goals (Willett et al., 2019). A shift in consumer attitudes towards high-value products like meat and dairy produced under better animal welfare standards could mitigate economic impacts (Westhoek et al., 2014) Consequently, promoting increased consumption of plant-based proteins is an effective strategy for addressing the sustainability challenges linked to high meat consumption.

1.3 Perceived Self-efficacy

Perceived self-efficacy is a critical factor in promoting health behaviours. It influences health at two levels. Firstly, individuals' belief in their ability to manage life stressors activates biological systems that affect health and disease. Secondly, self-efficacy impacts the ability to directly control behaviours that affect health and aging (Bandura, 1997). Individuals with higher self-efficacy reported better nutritional behaviours, and self-efficacy was influential in both the motivation and action phases of behavioural change (Schwarzer & Renner, 2000). These findings highlight the importance of focusing health interventions on enhancing coping self-efficacy and tailoring strategies to different phases of behavioural change.

Sheeran et al. (2016) conducted a meta-analysis supporting the premise that attitudes, norms, and self-efficacy have a causal effect on intentions and behaviour, suggesting that interventions targeting these cognitions can effectively promote health behaviour change. Notably, self-efficacy was found to have a medium-sized effect on behaviour, which is greater compared to the effects of attitudes and norms, making it a significant predictor of health behaviour. The review notes that while

self-efficacy primarily influences behaviour through intentions, it also has direct effects. Mediation analyses revealed that the direct effects of self-efficacy on behaviour remained significant even after accounting for intentions. This suggests that self-efficacy not only helps in forming intentions but also directly facilitates behaviour change, possibly by enhancing individuals' confidence in their ability to overcome barriers. This aligns with Bandura's social cognitive theory (Bandura, 1989), which emphasises the importance of self-efficacy in determining how people think, behave, and feel.

To extend the concept of perceived self-efficacy into the field of culinary activities, it is essential to explore how cooking self-efficacy profoundly influences dietary behaviours and overall nutrition. Cooking self-efficacy played a significant role in influencing cooking behaviour such as cooking frequency (Oleschuk et al., 2023; Wolfson et al., 2020), and food choice (Jarpe-Ratner et al., 2016). This direct link between cooking behaviour and healthier eating underscores the potential of targeted educational interventions aimed at enhancing cooking skills to foster better dietary habits.

1.4 The Dilemma with Protein-Rich Foods

The need to transition towards low- or reduced-meat diets are largely driven by health and environmental considerations (Onwezen et al., 2021; Runte et al., 2023). While the existing protein sources, particularly animal-based, are hindered by such concerns, it is also important to acknowledge their socio-economic advantages and the high level of consumer acceptance they enjoy (Henchion et al., 2017). Plant-based food preparations from pulses or grains have long been a major protein source in human diets. These raw materials are easily accessible, storable, and affordable. Traditional Asian plant-based meat substates like tofu, tempeh, and seitan have been consumed for centuries which are comparable with meat and fish in nutritional value and functionality. Historically, the use of plant-based meat alternatives was driven by economic or religious reasons, but from the 1960s, animal welfare also became a significant motivation (Sadler, 2004). Consumers have increasingly turned to meat alternatives for a healthy, sustainable, and convenient diet and to try new foods. This trend is supported by an increasing number of sophisticated new products made from various raw materials, now widely available in shops and restaurants (Sadler, 2004; Wild et al., 2014).

European consumers perceive plant-based diets as healthy and environmentally sustainable (Van Loo et al., 2017). A few recent studies indicate growing interest in reducing red meat consumption and increasing plant-based protein intake (Grasso et al., 2019; Nevalainen et al., 2023). However, changing meat consumption behaviour remains challenging as numerous barriers exist including preconceptions towards vegetarian diets, habits and prices (Vanhonacker et al., 2013). More recent studies show that meat is associated with positive attributes whereas meat alternatives are viewed negatively (Michel et al., 2021). Nevertheless, Schösler et al. (2012) found that in the (northern European) Netherlands, the most common foods chosen to substitute for meat were fish and eggs, followed by cheese, with plant-based meat substitutes ranked further down the list. Lentils, pulses, and nuts were even less preferred; seitan, tempeh, and tofu were the least preferred options. Given barriers to legume consumption such as preparation knowledge and time constraints (Figueira et al., 2019), plant-based meat substitutes could serve as a convenient way to boost intake. Similarly, incorporating whole grains like brown rice, buckwheat, and quinoa in plant-based meat substitutes can help consumers meet daily whole grain intake targets (Curtain & Grafenauer, 2019).

Dutch consumers' low preferences for legumes are partly due to them disrupting familiar meal formats, which traditionally feature meat as the structural component (Schösler et al., 2012). These gave indications that cultural resistance requires research into integrating plant-based proteins such as legumes into consumers' meals without compromising tradition. Whereas Australians consumers who included legumes in their diet 2-4 times weekly, often integrated them into more diverse dishes such as Mexican, Indian, and Middle Eastern cuisines. Non-consumers cited taste, preparation knowledge, time constraints, and family preferences as significant barriers (Figueira et al., 2019). These gave indications that consumers who have higher self-efficacy in cooking and are open to culinary diversity are more likely to integrate legumes into their diets, overcoming traditional barriers and making healthier food choices. Understanding consumer cooking behaviour is key to encouraging a balanced diet that includes high-quality meat and plant-based proteins. This approach not only addresses the practical barriers to legume consumption but also helps shift cultural and dietary norms towards healthier, more diverse eating patterns.

On the other hand, consumers consider meat as healthy and nutritious, as well as an important component of dietary needs (Verbeke, Pérez-Cueto, et al., 2010). For those who are particularly attached to meat, they tend to rationalise meat consumption as "natural, normal, necessary and nice" (Piazza et al., 2015). Despite strong motivations for sustainable practices like meat reduction, societal factors and daily routine complexities make it difficult for individuals to adopt such practices consistently (Mylan, 2018). Indeed, meat consumption is often associated with social norms, and is seen as suitable for family preferences and social occasions and forms a part of cultural traditions (Henchion et al., 2022; Horgan et al., 2019). In fact, low to moderate meat consumption levels align with climate targets and broader sustainable development goals (Willett et al., 2019). A shift in consumer attitudes towards high-value products like meat and dairy produced under better animal welfare standards could mitigate economic impacts (Westhoek et al., 2014). In response, there is a focused effort to enhance meat quality and encourage better meal planning, reflecting the urgent need for more sustainable meat production (Schösler & de Boer, 2018; Teixeira & Rodrigues, 2021). However, the challenges remain, as consumer perceptions of meat quality often conflict with its actual quality, which may result in dissatisfaction (Grunert, 2006). This discrepancy between expectations and reality poses a significant challenge for the food industry.

1.4.1 Consumer Dissatisfaction with Meat Quality

When considering meat consumption, consumer decision-making is significantly influenced by various quality cues (Steenkamp & Baumgartner, 2000). These cues play a pivotal role not only in purchase choices but also in shaping the eating experience. Consumers frequently rely on extrinsic cues like country of origin, food safety certifications, and price as guiding factors for their meat purchasing decisions (Borgogno et al., 2015; Morales et al., 2013). However, this reliance can lead to a notable gap between what consumers expect in terms of meat quality and their actual experience. Grunert (2006) highlights that this disconnect often arises from the misalignment of quality cues, which tend to change throughout the provisioning process. This misalignment can result in discrepancies between consumers' initial expectations based on external indicators and the reality of the product's quality upon consumption. Additionally, Aboah and Lees (2020) point out that existing research often focuses on pre-defined attributes and stated preferences, potentially

limiting a comprehensive understanding of how consumers use various cues in their purchasing decisions.

It becomes even more complex when consider individual differences. For instance, market segmentation based on consumer involvement with meat reveals multiple distinct segments, each differing in socio-demographic composition and decision-making processes regarding fresh meat consumption (Verbeke & Vackier, 2004). Moreover, real-life meal choices involve balancing practical considerations with health and social concerns, leading to context-based rationalities and values (Korzen & Lassen, 2010). In other words, individuals' concerns and priorities regarding meat consumption and its quality may highly be dependent on the context. In the everyday context, factors like family preferences and the effort involved in meal preparation may significantly influence how consumers perceive meat quality. Ultimately, the sensory quality of meat, such as taste, texture and flavour are a primary interest to the meat consumers (Bello Acebrón & Calvo Dopico, 2000). Cooking can enhance or diminish these sensory properties, and therefore may influence the overall satisfaction with the meat product (Lorenzen et al., 1999; Suleman et al., 2020). Current literature often overlooks the practical aspects of meat consumption, particularly how cooking behaviour affects perceived quality.

1.4.2 Resistance to Sustainable Proteins: Plant-Based Alternatives

Promoting increased consumption of more sustainable proteins is an effective strategy for addressing the sustainability challenges linked to high meat consumption. Plant-based food preparations from pulses or grains have long been a major protein source in human diets. These raw materials are easily accessible, storable, and affordable. Traditional Asian plant-based meat substitutes like tofu, tempeh, and seitan have been consumed for centuries which are comparable with meat and fish in nutritional value and functionality. Historically, the use of plant-based meat alternatives was driven by economic or religious reasons, but from the 1960s, animal welfare also became a significant motivation (Sadler, 2004). Consumers are increasingly turning to meat alternatives for a healthy, sustainable, and convenient diet and to try new foods. This trend was supported by an increasing number of sophisticated new products made from various raw materials, now widely available in shops and restaurants (Sadler, 2004; Wild et al., 2014).

However, more recent studies show that meat is associated with positive attributes whereas meat alternatives are viewed negatively (Michel et al., 2021). Nevertheless, Schösler et al. (2012) found in countries like Netherlands, the most common foods chosen to substitute for meat were fish and eggs, followed by cheese, with plant-based meat substitutes ranked further down the list. Lentils, pulses, and nuts were even less preferred, with seitan, tempeh, and tofu were the least preferred options. Given barriers to legume consumption such as preparation knowledge and time constraints (Figueira et al., 2019), plant-based meat substitutes could serve as a convenient way to boost intake. Similarly, incorporating whole grains like brown rice, buckwheat, and quinoa in plant-based meat substitutes can help consumers meet daily whole grain intake targets (Curtain & Grafenauer, 2019).

Consumers often find plant-based alternatives challenging to accept, which is primarily due to the difficulty in replicating the unique flavour and textural properties of meat and dairy products (Mancini & Antonioli, 2022; Ueland et al., 2022). For example, the extent to which a plant-based meat alternative resembles meat in terms of sensory attributes, such as a 'meaty' flavour, is a critical factor influencing consumer acceptability (Neville et al., 2017). To make it more difficult, ingredients commonly used in PBA, like pulses, are known to sometimes create off-flavours and tastes that consumers find undesirable (Roland et al., 2017). Despite the industry's efforts to craft more realistic and appealing PBA products, a notable gap exists in consumer education on how to cook these products to meet their needs (Hoek et al., 2017; O'Keefe et al., 2016).

Individuals' proficiency in preparing various types of food can significantly influence their willingness to experiment with new or alternative food options (Schösler et al., 2012). This relationship suggests that a higher level of culinary skill and confidence may lead to a greater openness towards incorporating different and potentially unfamiliar food items into one's diet. For example, Australian consumers who included legumes in their diet 2-4 times weekly, often integrated them into more diverse dishes such as Mexican, Indian, and Middle Eastern cuisines. Non-consumers cited taste, preparation knowledge, time constraints, and family preferences as significant barriers (Figueira et al., 2019). These indicate that consumers who have higher self-efficacy in cooking and are open to culinary diversity are more likely to integrate legumes into their diets, overcoming traditional barriers and making healthier food choices. Whereas Dutch consumers' low preferences for legumes are partly due to the fact that they disrupt familiar meal

formats, which traditionally feature meat as the structural component (Schösler et al., 2012). These indications show that cultural resistance requires research into integrating plant-based proteins such as legumes into consumers' meals without compromising tradition culinary culture and method.

Understanding consumer cooking behaviour is key to encouraging a balanced diet that includes high-quality meat and plant-based proteins. This approach not only addresses the practical barriers to legume consumption but also helps shift cultural and dietary norms towards healthier, more diverse eating patterns.

1.5 What We Eat is What We Cook

It is commonly believed that contemporary consumers generally lack cooking skills, a trend resulting from lifestyle changes and preferences for convenience (Caraher & Lang, 1999). This shift is evident in the growing preference for eating out or opting for pre-prepared or partially prepared foods due to time constraints (Brunner et al., 2010; Buckley et al., 2007). Convenience is now a valued attribute in food selection, particularly in meat products, where ease of preparation is a significant consideration (Korzen & Lassen, 2010). An example of this is the fact that lamb is often associated with being more challenging to prepare (Bernués et al., 2012), whereas chicken is seen as a convenient option (Barbut, 2012). However, perceptions of convenience in chicken also vary; cooking a whole chicken is viewed as more time-consuming, leading consumers to prefer chicken pieces or prepared chicken products in their daily meal choices (Magdelaine et al., 2008).

The lack of cooking skills is not limited to meat products. Cross-culturally, there is a significant gap in consumer confidence and skills in preparing and cooking fish (Brunsø et al., 2009). Moreover, the challenge extends beyond just preparation; it also affects how consumers evaluate protein foods. Many consumers lack the experience necessary to accurately assess fish quality, which is closely linked to their proficiency in fish preparation (Verbeke & Vackier, 2005). This phenomenon highlights the complexity of consumer perceptions, where decisions are based not just on the product itself but also on the effort and time involved in its preparation. This links back to what Korzen & Lasse (2010) noted: real-life meal choices are a balancing act where practical considerations are weighed alongside health and social concerns. This dynamic relationship between various factors

underlines the need for a nuanced understanding of consumer behaviour, especially in the context of promoting healthier or more sustainable food choices.

The increasing focus on consumer cooking behaviours in recent research has shed light on the multidimensional benefits of cooking. Developing cooking skills is increasingly seen as key to following nutritional guidelines and making healthier food choices (Hartmann et al., 2013). Moreover, the intrinsic enjoyment of cooking and eating is recognised as a factor that can encourage sustainable food choices (Schösler et al., 2014). For example, children who acquire skills and knowledge in preparing fish tend to develop a greater liking for and involvement with fish-based meals (Højer et al., 2021).

The development of various tools and measurements has also enhanced our understanding of consumers' cooking and food skills (Lavelle et al., 2017; Vidgen & Gallegos, 2014). Notably, more holistic scales, such as the one developed by Lahne et al. (2017) assess not just subjective cooking ability but also perceived self-efficacy in cooking and food provision. These tools reflect a broader understanding of cooking as an evolving, complex activity (Short, 2003; Wolfson et al., 2016).

Contemporary perspectives on cooking go beyond practical work to encompass mental planning, preparation, tool use, and more (Lavelle et al., 2020; Trubek et al., 2017). Recognising the complexity of cooking, which includes manual skills and cognitive and sensorial aspects, prompts important questions about consumer perceptions of their cooking and food skills. These perceptions directly influence cooking behaviour and broader behaviours related to food choice and quality perception. Addressing these questions may help formulate strategies to enhance cooking skills and promote healthier, more sustainable eating habits. By understanding and improving cooking behaviour, we can better tackle the challenges of promoting healthy and sustainable food choices in contemporary society.

1.6 Scope and Aims of the Thesis

In summary, the overall research question is:

What is the role of cooking self-efficacy in consumer food behaviours?

In particular, the thesis focuses on different protein sources to answer further questions:

1. How have cooking practices and definitions evolved in contemporary society, particularly in relation to dietary choices?
2. How does the cooking impact consumer evaluations of beef quality and satisfaction?
3. How does cooking self-efficacy influence the cooking and consumption of various protein foods?
4. What is the relationship between personal and prosocial motives and cooking, as well as consumption behaviours across different protein types?

The structure of the thesis is listed as follow:

Chapter 2 – This chapter presents a literature review focusing on the role of cooking in the complementary society. The review aimed at broadening the scope to include a wide-ranging review of how cooking informs dietary choices and highlighting the growing complexity and dynamic nature of cooking in contemporary society. The review also highlighted the need to understand more on the role of cooking self-efficacy on consumers food behaviours.

Chapter 3 – This chapter presents an exploratory focus group study aimed to explore how cooking and cooking self-efficacy influences the perception and actual quality of meat. It shed light on the discrepancy between consumer expectations and the sensory quality of meat, impaired by cooking methods and personal skills. From this qualitative research, it raised a further research direction on the need to further examine the role of cooking self-efficacy.

Chapter 4 – This chapter considers multiple protein foods and investigates the role of cooking self-efficacy in relation to food motives and protein food cooking behaviour, including both animal-based and plant-based protein sources.

Chapter 5- Summarised research findings and general discussion.

Chapter 2. The Role Cooking in Contemporary Society: A Narrative Review

2.1 Abstract

The aim of this literature review is to map out the multidimensional research on cooking and related topics, examining its impacts from a several perspectives. The review navigates the evolution of cooking's definition, taking into account the influence of cultural and socio-economic factors that potentially shape cooking practices and exploring the impact of cooking practice on informing dietary choices. By analysing current scholarly work, this review aims to assess the complex relationship between cooking behaviours and dietary choices, analytically identifying prospective directions for future research. The overarching goal of this review is to enrich our understanding of cooking behaviours in the context of modern society and recognising their significance in crafting strategies and policies that support healthy and sustainable eating practices.

2.2 Introduction

Over the past two decades, there has been a surge in research focused on topics related to cooking, such as ‘home cooking/prepared food’, ‘cooking/culinary/food skills’, and ‘food literacy’, in various countries (Clifford Astbury et al., 2019; Reicks et al., 2018; Virgin & Gallegos, 2014). This trend underlines an increasing awareness of the pivotal role that cooking plays in shaping dietary habits and promoting a healthy lifestyle. Researchers and public health professionals are prompted to investigate how cooking skills impact food choices (Caraher et al., 1999; Hartmann et al., 2013), consumption patterns (Lam & Adams, 2017), and the ability to maintain a healthy diet (Gatley, 2016). This growing body of research signifies a shift in focus towards the practicalities of dietary behaviour. It's not only about the nutritional content of what people consume but also the processes involved in food preparation. Therefore, understanding the influence of cooking practices is crucial for developing effective strategies to improve public health and foster healthy eating habits at a broader scale.

Despite the significant growth in research on cooking-related topics, several questions and knowledge gaps remain, pointing to the need for continued research. One such question is the ambiguity surrounding the definition of cooking, where a clear consensus is yet to be established (Gugliucci et al., 2022; Wolfson et al., 2016). This lack of clarity may complicate efforts to assess and improve cooking skills effectively. Furthermore, there is ongoing debate over whether the observed changes in cooking behaviour represent a real decline in cooking skills or simply a shift in culinary practices and preferences (Caraher & Lang, 1999; Lang & Caraher, 2001; Lyon et al., 2003). Additionally, questions persist about the effectiveness of current cooking conventions and whether they adequately address the needs and realities of modern lifestyles (Rees et al., 2012). There is a question of whether existing culinary norms and teaching methods adequately reflect contemporary life and whether they can effectively support the goal of improving diet quality in today's fast-paced world.

Cooking is also deeply associated with social and cultural practices as Trubek (2012) points out that specific cooking knowledge varies across different cultures, regions, and time periods. However, meal preparation, which includes the processes of shopping, cooking, as well as eating, is identified as a set of integral social practices (Grunert et al., 2022). These activities play a significant role in

shaping self-identity and defining roles within the household. These practices also extend beyond the individual or family level to reflect broader societal norms (Halkier et al., 2011). A study that compared Flemish time budget data from 1988 and 1999 to explore changes in eating practices found that Flemish eating habits remained structured in terms of timing, location, and social aspects during this period (Mestdag, 2005). This study highlighted the strong emphasis that cultural norms and practices in various societies place on the communal aspect of sharing meals.

The fact that cooking is a central part of meal preparation, and the communal nature of eating underscores the importance of cooking as a means to bring people together. Daniels et al. (2012) complement Mestdag's point (2015) by highlighting the social dimension of cooking and how it can shape an individual's experience and perception of the task. People are more likely to find cooking enjoyable when they are surrounded or assisted by family or friends. while solitary cooking tends to be seen as a necessary chore (Daniels et al., 2012). These findings make clear that cultural norms and practices place a significant emphasis on cooking and eating, the presence of others can enhance the experience of cooking and dining, reinforcing the idea that meals and food preparation are not solely about nourishment but also about social connection. They also suggest that cooking and eating can have different meanings for different individuals and can also vary depending on the specific circumstances.

It is also important to recognise the dynamic relationship and changes over time in food-related behaviours. A more recent study explored the experience of eating out in England and how it has evolved over time: eating out has become more common and is not restricted to planned or special occasions (Paddock et al., 2017). While many individuals cherish the experience of preparing and consuming meals at home, the convenience and social atmosphere of dining out that eliminates the need for planning, preparation, and clean-up has become increasingly appealing. This suggests a dynamic relationship between the comforts of home cooking and the social ease of eating out, reflecting changing lifestyle patterns and preferences.

Despite the transition, food cooked at home still represents a unity of production and consumption, in opposition to the alienation often associated with mass-produced foods (Moisio et al., 2004). Like Mestdag (2005) who emphasised the communal aspect of sharing meals is more than just the act of eating. While many researchers tend to focus on the nutrition and health implications of 'home

cooking,' it is important to note that cooking at home is still a fundamental part of many people's dietary practices (Mills et al., 2020). The emphasis on the social value of home cooking may add an additional layer of significance to the practice, and its importance extends not just for physical wellbeing but also for emotional and social health.

These critical debates and gaps underscore the necessity for more nuanced and in-depth research into cooking behaviours. By deepening our understanding of the role of cooking in dietary choices and exploring the complex influences on food preparation practices, we can better leverage our knowledge to assist the public in making healthier food choices. This understanding is essential for designing and implement effective interventions and educational initiatives that are attuned to the diverse needs of the population and the changing dynamics of food and nutrition. Therefore, the aim of this chapter will review, map out and analyse the current research surrounding the subject of cooking and its broader impacts, explore the social dimensions of cooking as a practice that promotes social structure and community. The review will first examine various interpretations and understandings relating to how the definition of cooking has evolved over time, then explore various factors such as socio-economic, cultural contexts and gender, that can shape cooking practices and behaviours and how these, in turn, affect dietary choices. This chapter also reviews the relationship between self-efficacy, cooking behaviours, and broader socio-cultural factors. Through a synthesis of recent scholarly work, this review intends to illuminate the complex nature of cooking and identify potential paths for future research. Ultimately, this literature review aims to enhance our understanding of cooking behaviours. This understanding may be crucial for creating effective strategies and policies that encourage healthy and sustainable eating practices, recognising the key role that cooking plays in our dietary health and social well-being.

2.3 Defining Cooking

2.3.1 The Evolution of Cooking

The concept and practice of cooking have experienced significant transformation over the course of history. In theory, cooking primarily entailed the application of heat to food to improve its nutritional properties (Carmody & Wrangham, 2009; R. Wrangham & Conklin-Brittain, 2003). The fundamental goal of these early cooking

methods like roasting and boiling was to enhance the digestibility of food by transforming its complex molecular structure. For instance, the cooking of plant-based foods led to the modification of starches and fibres, as detailed in studies by Muir & O'Dea (1992); Periago et al. (1997); R. W. Wrangham et al. (1999). Similarly, the cooking of meat focused on tenderising its tissues (Pathare & Roskilly, 2016; Zink et al., 2014). Therefore, cooking has been identified as a crucial evolutionary adaptation that significantly impacts human biology since it has led to some of the most remarkable improvements in dietary quality (Hardy et al., 2015; Zink & Lieberman, 2016). This evolution in cooking practices has deeply influenced not only what humans eat but also how food is distributed and made available (R. W. Wrangham et al., 1999). Cooking has played an essential role in shaping the dietary habits and food processing methods of human societies throughout history.

Throughout the evolution of human societies, there has been a remarkable expansion in the variety and diversity of foods available. As we delve into the historical progression of cooking, our focus shifts to more recent developments in the culinary field (Patrik et al., 2015) conducted an insightful study by analysing cookery books to gain a deeper understanding of the long-term evolution of European cookery. Their findings suggest a remarkable trend towards increasing complexity in European cookery practices. This complexity manifests in several dimensions, such as the number of ingredients and steps, cooking methods, semi-manufactured ingredients[1] , and compound semi-manufactured ingredients used in recipes (Patrik et al., 2015). The study revealed that over time, the complexity of recipes has significantly increased. This can largely be attributed to the expansion of the global food market, advancements in food preservation and transportation (Patrik et al., 2015). These developments have allowed for a broader range of ingredients to be available in various regions, thus enriching the culinary landscape. Interestingly, there has been an increase in the use of semi-manufactured ingredients in recipes. This shift may reflect changes in societal norms and practices, specifically towards efficiency of cooking practice (Verriet, 2015). As the availability of ready-made or semi-manufactured ingredients has increased in the market, the inclination to prepare these components from scratch has diminished

[1] Semi-manufactured: prepared ingredients containing one or more raw products; Compound semi-manufactured ingredients: semi-manufactured ingredients containing no less than two raw products (Patrik et al., 2015).

(Buckley et al., 2007). This shift in cooking practices might reflect a transformation in the definition of cooking itself. Cooking is not just about the physical act of preparing food but involves the broader implications on culture, nutrition, and societal norms (Bowers, 2000; Trubek, 2012). The evolution of cooking mirrors the dynamic journey of human development, and thus, the definition of cooking may need to be viewed through a lens that captures its impact on human life and society.

In summary, cooking is a learned skill developed through experience, education, and practice rather than an innate ability. It encompasses a wide range of practices, from preparing meals entirely from scratch using raw ingredients to incorporating pre-prepared or convenience foods into home-cooked meals. Cooking involves not only technical abilities but also conceptual, organisational, and creative skills, and is shaped by individual, social, and cultural contexts. In order to capture the key elements of cooking while focusing on the research goal of the current work, the definition of cooking in this thesis focus on planning and preparing dishes from raw ingredients (whether fresh, refrigerated, or frozen). The study explicitly excluded ready-to-eat items and foods that only require heating, such as takeaways or pre-made meals, which provides a precise and relevant framework for the current research. This specificity ensures consistency in data collection and is crucial for accurately assessing the impact of cooking skills on food choices. By emphasising skill development in cooking and excluding minimal preparation foods, this definition directly addresses how active engagement in cooking influences dietary choices and quality. This approach is well-suited for exploring the implications of cooking from scratch in promoting healthier and more sustainable eating habits and offers a clear, controlled perspective that aligns closely with the objectives of the research on food choice behaviours and health outcomes.

2.3.2 The Diverse Perspectives on Cooking Practice

Cooking is recognised as a skill that individuals develop through experience and learning, rather than an innate ability (Trubek, 2012). Stitt (1996) emphasised the significance of including food education in the curriculum of any country's education system. The rationale behind this is that the deskilling of cooking skills can have broader societal implications, potentially leading to a deterioration in the overall food and eating culture (Stitt, 1996). However, cooking is also a complex

and dynamic concept, and it can vary among individuals. Many researchers argued that there is no universally agreed-upon definition or understanding of cooking and cooking skills (Short, 2003; Trubek, 2012; Wolfson et al., 2016). For example, American adults had different views on what cooking means (Wolfson et al., 2016): some people think cooking is only about making meals from scratch with homemade ingredients; others believe cooking includes any kind of food preparation at home, even if it uses pre-prepared or semi-prepared ingredients. This shows that people have varied ideas about what cooking involves.

A more specific term, 'home cooking' has also been studied, though its definition varies across different research. While some studies define 'home cooking' in a specific way, focusing on meals made from scratch using raw or unprocessed ingredients (Mills et al., 2017), others adopt a broader interpretation. A much broader definition viewed home cooking as ' *the process of transforming food items into socially and culturally acceptable end products: that is, meals or parts of a meal*' (Janhonen et al., 2018). Indeed, 'home cooking' is perceived as much more than a mere practical task (Mills et al., 2020; Simmons & Chapman, 2012). Such an inclusive and flexible understanding of home cooking allows for the capture of the diversity and range of cooking practices found in different families.

The role of cooking skills extends to promoting healthier food practices and providing greater control over food behaviours. Burton et al. (2017) explored the significant role of household food gatekeepers, noting that their confidence in food-related skills and nutrition knowledge shapes household food practices. Their study found that individuals with greater confidence in their cooking abilities tend to include more vegetables in family meals, use fewer highly processed convenience ingredients, and manage their time more effectively for food preparation. A lack of cooking skills or confidence can negatively impact dietary choices. Individuals who lack cooking confidence or ability are often more are more likely to consume processed or unhealthy foods (Lam & Adams, 2017). This tendency arises from the belief that these foods are simpler and faster to prepare than meals made from scratch(Hartmann et al., 2013). This propensity towards convenience over nutrition can result in the selection of options that are less wholesome, emphasising the critical role that cooking skills play in promoting healthier eating habits (Foley et al., 2011). Furthermore, it points to the potential long-term health risks associated with a diet heavy in processed foods. The development of cooking skills, therefore,

is not just about culinary proficiency but also about empowering individuals to make dietary choices that support their long-term health and well-being.

The question of accurately assessing people's cooking skills has also been a subject of debate. The act of preparing a meal has evolved over time, traditional assumptions about cooking and meal preparation may no longer fully capture the nuances of contemporary food practices (Trubek et al., 2017). Short (2003) argued that cooking skills encompass not only mechanical and technical abilities but also perceptual, conceptual, creative, organizational, and academic knowledge. Additionally, they utilise less classifiable skills, such as meeting others' culinary preferences while simultaneously caring for children. This perspective blurs the distinction between 'cooking from scratch' and 'cooking with pre-prepared foods,' revealing that they are not separate practices. The research also highlights the ambiguity surrounding terms like 'fresh,' 'convenience,' and 'pre-prepared,' as they can be interpreted differently by individuals. Therefore, the act of meal preparation is not just about having a set of skills or abilities; it also involves the capacity to act upon them effectively (Trubek et al., 2017). In the context of cooking and meal preparation, these capacities encompass a wide range of factors beyond mere technical skills.

Another terminology ‘food literacy’ was widely used to describe and measure the knowledge as well as skills required for individuals to meet food needs (Amouzandeh et al., 2019; Palumbo et al., 2017). Vidgen & Gallegos (2014) summarised food literacy as the ‘*scaffolding that empowers individuals, households, communities, or nations to protect diet quality through change and strengthen dietary resilience over time’* (Vidgen & Gallegos 2014). It is composed of a collection of interconnected knowledge, skills, and behaviours essential for the various stages of food-related activities. These stages include planning meals, managing food resources, selecting appropriate ingredients, preparing meals, and consuming food in a way that meets nutritional needs and preferences. A few measurement tools can be used to measure food literacy (Amouzandeh et al., 2019). This concept of food literacy is comprehensive, covering all aspects of interacting with food, from its selection and preparation to its consumption, underlining the importance of a well-rounded understanding and approach to diet and nutrition. While the term focuses on how well people can meet their dietary and nutritional needs, it doesn't explicitly address the social aspects of cooking and food skills.

A recently developed concept ‘food agency’ refers to an individual's capacity and empowerment to actively engage in the process of planning, preparing, and cooking meals (Trubek et al., 2017). It goes beyond simply possessing culinary skills and includes a broader set of abilities and actions related to meal preparation. This multidisciplinary concept, adopted from and built upon the anthropological theory of human agency, refers to the capacity and ability of individuals to actively engage with their surrounding environments, which are shaped by various structural factors such as social, cultural, and historical contexts (Emirbayer & Mische, 1998). 'Food agency' adapts this broader concept to the specific domain of food preparation, emphasising the active role individuals play in making decisions and taking actions related to their food choices within the frameworks of their own life circumstances. This framework acknowledges the complexities of food-related decisions and actions, situating them within the broader context of individual lives and societal structures. Food agency can be measured by the Cooking and Food Provisioning Scale, which was designed to provide a comprehensive assessment of food agency, capturing both the personal and structural aspects that shape an individual's engagement with food preparation and cooking (Lahne et al., 2017). It covers three key components: Food Self-Efficacy, which gauges an individual’s confidence in their cooking and food preparation skills; Food Attitude, which assesses personal attitudes and values towards food and cooking; and Structures, which identifies external factors like time, financial resources, and accessibility that may impede food provisioning efforts.

The evolving definition of cooking and its related terms shape our wider understanding of food consumption. It also becomes evident that these transformations in cooking practices are deeply influenced by various external factors. The next section will focus more on the role of cooking skills and cooking self-efficacy on food behaviour.

2.4 Self-efficacy and Cooking Self-efficacy

Self-efficacy has been consistently positively associated with improved cooking frequency and confidence (Lo et al., 2019; Morin et al., 2013). This indicates that boosting self-efficacy is essential for successful behavioural change in cooking, as individuals who feel more confident are more likely to engage in regular meal preparation and make healthier food choices (Gordillo & Prescott, 2023). Gutiérrez-Doña et al. (2009) found that without sufficient self-efficacy, even well-formed

intentions and detailed plans may fail to result in actual behaviour change. Lower self-efficacy was linked to limited cooking time and lack of cooking skills (de Borba et al., 2021). Cooking self-efficacy also played a significant role in influencing cooking behaviour. Research showed a strong connection between cooking self-efficacy and cooking frequency (Wolfson et al., 2020). This relationship was further supported by Oleschuk et al. (2023), who observed a positive link between cooking self-efficacy and cooking frequency among single-living US adults, suggesting that those with higher self-efficacy were more likely to cook at home. Additionally, research indicated that adolescents believe that greater cooking self-efficacy would motivate them to prepare food at home more often. Horning et al. (2017) found that parents with lower cooking self-efficacy and meal-planning abilities were more likely to rely on pre-packaged meals, which also correlated with less healthful food availability in the home. Similarly, students with limited resources tend to prepare meals at home less frequently, with those experiencing very low food security showing significantly lower cooking self-efficacy and food preparation behaviours compared to food-secure students (Knol et al., 2019). These studies suggest that enhancing individuals' cooking self-efficacy could help reduce the reliance on conveniently processed foods, leading to healthier family meals.

The next section will explore the factors that influence cooking behaviours, focusing on traditional gender roles, socio-economic status, and demographic characteristics, which shape who cooks, what is cooked, and how cooking is perceived across different cultural contexts.

2.5 Changes in Cooking Behaviours

2.5.1 The Role of Gender in Cooking

Cooking is often linked to traditional gender roles, with women frequently seen as the primary caregivers responsible for feeding the family. This role is considered a cultural universal (Pace, 2020), central to female identity and a significant source of their influence and authority (Counihan, 1999). Cooking provides women with influence and control over domestic life (Meah, 2014) and can be a source of cultural pride and identity (Reddy & van Dam, 2020; Valentine, 1999). The act of cooking can symbolize nurturing and caregiving, roles typically associated with femininity (Cairns et al., 2014). However, it can also reinforce traditional gender

roles that limit women's opportunities and reinforce their subordinate status in society (Allen & Sachs, 2012). Despite the pressure to conform to traditional gender roles, many women view cooking as an empowering act that allows them to express creativity (Bugge, 2003).

Rodrigues et al. (2020) highlighted that gender roles and stereotypes significantly influence eating habits, with men often associated with the consumption of hearty, spicy, and less healthy foods, reflecting traditional notions of masculinity. In contrast, women are stereotypically linked with lighter, healthier, and smaller portions, which align with societal expectations of femininity (Zhu et al., 2015). These stereotypes are not only culturally specific but also influenced by media portrayals and societal norms. For instance, men in Western cultures are often depicted as preferring meat, which symbolizes power and masculinity, whereas women are more associated with vegetarianism or healthier diets (Thomas, 2016). However, cultural differences challenge this binary view; in Argentina, for example, meat is a central culinary identity for both men and women, regardless of gender norms (Greenebaum & Dexter, 2018).

With evolving societal norms, traditional gender roles in cooking are being challenged. In some culture, men are increasingly engaging in cooking as a nurturing activity, which challenging traditional gender roles that associate cooking primarily with women. For example, Szabo (2014) revealed in a qualitative research that Canadian men were beginning to embrace cooking as a regular, everyday responsibility, seeing it as a means to care for their families and express masculinity through nurturing rather than just providing. Similarly, Swedish men were increasingly engaging in cooking and domestic tasks (Neuman et al., 2017). They found personal satisfaction in cooking, viewing it as a creative and rewarding activity. Additionally, the study considered the societal influences, such as Swedish gender equality policies, that encourage men’s participation in domestic work (Neuman et al., 2017). This was consistent with a more recent study, where countries with progressive gender equality policies, like Denmark, Sweden, and Finland, exhibit smaller gender disparities in cooking frequency, likely due to supportive social policies that promote shared household responsibilities (Wolfson et al., 2021). Conversely, in regions where traditional gender roles are more entrenched, such as parts of the Middle East and North Africa, women tend to shoulder a larger burden of cooking duties (Wolfson et al., 2021). This shift presents an opportunity to encourage healthier and more sustainable diets. By actively

participating in meal planning and preparation, men can influence family eating habits, promoting the consumption of nutritious and sustainable foods. For example, men with high confidence in their seafood cooking skills showed a lower preference for convenient seafood solutions, suggesting that these men may resist using products that could hinder their cooking identity being attributed to their skills (Wien et al., 2020). Additionally, as more men become involved in cooking, they may explore diverse cuisines and cooking methods that emphasise plant-based and locally sourced ingredients, further supporting sustainability and health.

However, Rodrigues et al. (2020) pointed out that while some men embrace cooking as part of modern masculinity, others continue to view it through a traditional lens, often associating it with specific male-oriented activities like barbecuing or preparing large meals (Meah, 2017; Newcombe et al., 2012). For instance, Irish men found the participants often engage in cooking activities that are culturally framed as masculine which serve as expressions of strength and autonomy. Australian men showed a particular interest in learning how to cook specific items such as a perfect steak and poach meat, which are traditionally considered masculine skills (Worsley et al., 2014). Despite some involvement in cooking, many men relinquish primary cooking responsibilities to female partners, acknowledging women's expertise while maintaining a sense of masculine identity (Newcombe et al., 2012). A recent global study highlighted significant gender disparities in cooking frequency worldwide (Wolfson et al., 2021). Women cooked both lunch and dinner more frequently than men across all 142 countries surveyed, with a median frequency of five meals per week for women compared to zero for men. These disparities in cooking responsibilities reflect entrenched gender norms and the traditional view of cooking as a predominantly female task.

These cultural differences highlight how societal norms and policies can shape cooking behaviours and gender roles. Moreover, these stereotypes can impact dietary choices and contribute to unhealthy eating patterns, particularly among men who may feel pressured to consume more meat and avoid healthier options like fruits and vegetables (Thomas, 2016). By challenging traditional gender stereotypes and encouraging more diverse food choices, it is possible to foster dietary habits that are both health-conscious and environmentally sustainable. For example, reducing meat consumption and increasing the intake of plant-based foods can contribute to better health outcomes and reduce the environmental impact of food production.

These studies highlighted that while traditional norms often dictate household cooking expectations, there is growing recognition of cooking as a shared responsibility across cultural contexts. This shift challenges the traditional gender dichotomies by highlighting the diversity in men's cooking practices, which range from necessity-driven food preparation to expressions of creativity and care. Additionally, there is a need for future research to explore the impact of these evolving roles on health behaviours and to consider a broader spectrum of gender identities beyond the traditional binary male-female model.

2.5.2 The Role of Demographics and Socio-economic Status

Cooking engagement within households is influenced by a variety of factors, which also extend beyond demographic characteristics. Smith et al. (2010) noted that factors such as marital status, economic standing, and activity levels play a significant role. Typically, those who are married, have a higher socioeconomic status, or are more active are more engaged in meal preparation. On the other hand, Virudachalam et al. (2014) observed that households with lower wealth and educational levels often exhibit extreme cooking habits, either always or never cooking dinner at home. However, Harnack et al. (1998) found exceptions, noting that men from lower socioeconomic backgrounds might be more involved in meal preparation than anticipated.

Lack of cooking skills is not solely a concern for low-income individuals; affluent groups, particularly working women in Europe also face the challenges of limited cooking skills, and it often driven by time constraints (Lang & Caraher, 2001). In the modern context, time and convenience are critical factors influencing consumption choices (Appleton et al., 2017; Wolfson et al., 2016). According to Celnik et al. (2012), consumers who perceive themselves as time-scarce often seek to minimise the time spent on household tasks, including cooking. Foods that are perceived as 'quick' and 'easy' to cook often become preferred options for many individuals, especially young adults (Howse et al., 2018) and parents (Sealy, 2010). As lifestyles become busier and more demanding, there's a tendency to favour quicker, more convenient cooking methods. Time diary studies have also documented a notable decrease in the time spent on food preparation at home in both Britain and the United States over the years (Cheng et al., 2007; Zick & Stevens, 2010). Furthermore, a comparative analysis indicated that this reduction is

a common trend across various countries, including France, the UK, the USA, Norway, and the Netherlands (Warde et al., 2007). This observed trend indicates a shift in cooking habits and practices can be seen as a reflection of broader societal changes. Some consumers are willing to pay more in order to save time in cooking (Casini et al., 2019a).

This shift in cooking practices can be a matter of changing culinary preferences. For instance, Sealy (2010) pointed out that stress and time limitations can significantly affect food choices among busy parents, often leading to a preference for energy-dense foods with lower nutritional value. This preference reflects a compromise between the demands of a busy lifestyle and the need to provide meals to the family. However, several researchers have also shown the factors influencing cooking behaviours are understudied and extend beyond demographics and socio-economic status. For instance, Burton et al. (2017) found that confidence in food skills and nutrition knowledge is not significantly related to gender, age, or whether individuals have a child living at home. Similarly, generational differences in food practices may not be as distinct as presumed (Lyon et al., 2011). While some differences in specific food preparation techniques were noted when comparing younger and older age groups, their overall daily kitchen activities were very similar.

Overall, the various arguments presented underscore that cooking behaviours are not solely determined by demographic characteristics such as age, gender, or income; they are deeply be influenced by an individual's confidence in their cooking abilities, their cultural background, broader societal trends, and life events. For example, Murphy et al. (2021) and Grunert et al. (2022) showed how the COVID-19 pandemic led to a shift in cooking practices and attitudes. A cross-continental comparison study found the increase in available time during the COVID-19 virus pandemic may have contributed to a shift in cooking practices, such as a move away from ready-to-eat dinners and an increased focus on cooking with basic or fresh ingredients (Murphy et al., 2021). Similarly, Grunert et al. (2022) also found that that the pandemic led to a renewed interest in home cooking and meals prepared at home. This change was likely influenced by restrictions and a forced return to domestic meal preparation and consumption. Both studies highlighted the impact of disruptive life events on cooking and shopping habits.

2.6 The Influence of Cooking on Food Choice

2.6.1 Cooking and Healthy Dietary Behaviour

Meal preparation plays a significant role in influencing dietary choices. As Smith et al. (2010) found that among men, those who took sole responsibility for preparing their meals consumed a significantly higher amount of lean meats and alternatives; conversely, men who had their meals prepared by someone else tended to consume more processed foods. This may indicate that when individuals cook their own meals, they have more control over the ingredients used and the methods of preparation. This positive impact of cooking meals at home on diet quality has been observed in various studies, indicating that the practice of home cooking can significantly influence the quality of one's diet (McGowan et al., 2017; Wolfson et al., 2020). Cooking skills were also identified as a significant factor for reducing reliance on highly processed and moderately processed items (Brunner et al., 2010). Similarly, the use of convenience food products was found to be associated with lower levels of cooking skills (Hartmann et al., 2013; Ohlau et al., 2022). This suggests that individuals lacking cooking skills are more likely to rely on these processed food categories because they may not have the necessary skills and self-efficacy to prepare meals from scratch. Proficiency in cooking does more than just facilitate the preparation of different foods and dishes; it also expands the range of food choices and variety available to individuals.

While previous research has often emphasised the importance of cooking skills in improving diet quality, the scope of food skills extends beyond cooking, including aspects such as meal planning, shopping, and budgeting, which may have been relatively underappreciated (Lavelle et al., 2020). Food skills confidence emerges as a key predictor of diet quality, particularly in relation to vegetable consumption (Lavelle et al., 2020). Similarly, Winkler & Turrell (2009) focused on examining confidence in cooking skills rather than the actual cooking skills themselves and explored how confidence in preparing vegetables is linked to household purchasing habits. The research found that households were more likely to purchase a variety of vegetables when the main household chef had higher confidence in preparing them. In other words, individuals' self-efficacy in their cooking abilities and their skill in planning and preparing nutritious meals are closely linked to the reasons behind their purchase of pre-packaged and processed meals (Horning et al., 2017).

Gender also plays a significant role in cooking confidence and dietary habits. A nationwide survey focusing on low-income individuals indicated that a majority of women in this group felt capable of cooking a meal from basic ingredients without assistance, but the percentage dropped significantly for men (Nelson et al., 2007).

Women with higher cooking skills tend to make healthier dietary choices (Hartmann et al., 2013). The study by Shinozaki et al. (2023) identified a counterintuitive association in Japanese males, where lower cooking skills were linked to a lower consumption of highly processed foods. The researchers posited that this unique pattern might be influenced by marital status and traditional gender roles within households where males' dietary choices are influenced by the cooking habits and preferences of their female counterparts. This suggests that simply measuring cooking skills may not fully capture the comprehensive influence of cooking on food choices. It highlights the necessity of considering cultural and individual contexts in the interpretation of data related to cooking skills and food choices.

2.6.2 Cooking and Sustainable Dietary Behaviour

The connection between cooking behaviour and diet, especially in the context of adopting sustainable eating habits, has been a focus of recent research. Lack of cooking self-efficacy can be a significant barrier to adopting a more sustainable diet, even among individuals who are highly motivated to embrace healthy and environmentally friendly food practices (Hoek et al., 2017). This was further explored by Haverstock and Forgays (2012), who focused on individuals transitioning to a plant-based diet after avoiding meat. They found that the challenges in maintaining a plant-based diet were not just due to the absence of meat but also involved difficulties in cooking and preparing plant-based meals, as well as feeling limited in culinary choices.

The success of plant-based alternatives in the market significantly depends on consumer sensory acceptance (Giacalone et al., 2022). This is particularly important as the development and enhancement of meat alternative products are increasing (van der Weele et al., 2019). Those with higher cooking self-efficacy individuals may be more willing to experiment with plant-based ingredients, try new recipes, therefore more likely to overcome challenges related to preparing plant-based dishes, such as adopting to new flavours and textures. For instance,

Graça et al. (2019) identified that one effective way to overcome some of the challenges faced by individuals transitioning to a plant-based diet is to acquire cooking skills that allow them to prepare balanced and appetising plant-based meals tailored to their personal preferences. Furthermore, in a practical intervention study, researchers investigated how consumer acceptance of plant-based meat alternatives changed through repeated in-home preparation and consumption, and found that participants reduced desire to eat meal box meals compared to self-created meals (van Bergen et al., 2024). While the study did not ask about self-efficacy but simply self-reported cooking skills level, van Bergen et al. (2024) suggested that people with higher self-efficacy prefer having control over the cooking process if they feel more confident in their cooking ability to select ingredients, adapt recipes, and create dishes that align with their preferences.

2.7 Conclusion

In conclusion, cooking is not a mere act of food preparation, but a complex behaviour deeply embedded in our society. The exploration of cooking as a dynamic concept reveals its significate role on consumer food-related behaviour, emphasised by its complex connections with cultural, social, and individual factors. Research findings indicate that cooking self-efficacy is an important determinant of dietary habits, influencing not only the frequency of cooking but also the choice and quality of food consumed. The studies reviewed suggest that individuals with higher self-efficacy in cooking are more likely to prepare meals from scratch, incorporating a wider variety of fresh ingredients and lean proteins. This, in turn, supports healthier dietary patterns and may even facilitate the adoption of sustainable diets, as demonstrated by the positive correlation between cooking self-efficacy and the consumption of plant-based alternatives. Conversely, a lack of cooking skills or confidence can lead to a greater reliance on processed foods, highlighting an area where interventions could yield substantial health benefits.

The social dynamics of cooking, including the roles within households and the communal nature of meal-sharing, have been shown to significantly affect cooking practices. Social norms play a pivotal role, with the act of cooking extending beyond nutrition to become a medium for expressing care and fostering relationships. The impact of societal changes on cooking habits illustrates the adaptability of food-related behaviours to external circumstances.

For future research, there is a clear need to explore deeper into the role of cooking self-efficacy, particularly in how it can be enhanced to promote healthier and more sustainable cooking behaviours. Investigating the social aspects of cooking practices will provide valuable insights into how communal and familial dynamics influence food choices. Moreover, understanding the way of how cooking contributes to identity formation and cultural expression can inform the development of targeted educational programs and interventions.

As global food systems and societal norms continue to evolve, research must keep pace, exploring innovative ways to support and encourage cooking practices that are both health-promoting and sustainable. Such efforts are crucial in addressing public health challenges and ensuring the well-being of future generations. The review in Chapter 2 has established a theoretical framework for examining the influences of self-efficacy on consumer food choices. It has highlighted the importance of self-efficacy in navigating the complex decisions related to food, which not only include the selection and consumption but also the preparation of food. With this theoretical backdrop, Chapter 3 will explore these concepts in a practical setting through the 'task and talk' focus group methodology, focusing on the specific context of beef steak preparation. This methodological approach will allow us to observe the direct implications of cooking self-efficacy on quality formation and consumer satisfaction, thereby providing empirical substance to the theoretical constructs discussed here.

Chapter 3. The Role of Cooking in Consumers' Quality Formation: An Exploratory Study of Beef Steaks

3.1 Abstract

The role of cooking on pre- and post-consumption quality expectations and its impact on satisfaction during the eating experience is under-researched. To address this gap, a 'task and talk' focus group study involving participants preparing and eating a beef steak as part of a meal was designed to explore the role of cooking on consumers' evaluation of beef quality. The results from six focus groups (n=36 participants) identified that 'perceived cooking quality' of beef is an important criterion impacting pre-purchase evaluation. Cooking is a process of adaptation to personal tastes and is influenced by cooking self-efficacy. This personal confidence in steak preparation mediates a willingness to directly complain about a disappointing eating experience. Direct complaints generally occurred in relation to intrinsic quality cues prior to cooking where the locus of quality control was external to the participant. Poor eating quality of beef was generally attributed to a deficiency in cooking skills, an internal attribution of quality failure that minimised the likelihood of direct complaints. A lack of confidence in cooking skills may explain a delay in repeat purchasing following a negative eating experience.

Key words: beef; cooking; quality cue; consumer satisfaction; complaint behaviour; focus group

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3.2 Introduction

Palatability dominates consumers' satisfaction and purchase intentions of beef (Banović et al., 2009), However, beef is a biochemically dynamic product and is susceptible to variations in palatability, which depends on an animal's health, nutrition, and rearing environment, as well as pre- and post-slaughter practices (McCarthy et al., 2017) such as processing (Lagerstedt et al., 2008) and cooking (Elmore & Mottram, 2006). The inherent variability of beef in a high value market has focused research attention on the range of intrinsic and extrinsic quality cues that form quality expectations at point of purchase (Aboah & Lees, 2020; Becker et al., 2000a; Bredahl, 2004), and how these compare to quality evaluations post-consumption (Grunert, 2002). Consumers have been identified as making beef quality inferences based upon cues that they feel confident using, even though they may be aware of the potential importance of other factors that they are less familiar with, such as breed and age (Grunert, 2004; 2006). Previous researchers have identified that the most relevant quality attributes and informational cues for beef purchases are price and informative labels such as certifications and brands, followed by visible fat and meat colour (Aboah & Lees, 2020; Henchion et al., 2017). However, the use of pre-defined attributes in surveys and choice experiments may restrict the understanding of additional factors in consumers' purchasing decisions, and hence there is a need to further explore consumers' choices (Aboah & Lees, 2020).

A disconnect between a consumer's expected and experienced quality in beef has been associated with misaligned quality cues, which change during the provisioning process (Grunert, 2006). For example, consumers' preferences for 'healthier' lower-in-fat meats generally result in the purchase of beef with less visible intra and extra muscular fat; choices which have been enabled by the meat industry's production of leaner carcasses (Resurreccion, 2004; Russell et al., 1991). However, while the factors that determine perceived eating quality and health quality attributes of beef are weighted similarly by consumers pre-purchase, during consumption the eating quality (or palatability) has a stronger weight (Grunert, 2006). Intra-muscular fat content contributes to tenderness, juiciness, and flavour intensity (Corbin et al., 2015) and reducing fat content may result in a drier, tougher texture (Youssef & Barbut, 2011) with reduced overall acceptability. Therefore, pre-purchase quality judgements relating to the presence of fat in beef may misalign with experienced eating quality (Morales et al., 2013). This has also been observed

with consumers' preferences for a lighter red beef colour(Grebitus et al., 2013), which is associated with perceptions of freshness but not eating satisfaction (Carpenter et al., 2001).

This article advances the current research on consumer perception of beef quality by exploring the role of domestic cooking on beef quality expectations and evaluations, in terms of consumer satisfaction and dissatisfaction. This study seeks to address two research questions. Firstly, it explores the relationship between consumers' cooking and meal satisfaction. More specifically, the focus is on how consumers perceptions of meat quality and cooking self-efficacy impact meal satisfaction. Secondly, this study investigates how, if at all, cooking influences complaint attribution for a poor eating experience and associated complaint behaviours. The literature highlighted above highlights that the difference between consumers' expectations and experiences of palatability can lead to dissatisfaction and impact repurchase (Russell et al., 2005). The Total Food Quality Model (Grunert et al., 2004) provides a framework for exploring pre- and post-quality evaluations, and clearly identifies a gap in research relating to how beef is prepared and cooked. Therefore, this research addresses this knowledge gap by exploring the role of domestic cooking on beef quality expectations and evaluations, both in terms of consumer satisfaction and dissatisfaction (Figure 1).

As meat composition combined with its cooking methodology are among the factors affecting the experienced quality of meat products (Alfaia et al., 2010; Bonny et al., 2017; Serrano et al., 2007; Toldra, 2017), meat eating experiences and satisfaction can be altered by meat preparation and cooking skills (Fabre et al., 2018). Cooking-related factors are suggested to influence consumer satisfaction more than the quality of the product itself (Goodson et al., 2002; Grunert, 2002, 2005), thereby influencing post-purchase expectations and behaviours. Cooking is critical for assuring safety and achieving a desired eating experience(Suleman et al., 2020b). Culturally, the preparation and cooking of food involves transmitted techniques which require knowledge, abilities and confidence or self-efficacy, to understand the properties of food in terms of taste, colour, and texture and how ingredients will react when combined or heated (Gatley et al., 2014a; Short, 2003; Wolfson et al., 2016). Research examining consumers' cooking skills has been associated with understanding implications for public health (Monsivais et al., 2014; van Kesteren & Evans, 2020) and food choice (Hartmann et al., 2013; van Kesteren & Evans, 2020). However, recent research has begun to focus on the wider role of

cooking practices on consumer purchase intention (Argemí-Armengol et al., 2019; Casini et al., 2019b). Although cooking and consumers' meal satisfaction are positively related (Becker et al., 2000b), this remains under-researched in relation to beef satisfaction.

Confirmation or disconfirmation of meat expectations is a major determinant of consumer satisfaction (Grunert et al., 2004), such that negatively disconfirmed expectations lead to dissatisfaction. Predictions of consumer satisfaction with meat have typically been based upon their perceptions and use of quality cues (Acebron & Dopico, 2000; Bredahl, 2004), perceived sensory quality of meat (Egan et al., 2001; Verbeke et al., 2010a) which then contribute to the development of a beef eating-quality guarantee system (Bonny et al., 2018). Consumers' behavioural responses to dissatisfaction with a market exchange or 'complaint behaviour' (Crié, 2003) may involve direct responses through the communication of the negative experiences relating to a product with the vendor (Nyer & Gopinath, 2005) and indirect responses which can include ceasing repeat purchases, switching providers or sharing the adverse experience through negative word of mouth, the latter of which tends to occur in two-thirds of complaint situations (Nyer & Gopinath, 2005; Singh, 1988). Attribution Theory (Laczniak et al., 2001; Weiner, 2000) suggests that consumers try to determine the cause of product failure, specifically the degree of permanence or 'stability' of the source of the complaint, the 'controllability' or extent to which a failure can be prevented and the 'locus' (consumer or external actor) in causing the complaint, influencing their attitudes and future behavioural intentions. In the case of beef, little is known about complaint attribution and associated behaviour directed towards meat purchasing outlets such as supermarkets or butchers, an area this article explores.

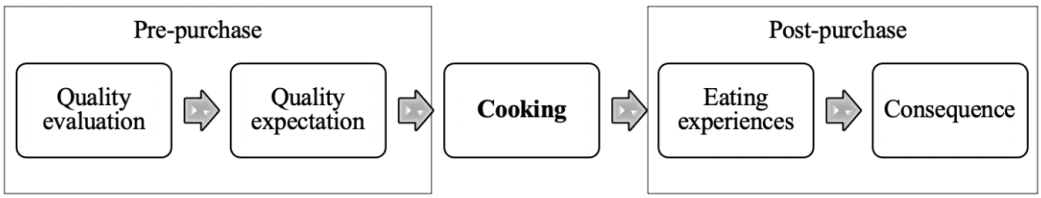

Figure 1 Cooking as a knowledge gap in between beef pre-and post-purchase quality evaluation.

3.3 Materials and Methods

To address the research questions discussed in the previous section, we used qualitative research methods which enable in-depth exploration of self-reported

attitudes, perceptions, behaviours and practices (Harris et al., 2009). In particular, in this study focus groups were the primary data generation technique. As guided discussions among a small number of participants, focus groups can integrate activities and/or prompt materials to encourage individual and intra group elicitation (Krueger & Casey, 2014).

3.3.1 A Dining "Task and Talk" focus group approach

Morgan & Bottorff (2010) argued that there is no single correct way to conduct focus groups; instead, researchers must choose methods that align with their project goals. In designing the data collection, we adopted what we have termed a hosted dining 'task and talk' (T&T) focus group approach. Here, participants prepared and cooked a beef steak to suit their own personal taste, and which formed part of a sit-down meal. 'Frying steaks' are relatively quick to prepare and they are a growth area in the UK beef market, accounting for 19.2% by volume (kg), and an overall value of sales of approximately £846.2 in 2020 (AHDB, 2021). The participant-prepared beef steak also afforded a number of investigative advantages. First, video recording of this process generated observational data on the range of practices used in cooking a steak which supplements and strengthens verbal reports (Belk & Kozinets, 2005). Second, the activities of preparation and cooking increased the salience of 'beef steak' which was the subject of the discussion, thereby acting as both a primer and a platform for launching the group discussion. Third, the preparation and cooking of the steaks became a unifying "shared experience", which facilitates the functioning of focus groups to the extent that it fosters participant interaction (Barbour, 2007). Fourth, the commensality provided a relaxed environment in which the participants could candidly share their opinions and experiences.

This method not only observed cooking behaviour but also integrated it within the broader social practices of cooking and eating, emphasising the experiential and participatory aspects of food preparation. By engaging participants directly in the cooking and eating process, the method provided a holistic view of how cooking techniques affect quality perception and consumer satisfaction. Hollander (2004) argued that participants in a focus group are not independent from one another, as the group forms a social context and, in this setting, researchers observe social interaction processes rather than merely collecting data. This T&T

approach enabled the participants to mirror the cooking practices they might have in their daily lives and allowed us to explore their social interactions and practices associated with food preparation. Through the combination of this research design, it was possible to investigate consumers' attitudes, perceptions and self-reported behaviours when choosing, cooking, and reflecting on the consumption of beef steak.

3.3.2 Participants

Participants were recruited through adverts that were circulated online, via emails and posters. A total number of 105 participants completed a screening questionnaire, which incorporated inclusion criteria such as age (18 or over), personal responsibility for buying and cooking beef steaks, meat eating frequency (at least once a month), as well as the absence of relevant food allergies. Participants were selected using non-probability judgement sampling (Malhotra & Dash, 2016), based upon attaining the maximum variation of experiences within the participant cohort, through selection of a wide variety of socio-demographic profiles in the sample. On acceptance into the study, participants were asked to list the ingredients they typically used for cooking steaks. Six focus groups with a total sample of 36 participants were conducted during evenings (from 6pm) in Newcastle-upon-Tyne (UK) over the two-month period September-October 2018. Each group contained 5-7 participants with broadly equal numbers of male and female and heterogeneous in terms of age, employment, and income (see Table 1). Male participants were 6.6% more than female participants.

Table 1 Focus groups participants' demographics information.

Demographic		Participants N=36	(%)
Gender	Male	21	58.3
	Female	15	41.7
Age	19-25	7	19.4
	26-35	11	30.6
	36-45	9	25.0
	46-55	4	11.1
	56-65	5	13.9
Income	Up to £12,999	5	13.9

£13,000-£18,999	8	22.2
£19,000-£25,999	6	16.7
£26,000-£31,999	5	13.9
£32,000-£47,999	8	22.2
£48,000-£63,999	4	11.1

3.3.3 Materials

Vacuum packed sirloin steaks with three different levels of ageing: 14, 21 and 30 days, which typically sold in a major UK supermarket, were supplied by the meat packer ABP Food Group. Within each ageing group, steaks were from the same beef carcass, with standardised weight and thickness. Each steak was vacuumed packed with the product name, use by date and original cooking instructions on its label. All 6 focus groups were randomly assigned steaks from one ageing group, so participants from the same focus groups had the same steak to cook and taste. Cooking ingredients (e.g., oil, garlic, rosemary, salt, pepper, butter) were provided according to participants' stated preferences. Participants were free to use gas hobs and oven to cook the steaks in their preferred manner. The steak preparation and cooking occurred in a cookery and food service training college, enabling participants from the same group to cook their steaks simultaneously. Each participant's preparation and cooking of their steak was video recorded using action cameras (Crosstour, C-CT7000-UK). The cameras were fixed in front of the participants' cooking stations, with the lens pointed at the preparation area and cooking hobs. When the steaks were cooked, the participants plated them up and moved to an adjoining dining area where they could add fries, salad, and bread and butter and choose a non-alcoholic drink to complete a meal. The participants then ate their 'evening meal' together and participated in the group discussion.

3.3.4 Procedure

The T&T focus group followed a semi-structured interview guide (Krueger & Casey, 2014), which consisted of three main discussion areas. First, participants were asked to describe the techniques they used to cook the steaks and explain the

source of their skills, to explore their cooking skills and knowledge. These questions aimed to uncover the depth of their cooking knowledge and the sources of their culinary skills, providing a foundation for understanding their confidence and competence in the kitchen. Second, participants were asked about their use of quality cues at the point of purchase through questions linked to steak purchasing, the purchasing occasion and the attributes that would be most important to them at the point of purchase. These questions were designed to identify the quality cues that influence consumer purchasing decisions and how these preferences align with their cooking practices. Thirdly, the guide probed into the participants' overall satisfaction with their cooking and eating experience of the beef steaks. Questions were designed to elicit detailed responses about any dissatisfaction encountered, the specific attributes of the steak that led to disappointment, and whether such experiences influenced their likelihood to complain or alter purchasing behaviours in the future. Additionally, participants were asked to evaluate the steak they prepared during the focus group in terms of overall liking, flavour, tenderness, juiciness, and their perceptions of its price and quality level.

3.4 Data Analysis

The data analysis followed a six-stage thematic analysis as outlined by Braun and Clark (2006) within an interpretive phenomenological analytical (IPA) tradition (Fade, 2004) IPA seeks to understand phenomena of interest from the perspectives of participants and uses their subjective knowledge for greater psychological insight (Stainton Rogers & Willig, 2017, p. 193) and supported our exploration of the role of quality in beef steak provisioning. Familiarisation with the data (stage 1 of the thematic analysis) began by transcribing each audio recorded discussion. In stage 2 of the thematic analysis, coding of both the transcription and video recordings was undertaken using NVivo 12 (QSR International Pty Ltd.). As we were approaching our data with specific research questions in mind, the coding began by block coding the transcripts into three main areas: i) cooking preferences; ii) pre-purchase quality cues; and iii) the beef being consumed, beef quality expectations when cooked at home and when dining out.

Focused coding then progressed within each of these blocks, with codes being grouped into higher order (more abstract) categories and the identification of themes (stage 3 of the thematic analysis). Reviewing these themes in stage 4 of the

analysis involved comparative analysis of the perceptions of the different beef steak qualities across the focus groups, and the causes of and responses to participants' dissatisfaction with beef quality when cooked and eaten within the home and externally in restaurants. This iterative process enabled us to define and characterise the main themes for example perceived cooking quality as a pre-purchase cue and the narrative within the analysis (e.g., the role of self-efficacy in complaint behaviours) (stage 5 of the thematic analysis) which is now produced in the results section (stage 6 of the thematic analysis) within the home and externally in restaurants was also undertaken.

3.5 Results

3.5.1 Perceived cooking quality, meat quality and meal occasion as criteria for steak choice

Perceived cooking quality emerged as an important criterion together with beef quality in steak selection for home cooking and was linked to meal occasion. For 'everyday' or 'convenience' meal occasions (differentiated from 'special' meal occasions by participants), 'cheaper' steaks would be purchased with the expectation that they would require slow cooking to tenderise the meat. In general, beef steak was perceived as an expensive food item, therefore prices and individual budget influenced participants' choices significantly. However, price was recognised as not always reflecting the actual eating quality, which was in part associated with personal cooking knowledge and skill. Comparisons were made between supermarket and butchers' steaks, and greater trust was placed in butchers' steaks which were perceived as higher quality: *"…it's quite easy to pay a lot of money at the supermarket for a not particularly brilliant steak that you can get a better steak for less (money) from the butchers"* (Male, Age 44, Group 5*).* Butchers' higher quality to price (or 'value for money') compared to supermarkets was linked to supermarket prices embodying additional marketing and distribution costs, as explained by one participant:

> "*The quality of the butchers' meat will be higher because the key factors that affect quality are also affecting the price. But in the supermarket, there will be a lot of marketing, distribution, and other costs, they'll influence the cost of supermarket meat, they are definitely not affecting the meat quality"* (M, 38, G5).

Price was also associated with animal welfare and the treatment of cattle both pre- and post-farm gate: "*I do think you get higher quality meats from responsible farms that treat the cattle well"* (M, 21, G3). Organic steaks were considered as the highest quality, and an ideal choice when affordable: "*I would go for the highest welfare piece of beef, organic if I could"* (M, 31, G3). Cheap beef was associated with low animal welfare.

The thickness of steaks also influenced participants' choices and was associated with cooking practice and eating occasion. Thicker steak was considered easier to cook to a preferred level of doneness, and were associated as more expensive and appropriate for 'a special meal'. By, thin cuts were associated with a cheaper price and were for 'convenient meals'. For some participants, thinner, cheaper frying steaks were purchased for their nutritional value rather than taste, reflecting a more functional than hedonic purchase motivation.

Beef colour was the most popular quality cue and was related to meat maturity. Most participants claimed they looked for a deep red colour, due to its association with meat maturity: the darker the colour, the more mature the meat and the better the perceived and experienced flavour. Thus, participants showed more confidence choosing beef steaks that had been aged because '[they] *have much more flavour'* (F, 33, G2). Ageing was associated with butchers, and less so with supermarkets*: "I find the ageing tends to make less difference with the supermarket meat, it makes quite a big difference with the butcher's meat"* (M, 44, G5). People who visually inspected meat to identify a darker meat colour were less likely to pay attention to maturity dates on packaging: *"in terms of flavour, the better stuff is a bit darker, whether it says it's been aged 15 days or 21"* (M, 44, G5*).* A bright red colour of beef was typically associated with supermarkets and was perceived negatively, prompting speculation on how the colour is produced: *"It's either food colouring or it was probably just being killed the day before* (M, 40, G1)"; "*If it's bright red, it's been sitting for a while, like through oxidation of the blood within the meat, so I didn't think that was necessarily an indicator of freshness or good meats"* (M, 26, G6). Meat colour was also used as an indicator of freshness. Grey/brown beef colour was considered as 'off-putting', and unlikely to be tasty: "*If it already looks brown before you cooked it, I can't imagine that cooking it's gonna make it any more appealing to eat*" (M, 46, G2).

Many participants were positively predisposed towards fat in beef steaks, because it was believed that fat provided beef with flavour. Participants illustrated

that they searched for the position of fat for example *'running over the top'*, *'on the side'* or *'in the middle'*; and its quantity, such as *'right amount of'* or *'large nugget of'* on a piece of steak. Participants also expressed preferences for specific fat content according to beef cut. For example, ribeye steaks were preferred by those who claimed they need the flavour from fat. Others mentioned that fat is favoured for cooking because it improves the eating quality of cooked beef and requires the use of less discretionary fat such as oil during cooking. However, some participants emphasised that the fat needed to be thoroughly cooked, therefore steaks with more fat content required an increased cooking time, which reduced the controllability of the cooking process. Steaks with a high fat content were considered as 'lower end cuts' requiring appropriate cooking methods, such as casserole cooking for a longer time (potentially a couple of hours) and at a lower heat than quick frying of higher quality steaks in minutes. For one participant (F, 38, G2) who showed less confidence in choosing steaks the presence of fat diminished perceived value for money. Only one participant (F, 60, G1) in this study believed that a lower fat content indicated a better-quality steak.

3.5.2 Cooking as a personalised and iterative activity

Two key themes arose from discussions on cooking skills, and they were: i) the iterative process of trial and error, and ii) the production of food that suits personal taste preferences. Steak cooking skills and knowledge came from multiple sources. The most frequently mentioned was direct knowledge passed from other people including family members and friends. This learning helped to develop a set of foundational cooking skills. Indirect guidance from cookery programmes or recipes provided more diverse knowledge, such as using herbs to enhance flavour. One source of cooking information which was routinely ignored by the participants was the cooking instructions on the steak packaging. Aside from those who indicated that they paid minimal attention to it, others did not follow the advice intentionally: *"instructions are for all well-done steak"* (M, 25, G3*)*. There was a perception that retailers are obliged to include cooking instructions on packaging for food hygiene reasons, but not for taste, and the generic nature of the instructions did not support differences in personal taste preferences: *"Everyone has different tastes, it's hard to give cooking instructions for one thing [meat]"* (F, 31, G3).

Although participants were open to different sources of cookery knowledge, many claimed they learned from their own cooking experience which included '*try and fail'*. This iterative and experimental process sometimes resulted in participants changing their taste preference for beef steaks as their cooking experience and self-efficacy increased: *"I used to have the steaks quite well done and I've just been getting more and more rare over the years"* (F, 38, G2). Participants who showed more confidence in their cooking practice discussed how they gradually gained the ability to adjust the cooking methods in line with their preferences.

There was a general consensus that meat was cooked to suit personal tastes and preferences. For example, although some older participants noted that TV chefs recommend that rare steaks provide the best eating quality, they tended to persist with their own practice of eating their steaks 'well done': "*they may say it's the best way to cook it, but really it's an individual choice to how you like your food"* (F, 60, G1). The degree of cooking personalisation was demonstrated in both the observed practices in the video recordings of the steak preparation and cooking, and discussions about how heating and temperature affect steak taste and texture. For example, for one participant's goal *'to get a crust but not overcook it, so it is still quite medium-rare inside'* (M, 26, G6), the frying pan was prepared to reach a desired temperature and a precise cooking time was followed for each side of the steak to achieve the target colour. Amongst the participants, seasonings such as salt and pepper, garlic, rosemary, butter, and cheese were used to enhance the flavour of the steak, to both suit personal taste preferences but also in response to the anticipated flavour of the beef. More flavourings were added to the steaks to compensate for a perceived deficiency in the eating quality of the beef.

Knowledge and experience of steak preparation and cooking was also identified as important when dealing with a variety of cuts of beef which required different cooking treatment, as one of the participants (M, 43, G4) described: *"for the ribeye, you're going to cook slightly different to a filet to a sirloin depending on how we like it".* Cooking practice and knowledge was identified as more critical than the overall meat quality for some participants. For example, one participant argued that professionals can turn a basic steak into a premium dish because "*it's the knowledge around what you can do with it"* (F, 24, G3). Confidence about cooking steaks affected the choice of price points for steak. For example, to reduce the financial risk of failure in cooking a steak, some participants would only buy cheaper steaks until their experience of cooking had improved: *"I wouldn't feel*

there was a risk if I bought an expensive steak that I wouldn't know how to cook it" (F, 35, G2).

3.5.3 Steak dissatisfaction and complaint behaviour

Pre- and post- consumption

Recall of situations in which participants were dissatisfied indicated differences between steaks in their raw and cooked state (Table 2). In general, participants were unlikely to complain about beef steaks they bought and cooked even when they were not satisfied with the eating quality. Instead, complaints were most likely to be made about meat prior to cooking.

Table 2 Participants' response comparison: raw versus cooked

	Unprocessed (Raw)	**Processed (Cooked)**
Likelihood of Complaining	Likely	Unlikely
Source of Dissatisfaction	Search attributes: colour; odour; fat content	Experience attributes: texture; flavour; Cause illness
Complaint Attribution	Others: Retailer	Self: self-efficacy in cooking; taste differences to 'norm'
Behavioural Consequence	Delay in buying meat from the retailer, switch retailer	Soften the meat; enhance the taste; change format
Complaint Risk Relieving Strategies	Full visual inspection of meat if packaged; Buying from trusted supplier; switch stores	Learn from experience

Source of dissatisfaction

Sources of dissatisfaction with uncooked steak related to visible or tangible defects such as a brown colour or '*off*' odour. Following cooking, dissatisfaction may come from a negative eating experience such as the meat being tough, lacking in flavour or containing gristle. In these situations, the participants were unlikely to complain directly to the retailer about the negative eating quality. Retailers would however be contacted if participants suffered food poisoning and suspected the meat as the source.

Complaint attribution

Retailers are likely to be attributed with blame for dissatisfaction with uncooked beef, in particular if 'defects' were perceived to have been intentionally hidden. For example, where a discoloured piece of meat is layered between others: *"I felt I've been deceived in the way it has been packaged "*(F, 40, G5). For cooked steak, participants recognised their partial culpability for the eating quality of the steak through their cooking. This potential shared responsibility for eating quality means that the participants were unlikely to complain to retailers: *"...you couldn't do* [a complaint] *after cooking, because then you didn't know whether it was the steak or whether you've done something weird"* (F, 38, G2). This contrasts with participants' attribution of dissatisfaction with steak eating quality in restaurants. Here the price to be paid for the steak and expectations of the 'skill' of the chef in selecting and cooking high quality steaks gave rise to a source to blame. In general, most complaints in a restaurant were associated with a steak not being cooked to the personal taste of the diner: *"I wanted it cooked right because they are the professionals"* (F, 46, G2).

Participants also tended to attribute blame to themselves when the poor eating quality of steak is associated with cheaper cuts of meat: "*It teaches you a lesson for buying the cheap steaks"* (M, 46, G2). However, participants held generally lower expectations of cheaper steaks and were therefore willing to accept eating quality imperfections. Finally, some participants attributed personal taste for a disappointing steak eating experience: *"...maybe your taste buds are funny, or some days I feel like everything's really spicy, so you're just having 'a bad steak day'"* (F, 55, G4).

Behavioural Consequence

The consequences of dissatisfaction with uncooked meat included delaying buying steaks from the responsible retailer. For cooked meats, dissatisfaction with poor eating quality could be partially rectified by masking the flavour or lack of juiciness with condiments or sauces to enhance the flavour or compensate for the dry steak: *'a good sauce can mask a lot of sins'* (M, 38, G5). Techniques for making anticipated tough steaks more chewable included increasing cooking time, cutting them into smaller pieces or mincing, and making them into different dishes.

Complaint risk relieving strategies

Strategies to reduce the risk of dissatisfaction or disappointment with steak eating quality included buying meat from trusted suppliers, inspecting both sides of packaged meat and avoiding visible defects and switching retailers temporarily. For eating quality dissatisfaction attributed to domestic cooking, there was a belief among participants that their skills will improve with practice.

3.6 Discussion

3.6.1 Perceived cooking quality and impact on choice

This exploratory study investigated the impact of cooking on consumers' beef quality perceptions. When purchasing beef steaks, consumers assess the 'perceived cooking quality' of the product, in addition to the meat quality attributes visible at the point of purchase. This concept indicates that consumers make an *a priori* assessment of how the steak will perform during cooking. This new finding adds to the practices surrounding meal preparation influencing experienced quality. The importance of having extra- and intramuscular fat to make cooking the steak easier and enhancing the flavour was highlighted during the discussion. This active search for 'a certain amount of fat' which suits personal preferences is contrary to previous studies, where UK consumers have expressed negative attitudes towards beef fat (Font & Guerrero, 2014; Glitsch, 2000), which is considered unhealthy (Resurreccion, 2004). The importance of fat in determining beef flavour also suggests a potential shift in knowledge, which had been lacking in previous studies (see for example (Grunert et al., 2004)). This also suggests that providing information about extra- and intramuscular fat level may generate positive eating quality expectations of beef (Morales et al., 2013).

While it is known that consumers use beef colour as an indicator for freshness, and consequently quality (Glitsch, 2000; Troy & Kerry, 2010), participants in this study used the maturity of the steak as a quality guide preferring a darker meat, which was associated with ageing. This finding contrasts with previous research, where the probability of purchase was observed to decrease with the darker strength of the meat colour (Carpenter et al., 2001), suggesting a change in awareness and knowledge of maturation processes over the past two decades, driven by a variety of sources such as internet and cooking programmes (García-González et al., 2018). Steak thickness also emerged as a cooking quality cue, linked to ease of cooking. Although the 'perfect' thickness varied between

individuals, thicker cuts were associated with higher quality. Given the relatively standardised thickness of beef steaks sold packaged in the UK, thicker stakes such as fillets are relatively "exceptional" and therefore may be perceived to be superior. Self-efficacy in cooking skills empowers people with their beef purchasing decisions. Although the purchase of cheaper steaks occurs when cooking confidence is low, the financial risk associated with buying more expensive steaks is mitigated when confidence in cooking increases. Although previous research has found a price-quality correlation in relation to beef (Grunert, 2006), this association is most closely associated with a place of purchase that is perceived as trustworthy and reliable and where steaks have been aged. In this study, independent butchers were afforded considerable trust and multiple retailers a scepticism, a finding in line with McEachern et al's (2005) analysis of British consumers' meat purchasing preferences. An association between higher priced beef with high levels of animal welfare and beef quality has also been observed by Fernqvist & Ekelund (2014).

3.6.2 The importance of cooking on beef eating quality

Beef preparation and cooking practices have an important contribution to the experienced eating quality of beef steaks. Participants demonstrated cooking strategies to accommodate perceptions of poor beef quality prior to cooking or flavouring adjustments to accommodate deficiencies on sampling the beef. Cooking temperature, time and method which have been identified as having an impact on beef tenderness (Bouton & Harris, 1981; Fabre et al., 2018; Obuz et al., 2003; Palka & Daun, 1999) and beef flavour (Berry & Leddy, 1990; Kerth, 2016) were all identified by participants as cooking variables that could impact eating quality. Prior research has identified that beef cooked at a higher temperature was preferred by UK panellists (Gagaoua et al., 2016). However, our research shows that consumers adopt a variety of personalised cooking practices to match their beef eating quality preferences. The findings of this study also revealed that UK consumers consider the impact of cooking on experienced beef quality to be more influential than pre- and post-slaughter practices, regardless of their cooking skills, which is supported by Bonny et al. (2017) in objective assessments of the major contribution of cooking to eating quality. Notwithstanding the importance of preparation and cooking practices to eating quality, consumers may lack knowledge of the sophisticated interaction of these multiple factors and overly value the impact

of cooking on beef eating quality (Grunert et al., 2004). This may influence consumers' corresponding post consumption behaviour, particularly in relation to complaint behaviour which is now discussed.

3.6.3 Cooking moderates the quality evaluation of beef and complaint behaviour

The interpretation of beef eating quality during cooking and associated adjustments in practice influences complaint behaviour. Visible deficiencies in quality associated with beef freshness (meat colour and odour) or value of money (in terms of fat and lean meat ratio) prior to cooking often trigger complaint behaviour. However, when cooked beef steaks do not meet expected eating quality, participants experience confusion, self-reproach, and guilt for their product selection or their role in the meal preparation. Notwithstanding personal confidence in cooking skills prior to a poor sensory experience, consumers' perception that their cooking has had a significant contribution to beef eating quality means that they engage in self-blame, which places the locus of responsibility for the unsatisfactory eating experience on themselves. As Weiner (1985, 2000) indicates complaints are more likely to occur when consumers recognise the failure locus is external. Since beef quality varies considerably, this notion of locus is particularly important in beef provisioning, to the extent that a consumer's experience of meat quality can be seen as a continuous process from purchasing through to cooking and eating, and that consumers bear some responsibility for the final experienced quality of beef within the home. Moreover, regret caused by feeling that wrong decisions have been made may also be associated with self-blame, reducing the likelihood of a complaint (Zeelenberg & Pieters, 2004). However, compensatory cooking strategies to assuage poor eating quality, such as adding sauces to a steak to improve or disguise flavours, mitigates the self-blame, and also suggests the source of the complaint is temporary and controllable. Investments into a beef eating quality guarantee scheme (Verbeke et al., 2010b) can address some of the externally-locused quality factors that are a source of complaint behaviour, by ensuring consumers can identify quality and minimise the risk of a mistake. However, our results indicate that delays in the repeat purchase of steak which typically follows a poor eating experience may also be based upon internally-locused factors arising from, e.g., a lack of cooking confidence, which require additional support. Supporting consumers with information to cook steaks to their

personal taste, rather than providing generic cooking instructions, could ensure any investments in the development of quality guarantee schemes will be effective in minimising dissatisfaction within the marketplace.

3.7 Limitations and Further Research

This exploratory study used a self-selecting and small sample of participants who may have had higher cooking skills than the 'average' UK consumer. While participants indicated that they were able to replicate domestic cooking practices in the experimental kitchen, some practices such as marinating or the use of sauces to disguise a poor sensory experience were raised during the discussion. An ethnographic study of domestically based cooking practices may identify additional cooking strategies to mitigate against poor eating quality. Such a study could also include participants from different geographical locations such as urban and rural neighbourhoods (Shaw & Mac Con Iomaire, 2019) and in other cultural settings (Gagaoua et al., 2016), and explore differences between beef eating frequency (occasional and frequent beef consumption) and cooking skill level. It is also important to acknowledge that the presence of 6.6% more male than female participants in the study may impact the findings. Future research should aim for a balanced gender representation to validate these findings further. Further research is also recommended to validate the exploratory results through a survey methodology and expand analysis of complaint behaviour into food service sectors.

3.8 Conclusion

This 'task and talk' focus group identified the importance of perceived cooking quality as a factor influencing beef choice. Cooking skills are also perceived as a key factor influencing the eating quality of beef. Due to this link, a self-attributed locus of blame for poor eating quality is associated with a deficiency in cooking skills, which means that complaint behaviours are unlikely to be made. Exploring how the food industry can provide more personalised cooking recommendations to match consumers' preferences and elevating consumers' knowledge of the supply chain's efforts at producing high quality meat may increase confidence and trust in the industry.

Chapter 4. The Role of Cooking Self-Efficacy and Food Choice Motives Towards Protein Food Cooking and Consumption Behaviour

4.1 Abstract

This study explored the relationship between cooking self-efficacy, personal and prosocial food motives, and the frequency of cooking and consuming various protein foods. The theoretical hypothesis in the study was tested through data collected from questionnaires, and a Structural Equation Modelling approach. The study results found that higher cooking self-efficacy was consistently linked to increased cooking frequency across most protein types. However, its impact on consumption frequency varied. Personal motives, such as health, taste, and convenience, strongly influence both cooking and consumption frequency, while the role of prosocial motives presented a more complex pattern. The study highlighted the importance of self-efficacy and personal motives in determining protein food choices and suggests that enhancing cooking self-efficacy could lead to healthier and more diverse dietary practices. These findings contribute to the understanding of consumer behaviour in protein consumption and offer insights for interventions aimed at improving dietary choices.

4.2 Introduction

In recent years, there has been a substantial increase in the focus on protein content and the various sources of protein in foods, driven by growing concerns related to ethnical and sustainability (Aiking, 2011). Aiking et al. (2006) proposed that reducing protein consumption by one-third in developed countries, while transitioning from intensively produced meat to plant-based proteins or meat produced extensively, could potentially liberate 87–94% of prime agricultural land currently used for feed crops. Such a shift would benefit biodiversity and biomass while alleviating resource strain. However, it is also known that essential dietary protein offers the crucial building blocks forming our muscles and bones to powering life-sustaining organs and immune system components. Studies shows that consuming higher protein diets may be beneficial to the metabolic level as dietary protein exhibits a greater satiating effect compared to carbohydrates and fats, has potential implications for lifestyle modification and weight management, particularly in obesity prevention and treatment. Additionally, higher dietary protein intake reduces the risk of muscle lost as a result of aging (Houston et al., 2008). Consequently, governmental dietary guidelines endorse the inclusion of variety of protein-rich foods to maintain a well-balanced diet among the general population (*The Eatwell Guide*, 2018).

While consumers have started to embrace more plant-based protein options, they continue to recognise the inherent richness and functional benefits of protein found in animal-based foods (Banovic et al., 2018). Even adverse views on meat do not invariably lead to a decrease in its consumption (Holm & Møhl, 2000). Moreover, the acceptance of traditional protein sources such as meat dairy and seafood-based was notably high among older consumers (Grasso et al., 2019), together with other study found similar findings (Piazza et al., 2015), highlights the significant role that animal-based protein plays in the customary Western diet. The social and cultural value of eating meat has remained important for consumers (Macdiarmid et al., 2016). Given these insights, it is essential to persistently examine consumer food choice behaviours, especially in relation to their consumption of protein-rich foods.

Building on the detailed examination of beef steak preparation in Chapter 3, Chapter 4 expands the study to encompass a wider range of protein sources. This broader scope responds to evolving dietary habits and the increasing diversity of

protein consumption. By comparing animal and plant-based proteins, the chapter seeks to uncover differences in cooking and consumption patterns. This comparative approach provides essential insights into cooking techniques, preferences, and dietary behaviours, supporting strategies for healthier and more sustainable eating. The chapter's expansion into diverse protein sources reflects the changing dietary landscape and emphasises the role of cooking self-efficacy in shaping consumer behaviour. By integrating this variety, the chapter aims to offer a comprehensive view of dietary practices that promote health and sustainability.

In the past two decades, cooking behaviour has gained increasing attention. There is growing evidence suggesting that cooking skills can be a significant enabler, allowing consumers to make healthier and potentially more sustainable food choices (Caraher et al., 1999; Foley et al., 2011). Cooking is recognised as a complex and dynamic concept, influenced by a multitude of factors (Short, 2003). The focus has shifted from merely examining the practice of cooking to understanding the role of cooking self-efficacy (Amouzandeh et al., 2019; Lavelle et al., 2020; Trubek et al., 2017). One of a recent developed 'Food Agency' framework positions cooking not just as a functional activity, but as a complex practice deeply embedded within and influenced by the societal and cultural background (Lahne et al., 2017; Trubek et al., 2017). Recognising and exploring these elements has proven crucial in comprehending how individuals perceive their abilities in cooking and food preparation and how this perception impacts their dietary choices (Daniels et al., 2012; Gatley et al., 2014b).

While Graça et al. (2019) have identified that a lack of cooking skills or food literacy can be a barrier to adopting more plant-based diets, d'Angelo et al. (2020) argue that merely enhancing cooking skills may not directly result in improved or more diverse dietary habits. This is attributed to the fact that the relationship between cooking skills and dietary choices is often influenced by deeper, underlying factors such as personal attitudes, preferences, or the importance individuals assign to certain dietary aspects (Furst et al., 1996). This implies that a more comprehensive understanding of these dynamics is crucial for gaining clearer insights into how changes in cooking skills might affect dietary behaviour. Such understanding is essential for uncovering the complex cause-and-effect relationships that oversee dietary choices and habits.

The scope of consumer cooking behaviour research has recently seen a surge in studies focusing on investigating consumer cooking behaviour in relation to

plant-based protein alternatives (Giacalone et al., 2022; Grasso et al., 2019; Ohlau et al., 2022), preparation or consumption of vegetables (Jarpe-Ratner et al., 2016; Winkler & Turrell, 2009). However, there appears to be a gap in research regarding the impact of cooking efficacy on protein food choice and consumption, particularly in comparing animal-based proteins with plant-based alternatives. To the best of the author's knowledge, no study has yet examined the role of cooking self-efficacy in relation to food choice motives or compared animal-based and plant-based protein foods specifically from the perspective of cooking behaviour. This suggests an unexplored area that could provide valuable insights into consumer dietary choices and cooking practices.

Therefore, this study aims to fulfil three key objectives: firstly, it focuses on exploring how cooking self-efficacy impacts behaviours around cooking and consuming protein-rich foods as well as the relationship between cooking self-efficacy and personal motives. Secondly, to enhance understanding of how personal and prosocial motives influence cooking and consumption behaviour. Thirdly, the study aims to compare the influence of self-efficacy across different protein food groups: beef, lamb, pork, chicken, fish, and plant-based meat alternatives (PBA), to ascertain if this relationship varies among the food types. This research is poised to make a significant contribution to existing literature by providing deeper insights into how cooking self-efficacy shape consumers' choices and behaviours regarding protein foods. By identifying the underlying reasons for consumers' limited protein food choices due to a lack of cooking efficacy, the study can guide consumers, researchers, and policymakers. It aims to enhance understanding of the link between cooking abilities and food choices, aiding the development of effective products, interventions, and educational programs that promote healthier and more varied dietary practices. This study is therefore crucial in bridging the knowledge gap about the role of self-efficacy in dietary choices, particularly in protein consumption, and in informing strategies to boost consumers' cooking confidence and dietary diversity.

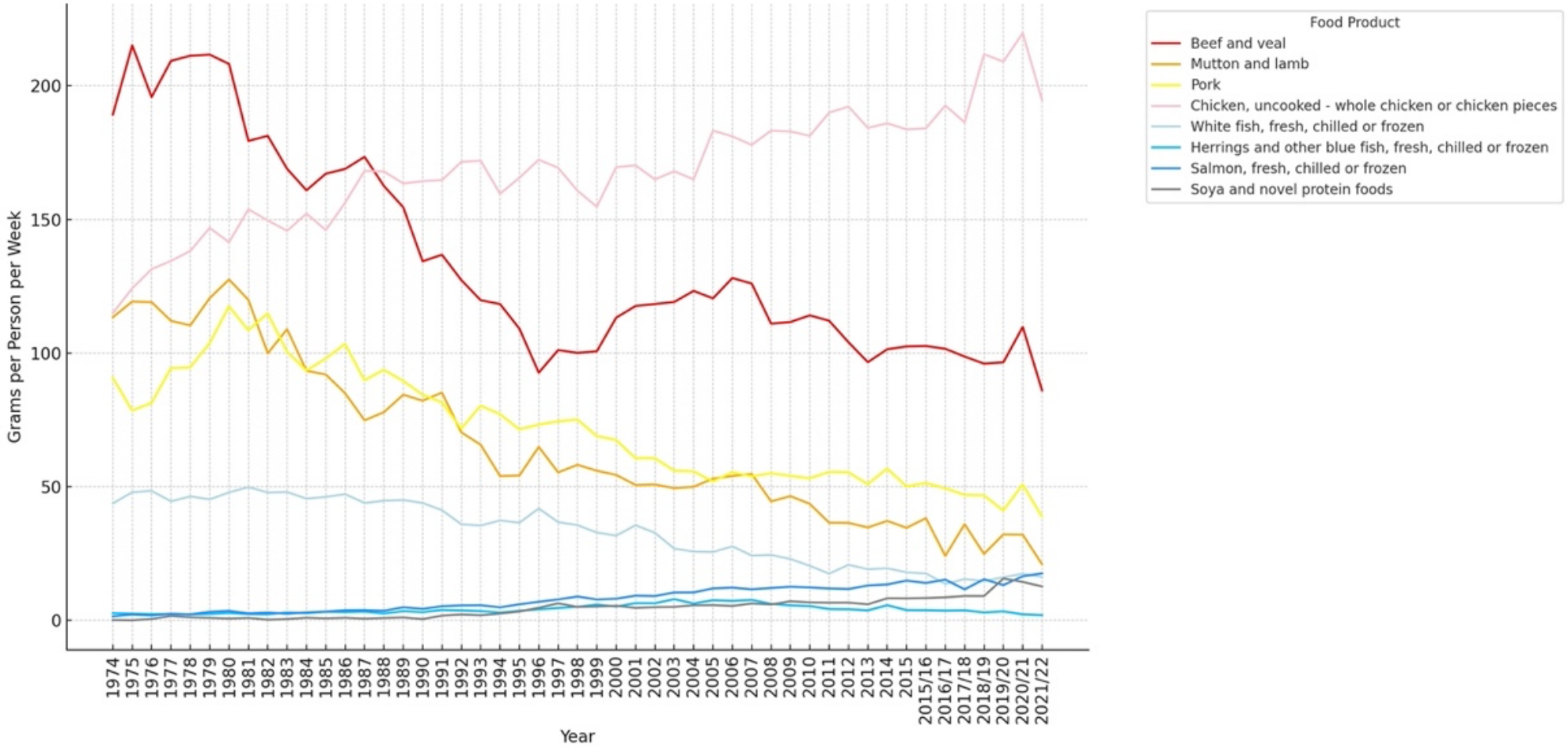

Figure 2 UK households' changes in protein food consumption from 1974 to 2021/22 (*Family Food Datasets*, 2023).

4.3 Literature Review and Hypothesis Development

4.3.1 Protein-rich Foods Consumption in the UK

Globally, meat consumption has been on the rise and is projected to continue increasing future. Analysing trends in the United Kingdom, the DEFRA 'Family Food' datasets offer insights into the average weekly acquisition of food and beverages per individual (*Family Food Datasets*, 2023). Figure 2 provides a longitudinal perspective on changes in protein food consumption from 1974 to 2021/22. There has been a notable decline in the consumption of red meats like beef and veal since the 1970s, reaching their lowest levels in recent years. Similarly, mutton and lamb consumption has consistently decreased. Conversely, chicken consumption has increased significantly from the late 1980s, making it the most consumed protein in recent years. Trends in fish consumption vary; while white fish consumption has decreased, salmon intake has gradually increased, especially in the last two decades. Notably, though soya and novel protein foods currently represent a small fraction of overall consumption, they have seen a slow yet steady increase over the past decade, reflecting a growing interest in plant-based proteins. The environmental impact of protein-rich foods is a significant consideration in sustainability (Fasolin et al., 2019; Sabaté et al., 2015). With the growth of the global population comes an increased demand for protein sources (van der Weele et al., 2019). In this context, comprehending consumer choices is pivotal for formulating strategies that promote sustainable food production and consumption, which aligns with wider societal goals. Consequently, it becomes essential to persistently study and understand consumers' choice behaviours, particularly in relation to their consumption of protein-rich foods. This ongoing research is key to addressing the environmental challenges associated with protein production and consumption, and to meeting the nutritional needs of a growing global population in a sustainable manner.

4.3.2 The Role of Cooking

The significance of cooking has been increasingly recognised in recent research, with evidence highlighting its connection to healthier dietary habits, enhanced food choices for families, and the potential for adopting more sustainable diets (Bech-Larsen & Tsalis, 2018; Caraher et al., 1999; Wolfson et al., 2020). It is believed

that home cooking enables individuals to exercise greater control over their meals, thereby making more informed decisions about ingredients and preparation methods that are beneficial for health and sustainability.

Furthermore, the importance of cooking skills in contemporary lifestyle and health promotion initiatives has also gained widespread acknowledgment (Caraher & Lang, 1999; Hartmann et al., 2013). Although several studies have identified a lack of cooking skills as a barrier to adopting and maintaining plant-based diets (Hoek et al., 2017; O'Keefe et al., 2016), cooking is a complex yet dynamic concept (Daniels et al., 2012). Only focusing on the practical element of cooking may not be sufficient to capture the full impact of other aspect of cooking. For example, d'Angelo et al. (2020) argue that enhancing cooking skills alone does not necessarily lead to a direct change in better dietary choice behaviour. As noted by Wolfson et al. (2016), organisational and planning skills are also crucial in facilitating cooking, which in turn promotes and encourages the activity. More inclusive concept such as the Food Literacy and its associated measurement tools have been developed to capture not only an individual's ability to cook but also to plan, select, and consume food (Vidgen & Gallegos, 2014). However, this concept does not encompass the social aspects of cooking and eating, which are significant elements in the practice of cooking and eating (Bildtgård, 2010; Gugliucci et al., 2022).

4.3.3 Theoretical Model and Conceptual Framework

The conceptual framework in this study (Figure 3) integrates the Food Choice Process Model (FCPM) (Furst et al., 1996; Sobal & Bisogni, 2009) and Food Agency to explore the role of cooking self-efficacy in shaping food choices. The FCPM, with its constructionist approach, provides a comprehensive view of food choice as an active, context-dependent process shaped by personal, social, and environmental influences. Its emphasis on the *Life Course* and *Influences* acknowledges how past experiences and external factors shape current eating behaviours. Central to this model is the *Personal Food System*, which captures the individual's active role in managing food decisions through cognitive processes and personal agency. Here, cooking self-efficacy is positioned as a crucial factor that influences not only the ability to perform a behaviour but also reflects a sense of empowerment and competence in engaging with food. Integrating Food Agency enhances the FCPM by considers the active role of personal agency in shaping food

practices, Additionally, personal and prosocial motives are embedded within the *Personal Food System*, representing the underlying values driving food choices. The inclusion of *liking* as a covariate recognises individual preferences that may moderate the impact of self-efficacy and motives on cooking behaviours, further refining the model's analytical focus.

Alternative theory was also considered. For example, the Theory of Planned Behaviour (TPB), formulated by Ajzen (1991) is a prominent model in understanding behavioural intentions and actions. According to TPB, an individual's intention to perform a behaviour, which precedes the actual behaviour, is influenced by three key factors: their attitude towards the behaviour, their perception of social pressures (subjective norms), and their perceived control over the behaviour (perceived behavioural control). Bamberg (2003) suggests that the appeal of models like TPB lies in their treatment of attitudes and by extension, values, beliefs, needs, and motivations - as consistent patterns that guide behaviour across various situations. The underlying idea is that identifying and modifying these cognitive components can lead to widespread behavioural changes in an individual's life.

However, recent insights acknowledge that individuals are influenced by their social context, which can sometimes override cognitive factors (Higgs, 2015). In addition, traditional behaviour changes models, which focus on individuals' cognitive states and contextual barriers, may be insufficient to capture the complexity of behaviour change interventions such as pro-environmental behaviour and sustainable consumption (Hargreaves, 2011). As Ajzen (2011) reflected that the TPB's primary focus on understanding goal-directed behaviour may be insufficient for understanding complex behaviours influenced by spontaneous or habitual actions. Therefore, TPB is less suitable because it frames behaviour as a linear function of intention, neglecting the dynamic inter-relation of factors. Combining FCPM and Food Agency offers a more comprehensive understanding of food choice behaviours, accounting for both contextual influences and cognitive processes.

4.3.4 Self-efficacy and Cooking Self-efficacy

Self-efficacy influencing the extent to which individuals can translate their intentions into action through planning in the content of dietary behaviour change (Bandura, 1997). It acts as a key moderator in the intention-planning-behaviour relationship, meaning that individuals with higher self-efficacy are more likely to create effective plans and follow through with them to achieve healthier dietary habits (Gutiérrez-Doña et al., 2009). Self-efficacy also has a stronger influence than cooking confidence in determining fruit and vegetable consumption (Lo et al., 2019). Therefore, self-efficacy is essential for facilitating successful goal achievement in dietary interventions.

Cooking self-efficacy emerged as the key predictor of meal healthiness prepared by mothers (Beshara et al., 2010). Although time pressure and convenience orientation negatively influenced cooking self-efficacy, they did not directly affect meal healthiness. Instead, their effects were indirect, primarily through reducing mothers' confidence in meal preparation. Thus, cooking self-efficacy acts as the central factor that can buffer the negative effects of time stress and convenience preferences on the nutritional quality of family meals. Interventions that included hands-on cooking demonstrations and practical experiences were particularly effective in enhancing cooking self-efficacy (Gordillo & Prescott, 2023). Cunningham-Sabo & Lohse (2014) found Spanish students from low-income public schools especially boys without prior cooking experience improved self-efficacy and attitudes towards cooking, as well as increased preferences for vegetables after experienced cooking programme. Another intervention results showed that 12-month after the programme, cooking self-efficacy remained significantly better in the intervention group compared to the control group suggests that self-efficacy improvements can be maintained overtime (Kuroko et al., 2020).

The recently developed framework Food Agency, drawing from anthropological and sociological perspectives, defines cooking as '*a skilled practice in relation to social and cultural contexts and constraint'* (Trubek et al., 2017). This concept focuses on an individual's capacity to overcome personal and social environmental barriers to produce the food they envision. The framework was subsequently measured by and Food Provisioning Action Scale (CAFPAS),

which consisting of 28 items across three domains: cooking self-efficacy which is about self-perception of cooking and food-preparation skills; food attitude towards food and cooking and individual's perception of their social structure (Lahne et al., 2017). Although it is a relatively new framework and scale, it has been the foundation for several studies exploring its broader applications (Clark-Barol et al., 2021; C. Morgan, 2020; Zagata et al., 2022).

One of the subscales of CAFPAS measures the food and cooking self-efficacy, which is a particular useful concept to understand individual's objective measurement of their ability of cooking. Self-efficacy is a crucial personal resource influencing whether individuals believe they can achieve their goals and how effectively they can motivate themselves (Bandura, 2006). Studies have shown that self-living individuals with higher cooking self-efficacy tend to cook more frequently (Oleschuk et al., 2023). Working mothers with greater meal preparation self-efficacy have been linked to serving healthier meals to their children, especially under time constraints (Beshara et al., 2010). Additionally, household food gatekeepers who possess confidence in their food skills and the ability to create meals from basic ingredients are inclined to buy less convenience food (Burton et al., 2017). In summary, cooking self-efficacy appears to be associated with increased control over cooking and food behaviours. Therefore, the hypothesis is that cooking self-efficacy is positively associated with both the frequency of cooking and the consumption frequency of protein foods. This implies that individuals who perceive higher confidence in their cooking abilities and food provisions, are more likely to cook frequently and consume protein foods more regularly.

H1: Cooking self-efficacy has a positive effect on cooking frequency.

H2: Cooking self-efficacy has a positive effect on consumption frequency.

4.3.5 Personal Food Motives

Food behaviour is a complex process that encompasses a series of interrelated decisions, extending far beyond the simple choice of what to eat. Each decision in the process is often interconnected with others, forming a comprehensive chain of actions related to food (Furst et al., 1996). The means-end model offers a valuable framework for understanding the cognitive links that consumers establish between product attributes and their deeper motives or values (Zeithaml, 1988). This model

implies that when individuals make food choices, their decisions are significantly influenced by their underlying motives and values. These motives and values serve as the 'ends' in the means-end chain, with the product and their attributes representing the 'means' to achieve these ends.

Further elaborating on this concept, food choice motives refer to the diverse reasons, motivations, or incentives that drive consumers to choose or consume particular foods (Onwezen et al., 2019; Steptoe et al., 1995). For example, consumers who are time scarcity and demand for convenience products associated with increased convenient food products (Brunner et al., 2010; Celnik et al., 2012); while for individual who strongly value health might lead someone to resist convenience options, even under time pressure (Grunert, 2006). Despite consumers adapting to a fast-paced and everchanging lifestyle, factors relate to personal benefit such as nutrition, taste, and economic considerations continue to be pivotal in their food choices (Verriet,2015). Healthiness and taste have been identified as highly relevant motives influencing the acceptance of all alternative proteins foods (Onwezen et al., 2021).

Food behaviour is also influenced by personal factors, for example personal self-identities (Sobal & Bisogni, 2009). This suggests that a person who identifies as a "good cook" is likely to have high cooking self-efficacy, which in turn positively influences their food choices and behaviours in line with their personal motives. For example, parents' ability to effectively navigate nutritional needs and preferences is influenced by their self-efficacy in meal management, suggesting that higher self-efficacy aligns with and enhances personal motives for meal choices and preparation (Morin et al., 2013).

Evidence from cooking intervention programs, such as those studied by Hutchinson et al. (2016) indicates that enhanced cooking and food skills can lead to an increase in the self-reported consumption of fruits and vegetables, as well as a decrease in snack consumption. This shift in dietary behaviour implies that as participants gain more self-efficacy in cooking, their personal motives towards healthier eating are also reinforced. Moreover, as individuals become more skilled and confident in their cooking abilities, they are more inclined to make healthier food choices (Hartmann et al., 2013). Furthermore, Lavelle et al. (2020) found that higher levels of food skills confidence are associated with a less consumption of take-aways and an increased willingness to try new foods. This finding further supports that personal motives can positively influence cooking frequency.

Essentially, individuals who are confident in their cooking and food skills, and who have strong personal reasons such as health or taste preferences, are more likely to engage in cooking frequently.

These studies collectively suggest that cooking self-efficacy plays a significant role in shaping dietary habits. Individuals who feel more confident in their cooking abilities are not only more likely to cook frequently but are also more inclined to make food choices that align with their personal motives, leading to healthier eating habits. Accordingly, the following hypotheses are proposed:

H3: Personal motives are positively influenced by cooking self-efficacy.

H4: Personal motives have a positive effect on cooking frequency.

H5: Personal motives positively influence consumption frequency.

4.3.6 Prosocial Food Motives

Cooking, especially home cooking is associated with positive emotions indicating a positive societal view of homemade meals as beneficial and enjoyable (Gugliucci et al., 2022). Cooking in family settings is associated with care and social bonding. In households with families, the prosocial motives of caring for and nurturing others can directly influence the frequency of cooking activities (Daniels et al., 2012). Furthermore, the role of food and food-related tasks within the household context are influential in defining the roles of each family member, also highlighting the social and familial dynamics around culinary practices (Cuevas et al., 2021). In this context, social norms involve making food choices that meet the expectations of others, while social image is characterized by consuming food to present oneself positively in social contexts (Renner et al., 2012).

Consumers who attached to meat consumption are not only more likely to consume meat frequently but also tend to hold more positive attitudes towards meat consumption. This preference is further reinforced by perceived social pressures to eat meat, aligning with societal norms or expectations (Graça et al., 2015; Piazza et al., 2015). Similarly, the transition to new dietary habits, such as increased consumption of beans and soy products, is significantly influenced by the social environment (Vainio et al., 2016). Individuals are likely to consider how their dietary choices will be perceived within their social circles, indicating the importance of social approval and belonging.

When it comes to meat or protein food consumption, individuals often undervalue or are less aware of the personal benefits associated with pro-environmental dietary choices (Grasso et al., 2019; Hoek et al., 2017), which environmental considerations may not be the primary motivator for choosing certain protein foods. On the contrary, social norms and interactions are often considered more impactful than other factors that shaping eating behaviours (Herman et al., 2003). For example, consumers might adopt vegetarianism or reduce meat intake influenced by their social circles (Collier et al., 2021). Social image is another crucial factor can impact consumer preferences on food choice, as consumers tend to have the desire to present themselves positively to others (White & Dahl, 2006), especially in the context of sustainable foods (Chong et al., 2022; Folwarczny et al., 2023). Younger consumers, in particular, are more likely to be influenced by social norms and concerns about their social image when making food choices, where the desire to present oneself favourably contexts often dictate what they eat (König et al., 2017; Renner et al., 2012).

Based on these insights, the following hypotheses can be formulated: prosocial motives, including the desire to meet social expectations and maintain a positive social image, are positively associated with the frequency of cooking specific foods. This reflects the influence of social dynamics and the role of cooking in fulfilling social and familial responsibilities. Similarly, prosocial motives also positively influence the consumption frequency of foods. The desire to align with social norms, to be perceived positively by others, and to maintain social relationships can drive individuals to consume foods more frequently, adhering to the dietary patterns valued by their social groups. Therefore, the following hypotheses are proposed:

H6: Prosocial motives have a positive effect on the cooking frequency.

H7: Prosocial motives positively influence consumption frequency.

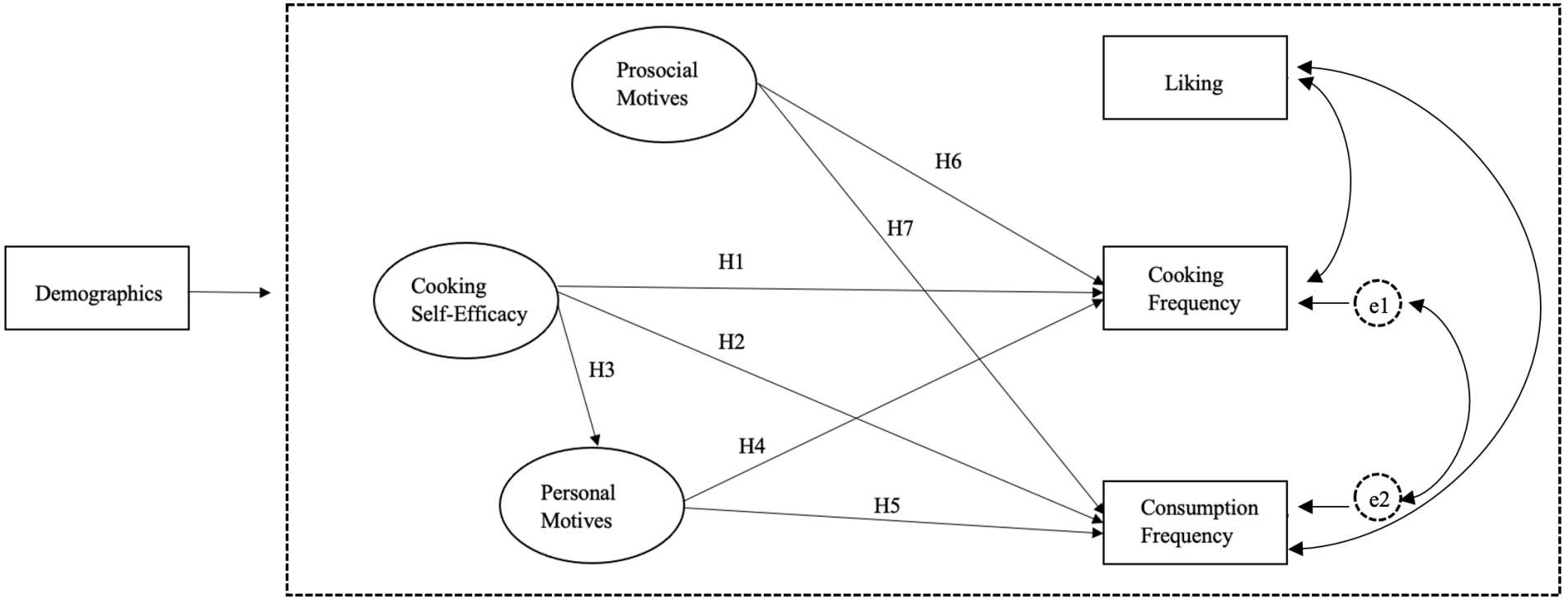

Figure 3 Conceptual Model

4.4 Methods

4.4.1 Questionnaire and Measures

The data were collected via an online survey administered in February 2022 using the Qualtrics platform (Qualtrics, UT). As Bongoni et al. (2015) suggested the self-reporting questionnaire represents the most practical research method for administering to a large number of respondents in a limited time frame. This approach effectively captures the wide variations in food preparation practices. A nationally representative quota for the UK was implemented. A total of 2,745 participants completed the entire questionnaire. Data were subjected to quality screening; respondents with abnormally rapid completion speed or those identified as potential bots were excluded. Consequently, data from 2,653 participants were included in the final analysis. Table 3 displays the comparisons between the sampled demographics and national demographics.

Table 3 Comparisons between sampled and national demographics.

		Sample characteristics (%)	National Census 2021(%) (*Census*, 2021)
Age	18-24	11.38	8.30
	25-34	19.26	13.50
	35-44	18.70	13.00
	45-54	19.71	13.30
	55-64	16.43	12.60
	Above 65	14.51	18.40
Gender	Female	51.49	51.00
	Male	48.02	49.00
	Other	0.41	/
	Missing	0.08	/
Ethnic	White	86.58	81.70
	Other	12.40	17.40
	Missing	1.02	/
Income	Less than £19,999	29.06	29.61
	£20,000 - £39,999	38.60	45.70
	£40,000 - £59,999	17.26	17.73
	Above £60,000	9.16	6.96

	Missing	5.92	/
Education	Secondary and Lower	48.25	30.60
	Higher	37.13	35.60
	UG, PG & Professional	13.95	33.80
	Missing	0.68	/
Location	Northern England	24.24	23.30
	Mid England	25.90	25.70
	Southern England	22.50	13.90
	Greater London	12.89	13.10
	Wales	4.52	4.60
	Scotland	8.10	8.10
	Northern Ireland	1.85	2.80

Participants were randomly allocated to one of six protein food groups: beef, lamb, pork, chicken, fish, and plant-based BPA, and answered questions specific for the assigned food group. The survey questions covered various aspects of their interaction with these foods, including the frequency of cooking and consumption, self-efficacy in cooking these specific foods, their motivations for eating them, and their personal preferences.

The definition of each protein food type is listed below:

Beef: Raw beef (fresh or frozen): any raw beef products that needs cooking. For example: roasting joints, steaks, diced beef burgers, mince.

Lamb: Raw lamb (fresh or frozen): any raw lamb products that need cooking. For example: roasting joints (legs and shoulders), steaks, chops, diced lamb burgers, mince.

Pork: Raw pork (fresh or frozen): any raw lamb products that need cooking. For example: roasting joints (legs and shoulders), steaks, chops, diced lamb burgers, mince, sausages, bacon.

Chicken: Raw chicken (fresh or frozen): any raw chicken products that need cooking. For example: whole chickens part chickens (thighs, drumsticks, wings, breast).

Fish: Raw fish (fresh or frozen): any raw fish and seafood products that need cooking. For example: whole or fillet of sea fish (e.g., salmon, cod, mackerel, haddock, tuna, sea bream, sea bass).

PBA: Source of protein that are not obtained from animals, in a format that needs cooking. For example: dried or canned beans and pulses (e.g., peas, broad beans,

chickpeas, butter beans, borlotti beans, kidney beans) soy and soy products (e.g., tofu, tempeh) frozen and refrigerated meatless products, such as plant-based steaks, minces, burger patties (e.g., Quorn or Linda McCartney's, or equivalent products from supermarket brands) other plant-based food that is high in protein.

When answering the questions, participants were asked to reflect on their home cooking practice, which was defined as planning and preparing dishes from raw ingredients (whether fresh, refrigerated, or frozen). The study explicitly excluded ready-to-eat items and foods that only require heating, such as takeaways or pre-made meals, to ensure the data reflected cooking practices for each type of protein foods.

To assess the participants' self-efficacy in cooking protein foods at home, the study employed a modified version of the CAFPAS. Participants were asked to reflect on how they feel about cooking specific food protein food at home and rate each statement on a 7-point scale ranging from 'Strongly Disagree' to 'Strongly Agree'. This scale, consisting of 10 items, was adapted to suit the study's specific needs. Details on the development and modifications of this scale are provided in a subsequent section of the study.

In addition to self-efficacy, the survey also explored the participants' consumption motives using a 13-item questionnaire (Appendix J). Food choice motives were measured using the single-item Food Choice Questionnaire (FCQ) (Onwezen et al., 2019). This questionnaire delved into various personal motivations for food choice, including health, convenience, sensory attributes, naturalness, price, and familiarity. Single items including the dimensions of ethical concern were removed. Instead, the questionnaire included questions on prosocial motives, including social norms and social image from The Eating Motivation Survey (TEMS) (Renner et al., 2012). Participants were asked to reflect on their reasons for consuming the protein foods that they were assigned to, and to rate each motive on a 7-point scale ranging from 'Strongly Disagree' to 'Strongly Agree'. Take the example of the beef group, the respondents were asked to statement starting with "Consider the reason why you eat beef and rate the following descriptions. I eat beef because…". Personal motives explored included: "eating beef because it is perceived as healthy"; "as a means of mood regulation (e.g., feeling good or coping with stress)"; "due to its convenience in terms of purchase and preparation"; "because of its taste"; "because it is considered natural"; "for its affordability"; "for weight control"; "due to its familiarity"; "for its perceived environmental benefits".

Prosocial motives items included: "to avoid disappointing someone"; "because of a perceived obligation to eat it"; "because it is commonly eaten by others"; and "because it enhances social image or appearance in front of others".

4.4.2 The Development of the Protein Food Specific CAFPAS

The CAFPAS was developed by Lahne et al. (2017) to measure the cooking agency from three aspects: self-efficacy, attitude and structure using a 28 items questionnaire. Given the varying skill levels and techniques required to cook the different protein foods, it raises the question of whether a single scale can adequately measure all aspects. Food-specific scales, like those focused on fruit and vegetable preparation self-efficacy (Condrasky et al., 2011).

However, considering the different skill levels and techniques required for cooking various protein foods, and one of the aims of the research is to compare the role of cooking self-efficacy among the different food types. Recognising this, a protein food-specific version of the cooking self-efficacy subscale was developed to more accurately assess the cooking self-efficacy related to different protein foods. This adaptation was essential to differentiate between consumers' perception of their efficacy associated with beef, lamb, pork, chicken, fish, and PBA. To achieve this, the CAFPAS was revised, tailoring each question to the context of preparing specific protein foods. For instance, a general item like, 'When preparing food, it is easy for me to accomplish my desired results,' was modified to be protein-specific, such as 'When preparing beef dishes, it is easy for me to accomplish my desired results'. This adaptation process involved evaluation by researchers to ensure that the core measurement of each question remained intact while being relevant to the specific protein food group. Additionally, interviews were conducted with 9 participants to assess the suitability of the revised items. Feedback from these participants was used to further refine the wording of the modified scales as well as the questionnaire.

The validation of the protein food specific self-efficacy scales involved a two-stage process, with the initial pilot study conducted through Amazon's Mechanical Turk (Mturk) with a sample of 300 participants. Participants answered the questionnaire contained the full modified CAFPAS scales for beef. The data was then analysed with exploratory factor analysis using Principal Component Factor analysis in its unrotated form. This analysis aimed to ascertain how well the

modified scale's variables aligned with the factors identified in the original CAFPAS scale. The primary results showed that the revised scale maintained the integrity and structure of the original while being tailored to specific protein food groups.

The subsequent stage focused on refining the 'self-efficacy' subscale of the modified scale after the main study was performed. For this purpose, Principal Component Factor Analysis with oblique promax rotation was utilised on the main data set. This method provided a more nuanced understanding of the factor structure, helping to identify items that were not distinctly associated with a single factor. Items with factor loadings less than 0.3 or those that loaded onto multiple factors were considered for removal to enhance the scale's clarity and precision. The scale retained items that clearly and exclusively loaded onto the self-efficacy factors for all protein foods were listed in Table 4, which also showing a comparison between the original and modified items was made, using beef as a representative example.

Table 4 Modified Cooking Self-Efficacy Items vs. Original Items

Item Code	Original CAFPAS Code	Modified - Protein Food Specific	Original
CAPFAS2	FSE3	When preparing beef dishes, I can always manage to decide what I would like to eat at any given time.	I can always manage to decide what I would like to eat at any given time.
CAPFAS3	FSE6	When preparing beef dishes, I am confident that I can deal with unexpected results.	When preparing food, I am confident that I can deal with unexpected results.
CAPFAS4	FSE7	When preparing beef dishes, it is easy for me to accomplish my desired results.	When preparing food it is easy for me to accomplish my desired results.
CAPFAS5	FSE8	In preparing beef dishes, I can solve most problems with enough effort.	In preparing food, I can solve most problems with enough effort.
CAPFAS6	ISCO1	I am comfortable preparing beef dishes.	I am comfortable preparing food.
CAPFAS7	ISCO5	I know how to use the kitchen equipment I need to cook beef.	I know how to use the kitchen equipment I have.
CAPFAS10	ISMP5	I am confident creating beef dishes from the ingredients I have on hand.	I am confident creating meals from the ingredients I have on hand.
CAPFAS11	ISMP7	Before I start cooking beef, I usually have a mental plan of all the steps I will need to complete.	Before I start cooking, I usually have a mental plan of all the steps I will need to complete.
CAPFAS12	ISSH4	When comparing two similar beef products before purchase, I feel confident choosing between them.	When presented with two similar products to purchase, I feel confident choosing between them.
CAPFAS13	ISSH5	I know where to find the ingredients I need to prepare beef dishes.	I know where to find the ingredients I need to prepare a meal.

Table 5 Factor Loadings, Reliability and Validity

	Standard Loadings					
Variable	Beef	Lamb	Pork	Chicken	Fish	PBA
Self-Efficacy						
CAPFAS2	0.79	0.83	0.73	0.74	0.83	0.75
CAPFAS3	0.77	0.79	0.77	0.69	0.81	0.77
CAPFAS4	0.84	0.83	0.89	0.73	0.88	0.83
CAPFAS5	0.78	0.84	0.91	0.76	0.85	0.84
CAPFAS6	0.80	0.83	0.91	0.70	0.83	0.87
CAPFAS7	0.78	0.82	0.92	0.81	0.87	0.88
CAPFAS10	0.80	0.82	0.85	0.76	0.84	0.81
CAPFAS11	0.74	0.73	0.81	0.73	0.77	0.78
CAPFAS12	0.77	0.78	0.85	0.69	0.82	0.77
CAPFAS13	0.76	0.82	0.90	0.85	0.82	0.86
α	0.95	0.94	0.96	0.94	0.95	0.95
CR	0.80	0.85	0.91	0.74	0.88	0.86
AVE	0.61	0.66	0.73	0.56	0.69	0.67
Personal Motives						
Convenience	0.69	0.68	0.80	0.88	0.72	0.72
Familiarity	0.82	0.75	0.87	0.79	0.73	0.57
Health	0.67	0.69	0.58	0.69	0.91	0.97
Natural	0.70	0.74	0.58	0.50	0.90	0.81
Price	0.62	0.53	0.84	0.78	0.63	0.65
Sensoric	0.94	0.99	0.95	0.89	0.95	0.90
α	0.86	0.88	0.90	0.86	0.86	0.91
CR	0.88	0.88	0.90	0.89	0.92	0.90
AVE	0.56	0.55	0.61	0.59	0.66	0.61
Prosocial Motives						
Social Image1	0.77	0.87	0.75	0.70	0.86	0.88
Social Image2	0.92	0.85	0.95	0.90	0.93	0.96
Social Norms1	0.83	0.86	0.79	0.81	0.90	0.87
Social Norms2	0.77	0.71	0.86	0.79	0.78	0.73
α	0.89	0.90	0.91	0.87	0.90	0.90
CR	0.89	0.89	0.91	0.88	0.92	0.92
AVE	0.68	0.68	0.71	0.65	0.76	0.75

Table 6 Latent Variable Correlations

	cafpas2	cafpas3	cafpas4	cafpas5	cafpas6	cafpas7	cafpas10	cafpas11	cafpas12	cafpas13	Convenience	Familiarity	Health	Natural	Price	Sensoric	Social Image1	Social Image2	Social Norms1	Social Norms2
cafpas2	1.00																			
cafpas3	0.62	1.00																		
cafpas4	0.67	0.68	1.00																	
cafpas5	0.67	0.69	0.71	1.00																
cafpas6	0.67	0.68	0.74	0.70	1.00															
cafpas7	0.62	0.62	0.68	0.67	0.70	1.00														
cafpas10	0.64	0.69	0.71	0.69	0.74	0.67	1.00													
cafpas11	0.59	0.56	0.62	0.61	0.61	0.61	0.60	1.00												
cafpas12	0.62	0.66	0.67	0.66	0.68	0.64	0.68	0.59	1.00											
cafpas13	0.62	0.59	0.67	0.65	0.68	0.71	0.67	0.63	0.64	1.00										
Convenience	0.47	0.43	0.48	0.45	0.51	0.42	0.47	0.42	0.45	0.41	1.00									
Familiarity	0.45	0.43	0.46	0.44	0.52	0.40	0.46	0.41	0.45	0.42	0.67	1.00								
Health	0.42	0.40	0.41	0.41	0.47	0.37	0.41	0.37	0.40	0.37	0.56	0.54	1.00							
Natural	0.40	0.40	0.41	0.41	0.45	0.34	0.42	0.36	0.40	0.36	0.55	0.58	0.66	1.00						
Price	0.39	0.38	0.42	0.40	0.46	0.35	0.42	0.36	0.41	0.34	0.66	0.61	0.54	0.53	1.00					
Sensoric	0.52	0.46	0.53	0.50	0.60	0.50	0.53	0.48	0.51	0.52	0.60	0.64	0.57	0.56	0.54	1.00				
Social Image1	0.18	0.23	0.19	0.21	0.19	0.10	0.20	0.17	0.18	0.10	0.40	0.41	0.33	0.39	0.40	0.19	1.00			
Social Image2	0.13	0.19	0.12	0.15	0.11	0.01*	0.14	0.11	0.14	0.01*	0.31	0.32	0.32	0.38	0.34	0.11	0.62	1.00		
Social Norms1	0.11	0.18	0.11	0.15	0.11	0.06	0.14	0.12	0.13	0.04	0.30	0.29	0.27	0.33	0.31	0.13	0.58	0.61	1.00	
Social Norms2	0.17	0.23	0.18	0.19	0.18	0.11	0.19	0.15	0.18	0.09	0.37	0.39	0.43	0.44	0.39	0.21	0.61	0.66	0.57	1.00

Note: * p>0.05

4.5 Data Analysis and Results

Descriptive statistics were performed in STATA version 17 (StataCorp LP, College Station, TX, USA). A Structural Equation Modelling (SEM) approach was chosen to allow direct statistical testing of a theoretical model. A key distinction and benefit of SEM compared to other methods lies in its ability to estimate and test the relationships among various constructs. Unlike general linear models, which often represent constructs with a single measure and do not account for measurement error, SEM enables the use of multiple indicators for each construct and effectively deals with measure-specific errors (Weston & Gore Jr., 2006).

4.5.1 Reliability and Validity

An exploratory factor analysis (maximum-likelihood method, promax rotation) for the model construction was performed to confirming that variables and test for inner reliability of each factor. Table 5 presents the standardised factor loadings (factor pattern coefficients), Cronbach's alpha correlation coefficients, construct reliability (CR) and average variance extracted (AVE) value for the three latent variables across all food types. Correlation between the items is showing in Table 6. The loadings for cooking self-efficacy range from a minimum of 0.69 to a maximum of 0.92 indicating the items are good indicators of measuring cooking self-efficacy for all food types. The loadings for personal motives vary considerably, with the lowest at 0.50 (Natural) for chicken and the highest at 0.99 (Sensoric) for lamb. This suggests the influence of the personal motives is highly food dependent. Overall, the loading values are strong for all motives. For prosocial motives, the loadings range from 0.70 to 0.96, indicating a strong relationship between the variables and prosocial motives.

In addition to the standardised factor loadings, AVE is used to assess the average amount variance that a construct explains in a model (Fornell & Larcker, 1981), and the suggested minimum desirable threshold is 0.5. The AVE values in the current analysis have a range from 0.55 to 0.76, indicating a satisfactory level of explained variance.

Cronbach's alpha is widely used to assess the internal consistency of a test or a set of items measures a single, unidirectional latent construct (Tavakol & Dennick, 2011). Cronbach's alpha values for all constructs exceed the minimum

desirable threshold of 0.7 (Hair et al., 2019). All the Cronbach's alpha value in the analysis exceeding 0.86, which is considered desirable for establishing internal consistency. Additionally, CR is another measure used in SEM evaluates the internal consistency of the items. CR values of 0.7 or higher are indicative of good reliability (Hair et al., 2019). The results show that the CR values range from 0.74 to 0.92 further confirming the reliability of the measurement instruments in SEM.

4.5.2 Demographic

The demographics of the sample showing in Table 8 highlights the distribution of demographic variables across different protein food types. Participants were randomly assigned to ensure a balanced sample size for each sub-group. The Kruskal-Wallis test was performed to compare the demographic profile of each food type sub-group. The test results show the p-value for all comparisons are greater than 0.05, indicates that there are no significant differences in the distribution of demographic factors across the food types. This confirms a homogenous representation of demographics across the different types of protein foods considered in this sample.

Table 7 Demographic profile (%) of the participants in each subgroup and Kruskal-Wallis test results

		Protein Food Type							
		Beef	Lamb	Pork	Chicken	Fish	PBA		
		%						χ^2	P
Age	18-24	8.70	12.08	12.24	12.64	10.34	12.27		
	25-34	19.68	18.79	19.27	19.41	20.00	18.41		
	35-44	19.22	19.24	21.54	19.19	15.96	17.05		
	45-54	18.76	20.58	22.00	15.35	21.57	20.00		
	55-64	18.76	15.66	15.65	16.93	15.51	16.14		
	Above 65	14.87	13.65	9.30	16.48	16.63	16.14		
								30.12	0.22
Gender	Female	50.80	49.66	56.69	50.11	51.24	50.45		
	Male	48.51	49.89	42.63	49.44	48.31	49.32		
	Other	0.46	0.22	0.68	0.45	0.45	0.23		
	Missing	0.23	0.22	0.00	0.00	0.00	0.00		
Ethnic	White	88.33	87.25	82.99	87.58	85.62	87.73		
	Other	10.30	11.19	16.33	11.51	13.03	12.05		
	Missing	1.37	1.57	0.68	0.90	1.35	0.23		
								11.83	0.69

Income	Less than £19,999	30.43	27.74	27.66	26.41	31.01	31.14		
	£20,000 - £39,999	37.53	39.60	40.59	39.73	37.08	37.05		
	£40,000 - £59,999	16.48	16.78	15.65	19.86	16.85	17.95		
	Above £60,000	8.47	10.29	9.98	8.58	9.21	8.41		
	Missing	7.09	5.59	6.12	5.42	5.84	5.45		
								14.63	0.15
Education	Secondary and Lower	36.84	38.26	38.55	35.44	36.40	37.27		
	Higher	36.84	38.26	38.55	35.44	36.40	37.27		
	UG, PG &Professional	13.96	11.63	13.83	17.38	11.69	15.23		
	Missing	1.14	0.89	0.68	0.45	0.67	0.23		
								10.42	0.96
Location	Northern England	24.71	25.50	24.72	21.44	26.07	22.95		
	Mid England	25.40	24.38	23.81	29.35	26.29	26.14		
	Southern England	25.40	22.82	25.40	21.44	20.00	20.00		
	Greater London	10.98	13.65	12.70	13.54	12.58	13.86		
	Wales	5.03	2.91	4.76	5.19	4.04	5.23		
	Scotland	6.41	9.40	7.03	7.90	8.76	9.09		
	Northern Ireland	2.06	1.34	1.59	1.13	2.25	2.73		
								13.16	0.59
Total		404	419	412	418	416	416	26.16	0.67

Table 8 Descriptive Statistics of Measurements

	Beef		Lamb		Pork		Chicken		Fish		PBA	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Measurements												
Cooking Frequency	2.11	0.75	1.70	0.74	2.02	0.87	2.31	0.77	1.89	0.77	2.00	0.89
Consumption Frequency	3.32	1.16	2.79	1.22	3.08	1.24	3.81	1.11	3.33	1.20	2.86	1.42
Liking	5.14	1.63	4.84	1.88	4.89	1.77	5.50	1.58	5.12	1.74	3.77	1.82

Table 9 Descriptive Statistics of Indicators and Kruskal-Wallis Test Results

	Beef		Lamb		Pork		Chicken		Fish		PBA			
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	χ^2	P
Indicators														
Self-Efficacy	5.07	1.47	4.65	1.68	4.82	1.58	5.23	1.41	4.66	1.62	4.33	1.62	140.3	**
Personal Motives														
Convenience	4.53	1.51	3.99	1.69	4.53	1.63	5.21	1.36	4.41	1.67	3.75	1.66	212.20	**
Familiarity	4.79	1.51	4.30	1.67	4.57	1.61	5.11	1.47	4.52	1.66	3.55	1.63	223.29	**
Health	4.31	1.54	4.02	1.67	4.07	1.68	4.98	1.44	5.23	1.57	4.31	1.79	228.63	**
Natural	4.51	1.54	4.23	1.70	4.20	1.79	4.54	1.54	4.84	1.60	3.98	1.78	68.84	**
Price	4.18	1.58	3.71	1.77	4.67	1.65	5.16	1.44	4.34	1.65	3.73	1.70	254.93	**
Sensoric	5.45	1.51	4.94	1.91	5.02	1.75	5.51	1.42	5.20	1.75	4.11	1.72	195.70	**
Prosocial Motives														
Social Image1[a]	3.54	1.73	3.33	1.78	3.43	1.81	3.83	1.75	3.43	1.82	3.10	1.66	38.85	**
Social Image2	3.14	1.70	3.12	1.81	3.04	1.84	3.12	1.80	3.11	1.86	2.98	1.73	2.47	NS
Social Norms1[b]	3.49	1.69	3.32	1.76	3.27	1.80	3.40	1.72	3.36	1.77	3.34	1.79	3.56	NS
Social Norms2	3.49	1.63	3.10	1.72	3.26	1.84	3.51	1.74	3.68	1.79	3.23	1.71	33.37	**

a. De Social Image1: ...because everyone else eat it; Social Image2: … because it makes me look good in front of others.
b. Social Norms1: ...to avoid disappointing someone who is trying to make me happy; Social Norms2: ...because I am supposed to eat it.
Descriptive Analysis

Table 8 and Table 9 provides mean scores and standard deviations insights for all measurements and indicators across the six food types. Comparing the cooking and consumption frequency, chicken is the most often cooked (M = 2.31, SD = 0.77) and consumed (M = 3.81, SD = 0.87) protein food in the comparison, and low variability. Lamb is less cooked (M = 1.70, SD = 0.74) and consumed (M = 2.79, SD = 1.22) than the other meats. PBA (M = 2.00, SD = 0.89) was cooked comparable to beef (M = 2.11, SD = 0.75) and pork (M = 2.02, SD = 0.87), however PBA has higher variability. PBA also shows a lower consumption frequency with a mean of 2.86 and the highest variability (SD = 1.42) among the food types.

Chicken is the most liked food type (M = 5.50), with low variation among consumers (SD = 1.58). PBA is the least liked (M = 3.77), with the highest variation (SD = 1.82). Beef, Lamb, Pork, and Fish are all similarly liked with mean scores above 4.80.

Table 9 provides a detailed descriptive analysis of indicators across various protein food types and Kruskal-Walli's test results. Chicken and beef were associated with the highest levels of consumer cooking self-efficacy, with means of 5.23 and 5.07, and standard deviations of 1.41 and 1.47, respectively. Pork and fish follow closely whereas lamb presents a modestly lower self-efficacy score (M = 4.65, SD = 1.68). PBA exhibit the lowest self-efficacy score (M = 4.33, SD = 1.62). The chi-square test result ($\chi^2 = 140.32$ $p < 0.001$) confirming statistically significant disparities in self-efficacy among the different proteins examined.

The Table 9 further presents an analysis of personal motives across various food types, showing statistically significant differences ($\chi^2 = 212.20$, $p < 0.001$ for convenience; $\chi^2 = 223.29$, $p < 0.001$ for familiarity; $\chi^2 = 228.63$, $p < 0.001$ for health; $\chi^2 = 254.93$, $p < 0.001$ for price; $\chi^2 = 195.70$, $p < 0.001$ for sensoric quality).

In analysing personal motives for food choices across protein types, sensoric qualities consistently emerge as a key driver, with chicken (M = 5.51, SD = 1.42), pork (M = 5.02, SD = 1.75), and beef (M = 5.45, SD = 1.51) scoring highest. While sensoric was also highly rated for fish and PBA, health motives were most strongly associated with fish (M = 5.23, SD = 1.57) and PBA (M = 4.11, SD = 1.72) consumption. Convenience was highly rated for chicken (M = 5.21, SD = 1.36) and beef (M = 4.53, SD = 1.51). On the contrary, PBA was rated the lowest (M = 3.75, SD = 1.66). Similarly, familiarity was the highest for chicken (M = 5.11, SD = 1.62) and beef (M = 4.79, SD = 1.62), while lower scores for lamb (M = 4.30, SD = 1.62) and PBA (M = 3.55, SD = 1.62). Fish scores the highest in the naturalness (M =

4.84, *SD* = 1.60), while PBA scores lowest (*M* = 3.98, *SD* = 1.78). Price was indicated to be a significant factor for chicken (*M* = 5.16, *SD* = 1.44) and pork (*M* = 4.67, *SD* = 1.65) and less so for PBA (*M* = 3.73, *SD* = 1.70).

In examining the prosocial motives across various protein food types, Social Image1, which relates to eating what everyone else is eating, has relatively consistent mean scores with slight variations, suggesting a moderate influence of peer consumption on individual food choices. Chicken exhibits the highest score (*M* = 3.83, *SD* = 1.75), while PBA has the lowest (*M* = 3.10, *SD* = 1.66). The significant Chi-square value (χ^2 = 38.85, p < 0.001) indicates that there are significant differences in the influence of social consumption patterns across different protein types. Social Image2, related to food choices enhancing one's image, generally scores lower across all protein types and does not show a statistically significant difference.

Social Norms1, concerning eating food to avoid disappointing someone, shows a narrow range of mean scores with no significant differences across the food types. Social Norms2, which relates to eating food because one is supposed to, also shows close mean scores with some variation, particularly higher for Chicken (*M* = 3.51, *SD* = 1.74) and Fish (*M* = 3.68, *SD* = 1.79), while lowest for Lamb (*M* = 3.10, *SD* = 1.72). Again, social norms have a relatively low influence for PBA (*M* = 3.23, *SD* = 1.71). The significant Chi-square value (χ^2 = 33.37, p < 0.001) indicates notable differences across proteins.

4.5.3 Model Fit

Confirmatory factor analysis (CFA) was conducted in the study, and all paths within the CFA model were found to be significant (P<0.001). The results and model fit indices, as detailed in Table 10, indicate that the Structural Equation Modelling (SEM) model fits the data well for each of the protein food types.

In SEM, model fit is typically assessed using multiple indices, as researchers often consider additional fit indices to ascertain the acceptability of a model's fit (Jackson et al., 2009). In the current study, the model fit was assessed by three indices: the comparative fit index (CFI), Tucker–Lewisindex (TLI) and the root-mean-square error of approximation (RMSEA), as well as chi-square statistic (χ^2). The RMSEA is classified as an absolute fit index, which evaluates the extent to which a hypothesised model deviates from a perfect model. In contrast, the CFI and

TLI are incremental fit indices, comparing the fit of a hypothesised model against a baseline model, which represents the worst possible fit (Brown, 2015). Hu and Bentler (1999) suggested that for assessing model-data fit in SEM, an RMSEA value smaller than 0.06, along with CFI and TLI values larger than 0.95, generally indicate a relatively good fit between the hypothesised model and the observed data. For all food types except Chicken, both CFI and TLI values exceeded 0.90, suggesting relatively good model fits. Chicken's TLI values were slightly below the threshold, suggesting an adequate but not optimal fit. The RMSEA values for all food types were below 0.06. This indicates a close fit of the model to the data across all protein types, confirming the model's adequacy in representing the relationships among constructs for different protein food types.

Table 10 Model Fit

Model Fit	N	$\chi 2$	df	R2	CFI	TLI	RMSEA
Beef	404	865.70	407	0.37	0.92	0.91	0.05
Lamb	419	850.25	407	0.37	0.93	0.92	0.05
Pork	412	911.11	407	0.38	0.93	0.92	0.06
Chicken	418	973.76	407	0.34	0.90	0.88	0.06
Fish	416	890.41	407	0.31	0.93	0.92	0.05
PBA	416	782.24	407	0.39	0.95	0.94	0.05

Table 11 Overall Results of SEM Mode

Structural	Beef		Lamb		Pork		Chicken		Fish		PBA	
	β	s.e.	β	s.e.	β	s.e.	β	s.e.	β	s.e.	β	s.e.
Self-efficacy → Personal Motives	1.206**	0.091	1.122**	0.058	1.366**	0.076	1.271**	0.078	1.208**	0.059	1.051**	0.066
Self-efficacy → Cooking Frequency	0.173*	0.066	0.315**	0.073	0.209*	0.062	0.247**	0.076	0.370**	0.076	0.309**	0.068
Personal Motives → Cooking Frequency	0.305**	0.077	-0.023	0.103	0.188*	0.073	0.018	0.081	-0.042	0.087	0.245*	0.092
Prosocial Motives → Cooking Frequency	0.102	0.065	0.313**	0.075	0.259**	0.059	0.137*	0.055	0.275**	0.054	0.002	0.072
Self-efficacy → Consumption Frequency	0.016	0.075	0.237**	0.070	0.101	0.075	-0.082	0.090	0.207*	0.076	0.195*	0.070
Personal Motives → Consumption Frequency	0.609**	0.073	0.317**	0.093	0.580**	0.065	0.601**	0.076	0.337**	0.080	0.606**	0.080
Prosocial Motives → Consumption Frequency	-0.066	0.064	0.172*	0.069	0.020	0.056	-0.002	0.053	0.168**	0.051	-0.206**	0.064

Notes:*p<0.05;***p<0.001, β = standardized regression weight

4.5.4 Structural Model

The results from the SEM present the relationships between self-efficacy, personal motives, prosocial motives, and their influence on cooking and consumption frequency across different protein food types. Overall, the structure outlined by the SEM results indicates that self-efficacy and personal motives are significant associated with both cooking and consumption frequency across various food types, while prosocial motives show a more complex and varied pattern of influence. Table 11 describes the results of the model with comparisons among all food groups. The relationship between self-efficacy and cooking frequency is consistently positive across most food types (beef: β=0.173, lamb: β=0.315, pork: β=0.209, chicken: β=0.247, fish: β=0.370, BPA: β=0.309), strongly supporting H1. Whereas the data show mixed support for H2. The influence of self-efficacy on consumption frequency is not as consistent as its effect on cooking frequency. There is a significant positive relationship for lamb (β=0.237) and PBA (β=0.195), but not for other food types, with chicken showing a negative coefficient (β=-0.082).

For all food types, self-efficacy shows a highly significant and positive relationship with personal motives (beef: β=1.206, lamb: β=1.122, pork: β=1.366, chicken: β=1.271, fish: β=1.208, BPA: β=1.051) provide robust support for H3. Moreover, personal motives have a varied influence on cooking frequency. The results significantly support H4 with beef (β=0.305) and pork (β=0.188), and PBA (β=0.245). However, there's no significant relationship for Lamb and a negative coefficient for Fish, which does not support H4 for these specific food types. Whereas there is a consistent positive relationship between personal motives and consumption frequency across all protein types (Beef: β=0.609, Lamb: β=0.317, Pork: β=0.580, Chicken: β=0.601, Fish: β=0.337, BPA: β=0.606) to confirm H5. Prosocial motives significantly influence cooking frequency for lamb (β=0.313), pork (β=0.259), and fish (β=0.275), which supports H6 for these food types. On another hand, the effect of prosocial motives on consumption frequency is mixed, with a positive relationship for lamb (β=0.172) and fish (β=0.168) supporting H7 for these food types, and a negative influence for PBA (β=-0.206). Further analysis and results relating to each protein food group are detailed as follows.

4.5.5 Individual Protein Food

Beef

The result for beef is showing in Table 12. Self-efficacy is positively correlated with cooking frequency ($\beta = 0.173$, $p < 0.05$), suggesting that individuals who are confident in their cooking abilities are inclined to cook beef more frequently. Although there is no direct link indicated between self-efficacy and consumption frequency, self-efficacy is strongly associated with personal motives ($\beta = 1.206$, $p < 0.01$), which are in turn significantly related to cooking ($\beta = 0.305$, $p < 0.01$) and consumption frequency ($\beta = 0.609$, $p < 0.01$). Age emerges as a notable factor, with above 45 years old individuals are associated with a lower consumption frequency. Above 55 years old individuals also significantly associated with higher cooking self-efficacy and prosocial motives. This could suggest a preference for beef that does not translate into frequent consumption, possibly due to health or lifestyle considerations. Income levels show a positive relationship with liking beef, especially in the higher income brackets (Above £60,000, $\beta = 0.189$, $p < 0.01$), which may reflect greater purchasing power or preference for beef as a protein source. The SEM results for beef, therefore, highlight the importance of self-efficacy and personal motives as determinants of cooking behaviour, with demographic factors such as age and income influencing liking and consumption frequency.

Lamb

The result for lamb is showing in Table 13. Self-efficacy in cooking lamb is robustly linked to both cooking ($\beta = 0.315$, $p < 0.01$) and consumption frequency ($\beta = 0.237$, $p < 0.01$), indicating that individuals with greater confidence in their cooking skills are more likely to prepare and eat lamb. Furthermore, self-efficacy shows a strong positive link with personal motives ($\beta = 1.122$, $p < 0.01$), suggesting that those who feel capable in the kitchen are motivated by their personal preferences and concerns when deciding to cook lamb. Personal motives are negatively associate with cooking frequency, yet strongly positive link to consumption. Prosocial motives are both significantly associated with the cooking frequency ($\beta = 0.313$, $p < 0.01$) and consumption frequency ($\beta = 0.172$, $p < 0.05$). Those who above 45 years old demonstrates a reduced frequency of both cooking and consumption of lamb.

Table 12 Results from the Structural Equation Model for Beef, standardised

Structural	Liking		Cooking frequency		Consumption frequency		Self-efficacy		Personal Motives		Prosocial Motives	
	β	s.e.	β	s.e.	β	s.e.	β	s.e.	β	s.e.	β	s.e.
Self-efficacy	/	/	0.173*	0.066	0.016	0.075	/	/	1.206**	0.091	/	/
Personal Motives	/	/	0.305**	0.077	0.609**	0.073	/	/	/	/	/	/
Prosocial Motives	/	/	0.102	0.065	-0.066	0.064	/	/	/	/	/	/
Female	-0.110*	0.052	-0.004	0.048	-0.053	0.045	0.021	0.055	-0.098	0.061	-0.091	0.056
Age: 25-34	0.165*	0.079	-0.050	0.073	-0.055	0.069	0.091	0.083	-0.006	0.094	-0.001	0.086
Age: 35-44	0.134	0.080	-0.113	0.073	-0.079	0.069	0.125	0.084	-0.080	0.095	-0.014	0.087
Age: 45-54	0.038	0.080	-0.123	0.074	-0.235**	0.069	0.138	0.084	-0.131	0.095	-0.100	0.087
Age: 55-64	0.111	0.079	-0.138	0.075	-0.233**	0.070	0.183*	0.083	-0.169	0.095	-0.272**	0.084
Age: Above 65	0.222**	0.075	-0.141	0.071	-0.218**	0.067	0.240**	0.078	-0.194	0.092	-0.228*	0.081
Education: Higher Education	-0.023	0.051	0.010	0.047	0.051	0.044	0.076	0.053	-0.109	0.060	-0.016	0.055
Education: Undergraduate	-0.246**	0.051	0.057	0.048	0.012	0.046	-0.066	0.055	0.005	0.062	0.006	0.057
Income: £20,000 - £39,999	0.080	0.055	0.027	0.051	0.008	0.048	0.118*	0.057	-0.021	0.066	0.096*	0.059
Income: £40,000 - £59,999	0.114*	0.055	0.066	0.052	0.040	0.049	0.159*	0.057	-0.025	0.067	0.195**	0.059
Income: Above £60,000	0.189**	0.052	0.094	0.050	-0.012	0.047	0.203**	0.055	-0.011	0.067	0.139*	0.057

Notes:*p<0.05;**p<0.001, β = standardised regression weight

Table 13 Results from the Structural Equation Model for Lamb, standardised

Structural	Liking		Cooking frequency		Consumption frequency		Self-efficacy		Personal Motives		Prosocial Motives	
	β	s.e.	β	s.e.	β	s.e.	β	s.e.	β	s.e.	β	s.e.
Self-efficacy	/	/	0.315**	0.073	0.237**	0.070	/	/	1.122**	0.058	/	/
Personal Motives	/	/	-0.023	0.103	0.317**	0.093	/	/	/	/	/	/
Prosocial Motives	/	/	0.313**	0.075	0.172*	0.069	/	/	/	/	/	/
Female	-0.168**	0.049	-0.002	0.044	-0.026	0.039	-0.045	0.052	-0.111*	0.047	-0.121*	0.052
Age: 25-34	0.088	0.070	-0.013	0.06	-0.088	0.054	0.020	0.072	0.036	0.065	-0.092	0.073
Age: 35-44	0.048	0.070	0.003	0.061	-0.117*	0.054	-0.019	0.072	0.005	0.065	-0.210**	0.072
Age: 45-54	0.132	0.071	-0.137*	0.064	-0.217**	0.057	0.001	0.074	-0.008	0.067	-0.301**	0.072
Age: 55-64	0.114	0.067	-0.164*	0.061	-0.216**	0.054	0.063	0.070	-0.083	0.064	-0.313**	0.068
Age: Above 65	0.140*	0.065	-0.156*	0.061	-0.256**	0.054	0.077	0.068	-0.064	0.062	-0.333**	0.066
Education: Higher Education	0.011	0.052	0.008	0.044	0.032	0.039	-0.001	0.054	-0.019	0.048	0.026	0.054
Education: Undergraduate	0.010	0.055	0.116*	0.046	0.090*	0.041	0.001	0.057	0.009	0.051	0.011	0.057
Income: £20,000 - £39,999	0.030	0.057	0.039	0.050	0.041	0.044	0.187**	0.058	-0.124*	0.056	0.071	0.060
Income: £40,000 - £59,999	0.006	0.058	0.032	0.050	0.066	0.044	0.110*	0.060	-0.048	0.055	0.053	0.060
Income: Above £60,000	-0.006	0.057	0.043	0.050	-0.036	0.045	0.144*	0.059	-0.096	0.055	0.133*	0.059

Notes:*p<0.05;**p<0.001, β = standardised regression weight

Table 14 Results from the Structural Equation Model for Pork, standardised

Structural	Liking		Cooking frequency		Consumption frequency		Self-efficacy		Personal Motives		Prosocial Motives	
	β	s.e.	β	s.e.	β	s.e.	β	s.e.	β	s.e.	β	s.e.
Self-efficacy	/	/	0.209*	0.062	0.101	0.075	/	/	1.366**	0.076	/	/
Personal Motives	/	/	0.188*	0.073	0.580**	0.065	/	/	/	/	/	/
Prosocial Motives	/	/	0.259**	0.059	0.020	0.056	/	/	/	/	/	/
Female	-0.113*	0.050	-0.011	0.043	-0.039	0.039	-0.101*	0.051	0.023	0.057	-0.145*	0.051
Age: 25-34	-0.023	0.070	-0.159*	0.059	-0.122*	0.053	0.023	0.072	0.035	0.079	0.020	0.073
Age: 35-44	-0.035	0.073	-0.164*	0.061	-0.220**	0.055	0.046	0.075	-0.039	0.082	-0.044	0.075
Age: 45-54	0.059	0.073	-0.131*	0.063	-0.202**	0.057	0.115	0.075	-0.067	0.083	-0.185*	0.075
Age: 55-64	-0.007	0.070	-0.199**	0.060	-0.235**	0.054	0.086	0.072	-0.043	0.079	-0.190*	0.071
Age: Above 65	0.088	0.061	-0.198*	0.054	-0.201**	0.049	0.125*	0.063	-0.063	0.070	-0.249**	0.062
Education: Higher Education	-0.025	0.054	0.016	0.045	-0.038	0.041	0.067	0.055	0.006	0.061	0.032	0.055
Education: Undergraduate	-0.148*	0.055	0.073*	0.047	-0.082*	0.042	-0.015	0.057	-0.003	0.063	0.002	0.058
Income: £20,000 - £39,999	0.021	0.059	0.056	0.050	0.127*	0.045	-0.064	0.061	0.051	0.067	0.078	0.061
Income: £40,000 - £59,999	0.009	0.057	0.102*	0.048	0.149**	0.044	-0.033	0.059	0.013	0.065	0.094	0.059
Income: Above £60,000	0.074	0.058	0.086	0.049	0.097*	0.045	-0.030	0.06	0.061	0.065	0.142*	0.059

Notes:*p<0.05;**p<0.001, β = standardised regression weight

Table 15 Results from the Structural Equation Model for Chicken, standardised

Structural	Liking		Cooking frequency		Consumption frequency		Self-efficacy		Personal Motives		Prosocial Motives	
	β	s.e.	β	s.e.	β	s.e.	β	s.e.	β	s.e.	β	s.e.
Self-efficacy	/	/	0.247**	0.076	-0.082	0.090	/	/	1.271**	0.078	/	/
Personal Motives	/	/	0.018	0.081	0.601**	0.076	/	/	/	/	/	/
Prosocial Motives	/	/	0.137*	0.055	-0.002	0.053	/	/	/	/	/	/
Female	-0.077	0.053	0.017	0.05	-0.003	0.046	0.077	0.0542	-0.119*	0.054	-0.161**	0.055
Age: 25-34	-0.006	0.072	-0.018	0.067	0.091	0.062	0.103	0.073	-0.180*	0.073	-0.037	0.075
Age: 35-44	0.008	0.072	-0.078	0.068	-0.049	0.063	0.188*	0.073	-0.188*	0.075	-0.133*	0.075
Age: 45-54	-0.004	0.070	-0.140*	0.067	-0.076	0.062	0.202**	0.070	-0.238**	0.073	-0.256**	0.071
Age: 55-64	0.063	0.071	-0.095	0.068	-0.085	0.063	0.200*	0.072	-0.210*	0.074	-0.287**	0.073
Age: Above 65	0.055	0.072	-0.238**	0.069	-0.240**	0.064	0.198*	0.073	-0.184*	0.075	-0.327**	0.073
Education: Higher Education	-0.057	0.053	-0.008	0.05	0.045	0.046	-0.004	0.055	-0.105	0.054	-0.041	0.056
Education: Undergraduate	-0.058	0.054	0.076	0.051	-0.020	0.047	-0.037	0.056	0.055	0.055	0.098	0.057
Income: £20,000 - £39,999	0.048	0.059	0.143*	0.054	0.045	0.05	0.023	0.060	-0.012	0.059	0.064	0.061
Income: £40,000 - £59,999	0.038	0.058	0.077	0.054	0.008	0.05	0.087	0.060	-0.041	0.0592	0.057	0.061
Income: Above £60,000	0.072	0.056	0.112*	0.051	0.057	0.048	0.046	0.057	-0.029	0.0563	0.014	0.058

Notes:*p<0.05;**p<0.001, β = standardised regression weight

Pork

The result for pork is showing in Table 14. Cooking self-efficacy significantly associated with both cooking ($\beta = 0.209$, $p < 0.05$) indicating that individuals with higher confidence in their cooking skills are more likely to cook pork. Moreover, self-efficacy shows a substantial positive relationship with personal motives ($\beta = 1.366$, $p < 0.01$), highlighting that the ability to cook pork is a significant driver of personal motivation to engage with this protein source. Personal motives are positively influencing cooking ($\beta = 0.188$, $p < 0.05$) and more to the consumption frequency ($\beta = 0.580$, $p < 0.01$). Prosocial motives significantly impact cooking frequency ($\beta = 0.259$, $p < 0.01$) but do not consumption.

Chicken

The result for chicken is showing in Table 15. The SEM results for chicken indicate that self-efficacy has a significant positive effect on cooking frequency ($\beta = 0.247$, $p < 0.01$), which suggests that individuals with more confidence in their cooking abilities are more inclined to cook chicken. However, self-efficacy does not have a significant direct relationship with consumption frequency. Self-efficacy again shows a substantial positive relationship with personal motives ($\beta = 1.271$ $p < 0.01$). Personal motives have a marginal effect on cooking but are highly significant for consumption frequency ($\beta = 0.601$, $p < 0.01$). On contrary, prosocial motives show a modest positive influence on cooking ($\beta = 0.137$, $p < 0.05$), but they do not significantly affect consumption frequency.

Fish

The result for fish is showing in Table 16. The SEM results for fish indicate that self-efficacy is a significant predictor of cooking frequency ($\beta = 0.370$, $p < 0.01$) and has a positive impact on consumption frequency ($\beta = 0.207$, $p < 0.05$). This suggests that individuals who are more confident in their cooking abilities are not only more likely to cook fish but also to consume it more frequently. Moreover, self-efficacy is strongly linked to personal motives ($\beta = 1.208$, $p < 0.01$), implying that confidence in cooking enhances the influence of personal factors on dietary choices.

Personal motives significantly drive the consumption of fish ($\beta = 0.337$, $p < 0.01$), but not for cooking them. Prosocial motives on another hand, significant and positive effect on both cooking frequency ($\beta = 0.275$, $p < 0.01$) and consumption

frequency ($\beta = 0.168$, $p < 0.01$). In general, age above 45 shows a decreased cook and consumption of fish, especially those who between 45-54 years old. While the older group also associated with higher self-efficacy in cooking fish.

PBA

The result for fish is showing in Table 17. BPA show that self-efficacy is positively related to cooking frequency ($\beta = 0.309$, $p < 0.01$), and consumption frequency ($\beta = 0.195$, $p < 0.05$), indicating that those with higher cooking self-efficacy are cooking and consuming plant-based alternatives more frequently. A strong positive relationship is observed between self-efficacy and personal motives ($\beta = 1.051$, $p < 0.01$), which implies that personal factors are significantly influenced by one's confidence in cooking. Personal motives are also positively associated with cooking ($\beta = 0.245$, $p < 0.05$) and consumption frequency ($\beta = 0.606$, $p < 0.01$). Prosocial motives, however, do not significantly affect cooking but are negatively associated with consumption frequency ($\beta = -0.206$, $p < 0.01$). The older age brackets, particularly those above 65, display the most pronounced negative relationship with both cooking ($\beta = -0.161$, $p < 0.05$) and consumption frequency ($\beta = -0.206$, $p < 0.01$), and also a significant decline in self-efficacy ($\beta = -0.287$, $p < 0.01$). Although higher income levels being positively correlated with cooking self-efficacy, this does not reflect on the cooking and consumption of PBA. Additionally, while younger age groups show a relatively neutral impact on prosocial motives, the older groups exhibit a notable negative effect.

Table 16 Results from the Structural Equation Model for Fish, standardised

Structural	Liking		Cooking frequency		Consumption frequency		Self-efficacy		Personal Motives		Prosocial Motives	
	β	s.e.	β	s.e.	β	s.e.	β	s.e.	β	s.e.	β	s.e.
Self-efficacy	/	/	0.370**	0.076	0.207*	0.076	/	/	1.208**	0.059	/	/
Personal Motives	/	/	-0.042	0.087	0.337**	0.080	/	/	/	/	/	/
Prosocial Motives	/	/	0.275**	0.054	0.168**	0.051	/	/	/	/	/	/
Female	-0.003	0.050	0.060	0.043	0.001	0.040	0.009	0.051	0.018	0.044	-0.059	0.053
Age: 25-34	0.083	0.076	-0.037	0.066	-0.049	0.060	0.009	0.077	-0.034	0.067	-0.045	0.081
Age: 35-44	0.183*	0.071	-0.037	0.062	-0.056	0.057	0.150*	0.072	-0.110	0.064	-0.028	0.076
Age: 45-54	0.106	0.078	-0.179*	0.067	-0.180**	0.062	0.015	0.079	-0.038	0.068	-0.152	0.083
Age: 55-64	0.191*	0.072	-0.077	0.064	-0.125*	0.059	0.195*	0.073	-0.128	0.065	-0.220**	0.076
Age: Above 65	0.229**	0.074	-0.147*	0.066	-0.104	0.061	0.180*	0.075	-0.099	0.066	-0.234**	0.078
Education: Higher Education	0.073	0.051	-0.020	0.045	0.004	0.041	0.125*	0.051	-0.111*	0.046	-0.042	0.054
Education: Undergraduate	0.073	0.054	0.052	0.046	-0.016	0.042	0.103	0.054	-0.043	0.047	0.012	0.057
Income: £20,000 - £39,999	0.096	0.056	0.118*	0.048	0.068	0.044	0.095	0.056	-0.009	0.049	0.105	0.059
Income: £40,000 - £59,999	0.062	0.055	0.011	0.048	0.064	0.044	0.104	0.055	-0.038	0.049	0.117*	0.058
Income: Above £60,000	0.118	0.056	0.130*	0.048	0.152**	0.044	0.117*	0.056	-0.010	0.050	0.142*	0.059

Notes:*p<0.05;**p<0.001, β = standardised regression weight

Table 17 Results from the Structural Equation Model for Meat Alternatives, standardised

Structural	Liking		Cooking frequency		Consumption frequency		Self-efficacy		Personal Motives		Prosocial Motives	
	β	s.e.	β	s.e.	β	s.e.	β	s.e.	β	s.e.	β	s.e.
Self-efficacy	/	/	0.309**	0.068	0.195*	0.070	/	/	1.051**	0.066	/	/
Personal Motives	/	/	0.245*	0.092	0.606**	0.080	/	/	/	/	/	/
Prosocial Motives	/	/	0.002	0.072	-0.206**	0.064	/	/	/	/	/	/
Female	-0.018	0.049	-0.001	0.043	0.003	0.036	-0.014	0.049	-0.025	0.046	-0.100	0.051
Age: 25-34	0.114	0.067	-0.151*	0.058	-0.068	0.05	0.066	0.068	-0.046	0.064	0.034	0.071
Age: 35-44	0.003	0.066	-0.065	0.058	-0.059	0.049	-0.081	0.067	0.044	0.063	-0.087	0.070
Age: 45-54	0.044	0.068	-0.090	0.06	-0.051	0.051	-0.013	0.069	-0.062	0.065	-0.136*	0.072
Age: 55-64	-0.017	0.065	-0.151*	0.057	-0.086	0.048	-0.077	0.066	-0.038	0.062	-0.144*	0.069
Age: Above 65	-0.188**	0.066	-0.161*	0.06	-0.206**	0.051	-0.287**	0.065	-0.008	0.067	-0.321**	0.068
Education: Higher Education	0.009	0.051	0.055	0.045	0.039	0.038	0.056	0.051	-0.079	0.048	0.023	0.054
Education: Undergraduate	0.065	0.053	0.132*	0.048	0.091	0.041	0.089	0.054	-0.102*	0.051	0.110*	0.056
Income: £20,000 - £39,999	0.104	0.055	0.023	0.048	0.052	0.041	0.100	0.055	-0.010	0.053	0.096	0.058
Income: £40,000 - £59,999	0.187**	0.054	0.046	0.049	0.126**	0.041	0.166**	0.055	-0.044	0.054	0.037	0.059
Income: Above £60,000	0.166**	0.053	-0.032	0.048	0.023	0.041	0.150*	0.054	0.019	0.053	0.065	0.057

Notes:*p<0.05;**p<0.001, β = standardised regression weight

4.6 Discussion

This study aims to explore the impact of cooking self-efficacy on protein food consumption behaviours. It examines how self-efficacy influences personal and prosocial motives related to cooking and eating different protein food groups, including beef, lamb, pork, chicken, fish, and plant-based meat alternatives. The research seeks to understand the variations in self-efficacy across these food types and its effect on consumer choices and behaviours. This study bridges the knowledge gap in the role of cooking self-efficacy in dietary choices and cooking behaviour, particularly in protein food consumption, and is instrumental in developing strategies to enhance consumers' cooking self-efficacy and dietary diversity.

4.6.1 The Effect of Self-efficacy on Cooking Frequency, Consumption Frequency and Personal Motives

The SEM results indicate a strong, consistently positive relationship between self-efficacy and cooking frequency across most protein types. This suggests that individuals with greater cooking self-efficacy are more likely to frequently cook protein foods. This concurs with broader cooking research, which has established that self-efficacy fosters more frequent cooking (Jones et al., 2014; Oleschuk et al., 2023). However, the impact of self-efficacy on the frequency of food consumption is less straightforward. While cooking self-confidence significantly boosts the consumption of lamb and plant-based alternatives, which suggest that enhanced cooking self-efficacy, has the potential to increase the consumption of these type of protein foods.

On the other hand, this effect is not uniformly observed across all proteins, such as chicken. Chicken is commonly perceived as convenient choice and requiring minimal preparation to cook compared with other meats (Kennedy et al., 2004). This perception implies that cooking chicken does not demand extensive cooking skills or knowledge for satisfactory results. Whereas lamb and PBA often viewed as more challenging to cook (Bernués et al., 2012; Giacalone et al., 2022), requiring a higher level of culinary confidence and skill for effective preparation. This perception may stem from the specific cooking techniques and knowledge needed to handle these foods. Lamb, for instance, might require more specific cooking methods to achieve desired textures and flavours, while PBA often demand

creativity and adaptability due to their unique properties compared to traditional meats.

The robust positive relationship between cooking self-efficacy and personal food choice motives highlights a critical insight: individuals who are more confident in their cooking and food-related abilities tend to have stronger personal motivations influencing their protein food choice. This relationship suggests that when individuals feel capable and skilled in the kitchen, they are more driven to make choices that align with their personal dietary goals, whether these are health-oriented, taste-focused, or convenient driven. Essentially, the more competent individuals feel in their cooking skills, the more empowered they are to make food choices that reflect their personal values and preferences.

Having higher confidence in not only include cooking but also actions like choosing ingredients, mental planning of cooking process and preparing foods to cook may give consumers more power to choose protein foods meet their personal dietary goals, such as health (McGowan et al., 2016). Moreover, the emphasis on autonomy in food-related decisions is a crucial component of consumer behaviour regarding meat consumption (Collier et al., 2021). This self-assurance in cooking and food preparation likely encourages individuals to select protein foods that not only satisfy personal motives but also reflect their independence and decision-making capabilities within their dietary habits.

4.6.2 The Effect of Personal Motives on Cooking Frequency and Consumption Frequency

The study's findings suggest that personal motives, like taste preferences or health concerns, significantly influence the frequency of cooking certain proteins like beef, pork, and PBA. However, the relationship is not universal; for example, cooking lamb and fish is less influenced by personal motives, potentially due to perceptions of inconvenience or cost associated with these foods.

Fish was strongly associated with healthy but also pricy and inconvenient to cook which was align with previous findings (Brunsø et al., 2009; Olsen et al., 2007). This may influence its cooking frequency in the home. Moreover, motivations for cooking fish may stem from prosocial and environmental considerations, suggesting that individuals might prioritise these factors over personal motives when choosing to cook fish. This pattern of variability in cooking

frequency across different protein types suggests that personal motives may strongly influence the preparation of some proteins like beef or pork, while others like fish are subject to a broader array of motivational factors beyond individual preference.

The influence of personal motives on the frequency of consumption is consistently positive across all protein types. This highlights that personal factors such as taste, health benefits, price, familiarity are integral in determining how often individuals eat various protein foods. The findings confirm the pivotal role of personal choice drivers in food consumption patterns, supporting previous research indicating that hedonic and utilitarian considerations are critical in daily food choices (Hoek et al., 2017; Renner et al., 2012).

4.6.3 The Effect of Prosocial Motives on Cooking Frequency and Consumption Frequency

Social considerations can both encourage and discourage the cooking and consumption of certain foods. Prosocial motives significantly influence cooking frequency for lamb, pork, and fish. This indicates that factors such as social norms or concerns about social image might encourage more frequent cooking of these proteins. This can be interpreted as lamb and pork are commonly associated with holiday and family gathering, whereas fish is commonly consumed when eating out. However, the effect of prosocial motives on consumption frequency is more complex. While lamb and fish show a positive relationship with prosocial motives, suggesting that social factors encourage their consumption, a negative influence is observed for PBA. Although previous research found higher acceptance of lab-grown meat can be explained by the effect of social imaging, however it may be cultural dependent (Chong et al., 2022). As Hoek et al. (2017) suggested that personal benefits, such as improved health also remain as the priority for the consumers when making food choice. Vainio et al. (2016) also observed that social motives are influential in dietary change, they may not directly correlate with the consumption of specific food items like beans and soy products. This suggests that while social factors are important, they don't necessarily dictate specific food choices but rather support the overall process of dietary transition. Thus, prosocial motives can have dual effects: they can uphold traditional protein consumption habits while potentially hindering the adoption of alternative proteins like PBA.

4.7 Limitation and Future Research

The study presented here is limited by its geographic and demographic scope, focusing predominantly on white and local participants within the UK. This specificity could potentially limit the generalisability of findings across diverse cultural contexts. Future studies should delve into the influence of cultural diversity on cooking self-efficacy to provide a more holistic understanding of global food preparation practices and motivations.

Additionally, the research was narrowed to meals prepared from raw ingredients, which allowed for a deeper insight into the cooking processes, skills, and motivations specifically related to beef, lamb, pork, chicken, fish, and plant-based BPA. Although we pre-set the definition of cooking in the study, however, the meaning of cooking can vary significantly from person to person, and this study does not account for the wide spectrum of individual interpretations of cooking. To unravel the underlying mechanisms of how cooking self-efficacy impacts personal motives and cooking behaviours, further qualitative research is recommended. Such research could provide rich, detailed insights into the personal experiences and perceptions that shape cooking practices and preferences, thereby enhancing our understanding of the complexities of cooking behaviour.

4.8 Conclusion

This research addresses the gap in understanding of the relationship between self-efficacy, personal and prosocial motives, and the cooking and consumption frequency of various protein foods. It emerged that self-efficacy may encourage the cooking frequency for most proteins. It may also increase the consumption of protein foods that are perceived as challenging to cook. Cooking self-efficacy was also found empower consumers to align their protein food choices more closely with their personal motives.

Chapter 5. Summary of Key Findings and Discussion

This thesis was guided by a central research question throughout the research:
What is the role of cooking self-efficacy in consumer food behaviours?
In particular, the thesis focuses on different protein sources to answer further questions:

1. How have cooking practices and definitions evolved in contemporary society, particularly in relation to dietary choices?
2. How does the cooking impact consumer evaluations of beef quality and satisfaction?
3. How does cooking self-efficacy influence the cooking and consumption of various protein foods?
4. What is the relationship between personal and prosocial motives and cooking and consumption behaviours across different protein types?

The final chapter aims to give an overall summarise of the key findings, then discuss the potential implication of the research results as well as future research directions.

5.1 Overall Findings

5.1.1 The Growing Complexity of Cooking

This review critically examined the evolving definition of cooking, acknowledging the significant impact of cultural and socio-economic factors that shape these practices. Key themes identified include the discussion of healthy and sustainable diet and its relationship with protein foods, growing complexity and dynamism of cooking in modern life, the integral role of cooking in informing dietary decisions, and the relationship between cooking behaviours and food choices.

A central theme was the broadening scope of what constitutes cooking, moving beyond traditional perceptions to encompass a variety of practices influenced by cultural norms, convenience, and individual preferences. The review also highlighted the critical link between cooking skills and consumer dietary habits, which includes not just the frequency of cooking but also the variety and quality of food choices, supporting healthier dietary patterns and potentially facilitating the adoption of more sustainable diets, which further demonstrated the importance of cooking as a concept that extends beyond mere preparation to include aspects of planning, selection, and consumption.

Another theme was the significant social dynamics involved in cooking, where it transcends its basic function of nutrition to act as a medium for expressing care, fostering relationships, and reflecting social norms. Cooking behaviours are influenced by traditional gender roles, socio-economic status, and demographic factors, which shape who cooks, what is cooked, and how cooking is perceived across different cultural settings. As gender norms evolve, men are increasingly participating in cooking, which can positively influence family dietary habits. Socio-economic factors such as time constraints and access to resources further affect cooking practices and food choices, reflecting broader societal trends in food consumption and health. The adaptability of cooking habits to societal changes suggesting that cooking practices are evolving in response to the changing dynamics of modern lifestyles.

The reviews also highlight the needs to further understand the relationship between self-efficacy, cooking behaviours, and broader socio-cultural factors. Cooking self-efficacy consistently emerges as a crucial determinant of cooking frequency and dietary quality, with individuals possessing higher self-efficacy being more likely to prepare meals at home and make healthier food choices. Conversely, low self-efficacy is linked to limited cooking skills, reduced meal preparation, and increased reliance on processed foods. This association is evident across diverse populations, including adolescents, single adults, and those facing food insecurity.

Looking forward, the study identified the need for future research to delve deeper into the role of cooking self-efficacy. This includes understanding how it can be enhanced to encourage healthier and more sustainable cooking behaviours and exploring the social aspects of cooking, such as how communal and familial dynamics influence food choices and how cooking contributes to identity formation and cultural expression. This knowledge can inform the development of targeted educational programs and interventions.

5.1.2 Cooking Self-Efficacy Impact on Perceived Meat Quality

The exploratory focus group study aimed to explore the complex interaction between consumers' cooking behaviour and their perception of meat quality. The study utilises a qualitative approach, employing focus group discussions to gather in-depth insights into consumers attitudes and practices regarding meat preparation

and cooking. Participants engaged in a "task and talk" focus group method, where they cooked and discussed their experiences with beef steak. This approach facilitated an exploration of the varied cooking methods and their impact on both the perceived and actual quality of the meat. The study also examined the discrepancy between consumers' pre-purchase expectations and their post-consumption experiences, revealing a mismatch between perceived and experienced meat quality.

The study's findings illustrated that cooking beef is not only about adhering to technical culinary practices but also about adapting these practices to personal preferences and skill levels. This adaptation is influenced significantly by consumers' cooking self-efficacy, which mediates their willingness to voice complaints about disappointing eating experiences. The findings also discovered the personalised nature of cooking, where individuals rely on an iterative process of trial and error, not only influenced by personal preferences but also past experiences rather than standard cooking instructions. Interestingly, dissatisfaction with beef steaks tends to arise pre-consumption, based on visible defects, and less often post-consumption, as consumers attribute the final eating quality to their own cooking methods. This self-attribution significantly reduces the likelihood of complaints to retailers. Overall, the study identified gaps in consumer knowledge and skills related to meat cooking, underscoring the need for educational initiatives aimed at enhancing cooking self-efficacy and knowledge. The findings contributed to the broader understanding of consumer behaviour in meat consumption and offers valuable insights for the meat industry and policymakers to improve consumer satisfaction and promote sustainable meat consumption practices.

It is also worth to mention that the 'Task and Talk' (T&T) focus group methodology employed in Chapter 3 presented a highly effective approach for examining the nuances of consumer behaviour and cooking practices. This method allowed for an immersive exploration of how individuals prepare and perceive beef steaks, enriching the data collected through traditional focus groups. By having participants actively engage in the cooking process, the method provided valuable observational data that complemented and enhanced verbal reports. The video recordings captured a range of cooking practices, offering insights that might otherwise be underreported or overlooked in a purely discussion-based setting. Furthermore, this activity served as both a catalyst for discussion and a shared experience among participants, fostering a natural environment for interaction and

dialogue. Such a setup not only heightened the relevance of the discussion topics-cantered around beef steak—but also facilitated a deeper exploration of participants' cooking skills, preferences, and decision-making processes. The communal aspect of meal preparation and consumption created a relaxed atmosphere, encouraging open and candid exchanges of views. This unique integration of cooking and discussion within the focus group format provided a holistic view of the participants' culinary practices and their social implications, making it an invaluable method for future research that seeks to delve into the experiential aspects of food preparation and consumption. This approach is particularly recommended for studies aiming to understand consumer behaviour in a naturalistic setting, as it aligns closely with real-world cooking experiences and social dining contexts.

5.1.3 Cooking Self-Efficacy Enhances Personal Food Choice Motives

The quantitative study investigated the role of cooking self-efficacy in influencing cooking behaviours, particularly focusing on the cooking and consumption of various protein-rich foods, including both animal-based and plant-based alternatives. This study examined how self-efficacy impacts personal and prosocial motives related to cooking and eating different protein food groups, with an aim to understand consumer choices and behaviours in the context of protein consumption.

With a structured online survey methodology, the study engaged a UK population representative participant who were asked about their frequency of cooking and consumption, self-efficacy in cooking specific protein foods, motivations for eating them, and personal preferences. The survey was designed to capture a wide range of interactions with these foods, from cooking frequency to consumption motives.

The key findings revealed a strong, positive relationship between cooking self-efficacy and cooking frequency across most protein types, indicating that individuals with greater cooking self-efficacy are more likely to cook protein foods frequently. However, the impact of self-efficacy on consumption frequency varies among different proteins. Personal motives, like taste and health considerations, significantly impact consumption frequency across all protein types, while prosocial motives show a more varied pattern of influence. The study's insights underscored the importance of enhancing cooking self-efficacy and aligning it with

personal and social motives to encourage healthier and more varied dietary practices.

By exploring cooking self-efficacy as a key determinant of dietary behaviours, this research extends the theoretical framework to consider the psychological and social factors that underpin food choice. The thesis focused on the concept of cooking self-efficacy and its impact on food choices, particularly in relation to dietary behaviours that support healthier and more sustainable eating patterns. By integrating self-efficacy within the domain of culinary practices, this research provides a fresh lens through which to examine how individual' belief in their cooking abilities shapes not only the frequency and type of meals they prepare, but also their broader food-related decisions. Enhanced cooking self-efficacy can encourage the reduction of meat consumption and promote the inclusion of more plant-based and alternative protein sources, which are aligned with sustainable dietary goals. Individuals with greater believe in their cooking skills are more likely to experiment with a diverse range of ingredients, overcome perceived barriers associated with cooking complexity, and make food choices that align with both health and sustainability objectives. Moreover, higher cooking self-efficacy motivates individuals to engage more frequently in cooking with raw ingredients, thereby reducing their dependence on processed and convenience foods. This highlights cooking self-efficacy as a critical component in fostering dietary diversity and promoting long-term health outcomes. Furthermore, the research addresses a gap in existing literature by investigating how cooking self-efficacy interacts with both personal and prosocial motivations, offering a more comprehensive understanding of its role in driving food-related behaviours. Ultimately, these theoretical insights contribute to the broader discourse on food-related self-efficacy and behavioural change, providing a strong foundation for future research to develop targeted interventions that enhance cooking skills and confidence, thereby facilitating shifts towards more sustainable and health-conscious dietary patterns.

5.1.4 Overall Conclusion

In conclusion, the findings collectively offer valuable insights into the complex role of cooking in shaping of consumer perception of protein foods and related behaviours. Enhancing consumer understanding and cooking self-efficacy can

potentially lead to better alignment between expectations and experienced quality of food, particularly protein-rich foods, and can encourage healthier and more varied dietary practices.

5.1.5 Potential Implication and Future Research

The collective findings offer implications for various sectors including consumer education, public health, food industry, and policymaking. Firstly, we learned that the critical role of cooking self-efficacy in shaping dietary choices which then indicating the necessity for educational programs that go beyond nutrition to enhance practical cooking skills. Such initiatives could bridge the gap between perceived and actual food quality, fostering informed decision-making and potentially increasing the acceptance of meat products and more sustainable protein food options.

For the food industry, insights into consumer perceptions of meat quality and the influence of cooking on food satisfaction provide valuable guidance for product development and marketing strategies. Tailoring products to align with consumer expectations and effectively communicating their benefits could lead to increased consumer satisfaction and loyalty.

In public health, improving cooking self-efficacy and understanding its role of enhancing motives behind food choices can lead to healthier eating habits. This is particularly crucial in addressing public health concerns such as obesity and malnutrition caused by lack of home-meal and overly consumption of processed food. Policymakers could leverage these insights to design interventions that encourage a more varied, balanced diet that also environmentally sustainable.

Lastly, these studies pave the way for future research, particularly in exploring social and cultural influences, long-term effects of enhanced cooking self-efficacy. In particular, the food industry should consider the sociability of protein foods during the development, such as communal dining and sharing. More research needs to be done to understand not just how acceptable the consumers are for the developing products, but the practical aspects of using these products. How consumers prepare, cook, and consume new protein products in their daily lives, considering various trade-offs and decision-making processes needs to be further explored.

Cooking interventions can be designed to boost confidence and skills in preparing various protein-rich foods, especially fish and plant-based alternatives which were perceived as challenging. While the technical skills are essential, interventions should also focus should be designed to enhance self-efficacy, to help consumers become more confident to invasion what they want to achieve with the foods and align with their personal motives.

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Appendix A Consumers Expectation of Beef Steaks: Focus Group Discussion Internal Protocol

Project background

A lack of consistency in the eating quality of high value beef steaks remains an industry challenge. The discrepancy between search and experience quality undermines consumer's confidence which leads dissatisfaction which is evidenced in complaint behaviour. Evidence from the industry also suggests that there is a gap between actual and perceived price and quality which makes it important to understand how consumers use intrinsic cues to choose meat products, encode the prices of meat products and the situations that give rise to meat quality complaints. Cooking skills are also significant for the meat quality experience, but this has been under researched.

Aims

The research aims to understand how consumer choose their desired beef steak. Specifically, the aims are to:

To explore consumer perceptions of and attitudes towards high price beef steaks in the market.

To understand consumer complaint behaviour associated with price and quality.

To observe how consumer cooking skills variation influence their experienced quality of beef steak.

Method

Three heterogeneous focus groups will be conducted. Each group will contain 6-8 participants with mixed age ranges and broadly equal numbers of male and female discussants. Each focus group will be kept homogeneous in terms of age and social class to ensure a good, representative of the consumer base, but also avoiding dominant characters. Each participant will be given a slice of steak and asked to cook according to their own habit. Fresh steak will be purchased from supermarket. The meat will come from the same animal with equal slice thickness and weight (confirmed by the supplier).

Labels on the steak packaging will be removed to avoid bias. The steaks will only be labelled basic product information: product name and used by date. The original cooking instruction from the label will be kept. After they finished the cooking, each participant will be asked to eat the steak and rate the steak on a score sheet (Appendix 6). Side dishes will be provided to mimic the real eating condition. In the discussion, participants will be asked to discuss topics about 1) their cooking

skills and behaviour 2) their perception on beef steak quality 3) attitude towards price and quality of beef steaks 4) complaint behaviour and experience.
Participant will be rewarded £10 cash for their time.

Participants

The participants must be aged between 18-65 years
Participants must buy and cook their beef steak at least once a month.
Participants who have food allergies may be excluded.

Recruitment

Recruitment will be held through posters, social network and email. An online questionnaire developed via Qualtrics (Appendix C) will be used to screen the participants according to the criteria. Each focus group should consist of minimum 6 people, whereas 8 people are recruited to allow for drop out. Information sheet with a consent form will be sent via email once participants showed interest on the study. If they decide to participate, they will be asked to sign either through the E-form or on the day when they visit. Before the focus group started, participants will be asked to read the information sheet and consent form again.

Equipment

- Fresh steak samples
- Cooking utensil (stainless steel tongs, pans, thermometer, cutlery and plates, etc.)
- Seasoning and ingredients (oil, butter, salt and pepper, etc.)
- Sides to consume with the steak (salad and chips)
- Refreshments

- Focus group discussion schedule
- Information sheets and consent forms
- Audio and video recording equipment

- A kitchen where 6-8 individuals can cook at the same time.
- A room for the focus groups where up to 10 individuals can sit comfortably in a circular arrangement around a table, in a quiet, private and neutral location.

Procedure

Preparation

Two researchers will be present – one to moderate and guide the discussion and another to take notes. Staff from Newcastle College will be on duty in the kitchen. The focus group discussions will last approximately 1/1.5 hours and will be audio recorded. The participants will be greeted by the researchers in a seminar room at Newcastle College. Light refreshments (tea, coffee, soft drinks and snacks) will be provided upon arrival. Whilst waiting for all participants to arrive, participants will be asked to read the information sheet (Appendix D) about the study and read and sign the informed consent form (Appendix E). Honorarium of £10 fee will be given at the end of the focus group discussion.

Welcome and Introduction

Welcome the participants and thank them for their willingness to participate.

Briefly introduce the moderator and assistants and let the participants introduce themselves.

Give a brief explanation of the research and why the participants have been invited to attend

The focus group agenda will be passed to the participants. Moderator will go through the schedule (Appendix F), health and safety issue will be explained and emphasised.

The participants then will be led to the kitchen.

Cooking

Participants will be asked to wash their hands.

After they are introduced to the kitchen facilities and what they need to do in case of emergency, they will be provide with the steak sample.

Participants will start to cook, and make a record of their cooking procedures on the cooking log provided (Appendix G).

Group discussion

Before the group discussion begins:

The ground rules for the focus groups will be establish (e.g. no speaking over one another)

Re-explain the eating and discussion session, participants will be asked to eat the steak while we are discussing.

During the focus group discussion:

It includes a set of questions and scenarios as well prompting questions to help expand an area of discussion (See Appendix B).

At the end of the focus group discussions, thank all the participants for their time and check no one has any unresolved queries/ issues.

After the focus group discussion:

Participants will be asked to rate the steak according to their perception of beef quality and finish the score sheet (Appendix G).

Compensation fee will be handled for their time and effort.

Transcribe all the recordings verbatim with participants anonymised to protect confidentiality.

Risks

The main risk is food handling and use of kitchen facilities. Food will be kept in the fridge all the time before being cooked. Food allergy information will be provided before participants enter the kitchen.

Health and safety training has to be provided, Newcastle college staff will be asked present and coordinate during the cooking time.

It is possible that discussions may generate emotive feelings and responses, and in which case it is possible that a participant may become upset during the discussion. The moderator will be trained in how to control the conversation.

Appendix B Consumers Expectation of Beef Steaks: Focus Group Discussion Internal Discussion Guide

After the participants finished cooking, they will be asked to eat their steak and rate the steak on the score sheet. Side dishes and soft drinks will be provided to mimic the real eating experience. While they are eating, we will start the discussion.

Introduction

- Give a brief explanation of the discussion process, such as structure of the group, there will be no right or wrong answers, use of audio recorders, how we report the results - commitment to confidentiality with participant responses anonymised, also remind participants participation is voluntary and they can withdraw from the focus group at any time.

- Establish the ground rules for the focus groups (e.g. no speaking over one another, no mobile phone during the discussion, etc.)

Questions

Warm up

- *Ask if they are enjoying their steaks. Were they able to cook steak in the way that ordinarily would?*
- *How often do you buy and cook beef steaks? For what occasion?*

Cooking skills and behaviour

- *How did you just cook your steak? Do you have your specific recipe?*
- *Where did you learn to cook steaks?*
- *Are you happy about your steak cooking skill? Do you always get the steak you like to be cooked? Why/Why not?*
- *Have you ever read the back label to determine how to cook the steak? Why/Why not?*

Quality

- *Which cut you normally buy/ never tried before?*
- *Which supermarket you shop beef steaks the most?*

- *How do you determine if a steak is high/low quality? What factors do you look for?*
- *How confident are you when you choosing beef steaks from the supermarket?*

Price

- *How much you normally spend on a beef steak?*
- *How much did you pay for the most expensive steak in the supermarket?*
- *Do you think higher priced steak has better quality than the cheaper ones? Why/Why not?*
- *How much did you pay for a similar piece of steak as the one you just cooked?*

Complaint

- *Can you remember the best steak you have ever had? Why it was good?*
- *What about the worst one, what made you unsatisfied?*
- *Did you complain? (If yes, want did you want to happen after you complained; if no, why not.)*
- *What happened after you were unsatisfied about the product?*

Wind down

Do you have any suggestion or comment to the beef producer?

Debrief, Close and Thanks

- *How you are feeling about the discussion and its content.*
- *Does anyone have any further questions or comments?*
- *Thank participants for their time and contribution.*

Appendix C The Quality of Beef Steaks: Group Discussion (Screening Questionnaire)

Thank you for your interest to participant in the discussion group. The purpose of this questionnaire is to help us to understand if you are the right participant we are looking for. It should take approximately 2 minutes, and all the answers you give will be kept completely confidential. If you succeed, we will contact you by email or phone.

1 Do you buy and cook yourself beef steaks at least once a month?

- Yes (1)
- No (2)

2 On a scale from 1 to 7 where 1 means very poor and 7 means very good, please say how good you are at:

1) Preparing and cooking raw meat/poultry?
2) Frying/stir-frying food in a frying pan/wok with oil or fat using the hob/ gas rings/hot plates?
3) Comparing prices before you buy food?

Skip To: End of Survey If Do you buy and cook yourself beef steaks at least once a month? = No

2 Do you have any food allergies?

- Yes, please specify: (1) _____
- No (2)

3 Pleases choose your highest qualification of education.

- University Degree (1)
- Higher Education (2)
- A-levels (3)
- Other qualifications (4)
- None (5)

4 What is your marital status?

- Single (1)
- Married/Living with a partner (2)
- Divorced/Separated (3)
- Widowed (4)

5 Please choose your annual income range.

- Up to £11,999 (1)
- £12,000 and up to £14,999 (2)
- £15,000 and up to £19,999 (3)
- £20,000 and up to £29,999 (4)
- £30,000 and up to £49,999 (5)
- £50,000 and above (6)
- I prefer not to say (7)

6 Indicate the number of people in your household.

- Young children (0-5 years) (1) _____
- Children (6-10 years) (2) _____
- Teenagers (11-17 years) (3) _____
- Adults (18 years or older) (4) _____

7 What is your gender?

- Male (1)
- Female (2)
- Prefer not to say (3)

8 What is your age? _____

9 What is your full name? _____

10 How do you prefer to be contacted?

- Email- Please enter your Email Address: (1) _____
- Phone- Please enter your phone number: (2) _____

11 During the discussion, we will provide some side dishes along with your beef steak. Please choose your preference for the dishes.

- Chips
- Salad
- Bread
- Other_____

Thank you very much for your interest. You are eligible to participate in our study.

We will contact you as soon as possible to let you know if you are chosen.

Appendix D Participant Information Sheet

The Quality of Beef Steaks: Focus Group Discussion
PARTICIPANT INFORMATION SHEET

Principal investigator: Naomi Kang

School of Natural and Environmental Sciences

Agriculture building, King's road

Newcastle University

Newcastle upon Tyne, Tyne and Wear, NE1 7RU, United Kingdom

For further information please contact:

Email: N.Kang2@newcastle.ac.uk

You are invited to take part in a study to understand what people think about the quality of beef steak. This research is part of a study which is funded by the Newcastle University. Before you decide to take part it is important you understand why the research is being conducted, and what it will involve. Please take time to read the following information and ask us if there is anything that is not clear or if you would like more information. Thank you for your time.

What is the purpose of the study?

In order to understand consumer expectation and requirements of beef steaks, this research will explore the quality cues that people look for when they buy steaks. We are also interested in how people cook their steak. The result will be used in further research and help us to improve the beef quality.

Why have I been chosen?

You are eligible to take part if you are apparently healthy and aged between 18 and 65 years. You do not have allergies to any foods products. You also buy and cook your own steaks frequently.

Do I have to take part?

Participation in the study is voluntary. You have a right to decline the invitation or to withdraw from the study at any time without providing an explanation or incurring any penalty. If you do decide to take part you will be asked to sign a consent form on your visit. We cannot accept you if you do not sigh your consent form (we will bring copies on your visit). If you withdraw, we will give you compensation only for the time spent.

What will happen to me if I take part?

If you agree to take part in the study, you will be part of a group of approximately 6 to 8 participants who will be asked to cook and eat a piece of beef steak, and discuss issues related to your beef steak and the meat that you buy. The discussion will take place at Newcastle College. The group discussion will be audio recorded. You will also be asked to complete a short (2-pages) anonymous questionnaire. The group discussion will last approximately one and a half hours. The audio recordings will be transcribed (copied word for word) and analysed.

Are there any potential benefits of taking part in the study?

There will not be any immediate benefits to those who take part in the study. However, it is hoped that the results of the study will, through time, improve our understanding of meat quality and help the meat industry to produce better products. Each participant will receive a £10 for their time, and £5 to spend on the sample steak.

Are there any risks that could be incurred by taking part in this study?

As with all food products, there is a risk of allergy after the ingestion of the study foods. This however means that if you have an allergy to any food you will be ineligible to take part in the trial. The researchers have been trained to handle food, with CIEH Level 2 Food Hygiene Safety for Manufacturing certificate. In addition, the researchers have undergone training in the management of focus group discussion groups. Although no specific risks have been identified, there is always the possibility that discussion could become heated. In the unlikely event of this occurring, the researchers will ensure that any disruptive and/or upset individuals are retired from the group and provided with appropriate after care.

What if something goes wrong?

It is extremely unlikely that something will go wrong during this study. However, you should know that the University has procedures in place for reporting, investigating, recording and handling adverse events and complaints from study volunteers. The University is insured for its staff and students to carry out research involving people. The University knows about this research project and has approved it. Any complaint should be made, in the first instance, to the researcher identified for this particular study. Any complaint you make will be treated seriously and reported to the appropriate authority. Should you feel the need for a formal complaint, please contact Dr. Luca Panzone:
Luca.Panzone@newcastle.ac.uk.

Will my taking part in this study be kept confidential?

Any information you supply will be held in strict confidence, viewed only by the named researchers (see below) and then anonymised. Names will not be attached to audio recordings or questionnaires and respondents will be identified by a code number. Anonymised interview transcripts and questionnaires will be stored in a

locked password protected computer and/or a locked cupboard within secure office space. When we use your data in a scientific report, all data will be anonymised.

What will happen to the results of the study?

The information from the focus groups will be analysed, discussed and reported to the funders. The overall results of the study may be presented at scientific meetings or published in a scientific journal. Transcripts and questionnaires may be made available to other researchers for reanalysis. In this case, anonymity and confidentiality of the participants will be maintained. You will not be personally identified in any publications.

Contact for further information

If you have any further questions please contact Naomi Kang.

Email: N.Kang2@newcastle.ac.uk.

Appendix E Consent Form

The Quality of Beef Steaks: Focus Group Discussion

CONSENT FORM*

Principal investigator: Naomi Kang
N.Kang2@newcastle.ac.uk
(*one copy to be kept by participant, the other by the Researcher)

		Please initial box
1.	I confirm that I have read and understand the information sheet dated *(_____ 2018)* for the above study. I have had the opportunity to consider the information and to ask questions. Any questions asked have been answered satisfactorily.	☐
2.	I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my legal or personal rights being affected. In this instance, I will only be paid for the extent of my participation.	☐
3.	I understand that the researchers will hold all audio recordings and transcripts of these collected during the study confidentially. I will not be identified as a participant of the study (except as might be required by law). I give permission for the researchers involved in the study to hold relevant personal data I provide on me.	☐
4.	I understand that the research team will only pass on anonymised data to other researchers for non-profit use and if they agree to the terms I have specified in this form.	☐
5.	I agree to take part in the above study.	☐

Please sign on the back

_____ _____ _____

Name of participant (please print)	Signature	Date (ddmmmyy)
Name of person taking consent (if different from researcher)	Signature	Date (ddmmmyy)
Name of Researcher	Signature	Date (ddmmmyy)

Appendix F Focus Group Discussion Agenda

The Quality of Beef Steaks: Focus Group Discussion Agenda

Principal investigator: Naomi Kang
Assistant investigator: Dr. Sharron Kuznesof
Technical staff:

Thank you very much for joining our group discussion. The focus group discussions will last approximately 1/1.5 hours and will be audio recorded. While you are waiting, please enjoy the light refreshments we prepared and take time to read the information sheet about the study, and sign the informed consent form. Compensation fee will be handled to you at the end of the focus group discussion.

1. Welcome and Introduction
    - Introducing ourselves to each other.
    - Give a brief explanation of the research and why you have been invited to attend.
    - Go through the health and safety rules.

2. Cooking
    - After you are introduced to the kitchen facilities and what you need to do in case of emergency, you will be handle the steak.
    - Participants will start to cook, and finish about the same time.
3. Group discussion
    - You will be asked to eat the steak you just cooked and evaluate it on the score sheet.
    - We will discuss how you just cooked your steak and your steak buying experience.
4. Debrief and thank you
    - Question time.
    - We would like to have your feedback on this discussion.
    - Compensation fee will be handled to you for your time and effort.

Appendix G Cooking Log

The Quality of Beef Steaks: Cooking Log

Name_____
Date_____
Sample Code_____

What preparation you just did?	
What seasonings you are using?	
How do you know the pan is ready?	
Key procedures	1.
	2.
	3.
	4.
	5.
	6.
Total time used	
How do you know the steak is ready?	

Appendix H Focus Group Discussion Score Sheet

The Quality of Beef Steaks: Focus Group Discussion Score Sheet

Name_____
Date_____
Sample Code_____

Please rate the beef steak you just eaten on the scale. Please indicate your evaluation by **put an 'x'** on the scale.

1. Please evaluate the **tenderness** of the beef steak.

Not Nearly Tender Just about Right Much too Tender

|_____|_____|

2. Please evaluate the **juiciness** of the beef steak.

Not Nearly Juicy Just about Right Much too Juicy

|_____|_____|

3. How much do you like the beef **flavour?**

Extremely Dislike Just about Right Extremely Like

|_____|_____|

4. Please indicate your **overall liking** of the beef steak**.**

Extremely Dislike Just about Right Extremely Like

|_____|_____|

Please tick one of the following to rate the **quality** of the beef steak you have just eaten.
Choose **one** only (you must make a choice).

- ☐ Unsatisfactory
- ☐ Good everyday quality
- ☐ Better than everyday quality
- ☐ Premium quality

Appendix I Debriefing Sheet

The Quality of Beef Steaks: Focus Group Discussion
Debriefing Sheet

Dear Sir/Madam,

Thank you for participating in ***The Quality of Beef Steaks: Focus Group Discussion*.** We hope that you have found it was interesting and have not been upset by any of the topics discussed. However, if you wish to speak to one of the researchers, please contact: Dr. Luca Panzone, Luca.Panzone@newcastle.ac.uk.

We are conducting this focus group to understand the reason of consumer complain of the high value beef steaks quality. Previous studies show the discrepancy between search and experience quality undermines consumer's confidence which leads dissatisfaction. Evidence from the industry also suggests that there is a gap between actual and perceived price and quality which makes it important to understand how consumers use intrinsic cues to choose meat products. Cooking skills are also significant for the meat quality experience, but this has been under researched. Therefore, we are interested in how consumer choose their desired beef steak. Specifically, the aims are:

- to explore consumer perceptions of and attitudes towards high price beef steaks in the market
- to understand consumer complaint behaviour associated with price and quality
- to observe how consumer cooking skills variation influence their experienced quality of beef steak

We will use the information from your participation to conduct more research on developing beef steak quality. We believe it will benefit the consumer as well as the meat industry in the future.

If you have any further questions about the project, please get in touch using the email below.

Your sincerely,
Naomi Kang
PhD Student in Food Science
School of Natural and Environmental Sciences,
Agriculture building,
Newcastle University
N.Kang@newcastle.ac.uk

Appendix J The Role of Cooking Self-Efficacy Questionnaire
(Example questionnaires include the Beef group only)

Start of Block: Introduction

Q1.1
Cooking and Eating

Thank you for taking the time to participate in this survey. This survey should take 4-10 minutes to complete.
In this survey, we are interested in how you feel about cooking specific food. You will be asked questions about the food you eat, your cooking experience, and how you would behave when facing certain cooking-related scenarios.

You will be assigned to a series of questions about a specific food at random. Please do your best to answer all the questions based on your personal experience.
Participation in this survey is voluntary; you will be given the chance to decline your participation, and you will be able to withdraw from the study at any time without having to provide an explanation - although a withdrawal will affect your ability to receive a payment.
Your responses in this questionnaire will be completely anonymous, with no one (including the research team) having access to any personal information. The data collected from this survey will be securely stored in a university repository, with sole access to the research team purely for not-for-profit research. Your responses will be used for research purposes, and aggregated results (never individual responses) may be included in written reports, University press releases, or academic articles.
Any questions? Please e-mail Naomi Kang: N.Kang2@newcastle.ac.uk
With many thanks for your time and support.

The research team,
Centre for Rural Economy, Newcastle University.

Q1.2 I want to participate in this study.

- ○ Yes (1)
- ○ No (2)

Q1.3 Click to write the question text

End of Block: Introduction

Start of Block: Demographics

Q2.1 First of all, we would like to ask a few questions about you. Responses will be treated confidentially and reported so that individual respondents cannot be identified.
Q2.2

What gender do you identify with?

- ○ Male (1)
- ○ Female (2)
- ○ Non-binary / third gender / other (3)
- ○ Prefer not to say (4)

Q2.3 How old are you?

- ○ Under 18 (1)
- ○ 18 - 24 (2)
- ○ 25 - 34 (3)
- ○ 35 - 44 (4)
- ○ 45 - 54 (5)

○ 55 - 64 (6)

○ 65 - 74 (7)

○ 75 - 84 (8)

○ 85 or older (9)

Q2.4 What is your ethnic group? (Choose one option that best describes your ethnic group or background)

○ White (including English/Welsh/Scottish/Northern Irish/British; Irish; Any other White background) (1)

○ Mixed/Multiple ethnic groups (including White and Black Caribbean; White and Black African; White and Asian; Any other Mixed/Multiple ethnic background) (2)

○ Asian/Asian British (including Indian; Pakistani; Bangladeshi; Chinese; Any other Asian background) (3)

○ Black/African/Caribbean/Black British (including African; Caribbean; Any other Black/African/Caribbean background) (4)

○ Any other ethnic group (5)

○ I prefer not to say (6)

Q2.5 What is your highest qualification?

- ○ No formal qualification (1)
- ○ Lower secondary stage e.g., GCSEs, 'O' levels (2)
- ○ Upper secondary stage e.g. 'A' levels, Highers, NVQ3, IB (3)
- ○ Certificate or diploma in Higher Ed or equivalent e.g., Level 4 or 5 NVQ; HNC; HND (4)
- ○ Bachelor's degree or equivalent e.g., NVQ6; level 6 (5)
- ○ Postgraduate degree (MSc or PhD) or equivalent e.g., NVQ 7; level 7 or 8 (6)
- ○ Professional qualifications (7)
- ○ I prefer not to say (8)

Q2.6 What is your annual pre-tax income? Include all income sources such as salary, pensions, benefits.

- ○ Less than £15,000 (1)
- ○ £15,000 to £19,999 (2)
- ○ £20,000 to £29,999 (3)

- ○ £30,000 to £39,999 (4)
- ○ £40,000 to £49,000 (5)
- ○ £50,000 to £59,999 (6)
- ○ £60,000 to £69,999 (7)
- ○ £70,000 or more (8)
- ○ I prefer not to say (9)

Q2.7 In what part of the country do you live?

- ○ Northern England (North West, North East, Yorkshire and the Humber) (1)
- ○ Mid England (West Midlands, East Midlands and East of England) (2)
- ○ Southern England (South West and South East) (3)
- ○ Greater London (4)
- ○ Wales (5)

- ○ Scotland (6)
- ○ Northern Ireland (7)

End of Block: Demographics

Start of Block: Cooking Frequency General

Q3.1
In this section, we will ask you about your home cooking.
'Cooking' in this survey refers to 'the planning and preparation of fresh or raw ingredients to transform them into a final dish'.

For the questions below, please **only consider raw ingredients** (these can be fresh, refrigerated, or frozen) that you would normally buy in supermarkets, local market, or grocery stores.
Please, **DO NOT consider cooked and ready-to-eat products**, and anything that does not require processing, and may only require heating - that is, ignore e.g., take-away, or ready meals.

Q3.2 How many people – including yourself – do you normally buy food for in your household?

- ○ None (1)
- ○ 1 (only myself) (2)
- ○ 2 (3)
- ○ 3 (4)
- ○ 4 (5)
- ○ 5 or more (6)

Q3.3 In the past 2 weeks, how may meals (e.g., breakfast, lunch, dinner and snack) have you prepared from scratch and/or used fresh ingredients (such as fresh vegetables or raw meats)?

- ○ Never (1)
- ○ 1-7 meals (2)
- ○ 8-15 meals (3)
- ○ 16-23 meals (4)
- ○ 24-31 meals (5)

○ 32 meals or more (6)

End of Block: Cooking Frequency General

Start of Block: CAFPAS-Beef

Q4.1 For the rest of the questionnaire, you will be ask questions specifically about cooking **raw beef**.

Raw beef (fresh or frozen): any raw beef products that needs cooking. For example: roasting joints, steaks, diced beef burgers, mince

Q4.2
In the past 2 weeks, how often have you prepared and cooked meals with raw beef?

- ○ Never (1)
- ○ 1-2 times a week (2)
- ○ 3-4 times a week (3)
- ○ 5-6 times a week (4)
- ○ More than 6 times a week (5)

Q4.3 In this session, you will be asked questions on how you feel about cooking beef at home. Please read the questions carefully and respond to all of them.

Select your answer using the 7-point scale with 1 = completely disagree and 7 = completely agree.

	Completely disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Completely agree (7)
I feel limited by my cooking knowledge of beef. (1)	○	○	○	○	○	○	○
I feel limited by my knowledge of judging beef quality. (2)	○	○	○	○	○	○	○
If I am planning to make beef dishes, I can always manage to decide what I would like to eat at any given time. (3)	○	○	○	○	○	○	○
When preparing beef dishes, I am confident that I can deal with unexpected results. (4)	○	○	○	○	○	○	○
When preparing beef dishes, it is easy for me to accomplish my desired results. (5)	○	○	○	○	○	○	○
In preparing beef dishes, I can solve most problems with enough effort. (6)	○	○	○	○	○	○	○
I am comfortable preparing beef dishes. (7)	○	○	○	○	○	○	○
I know how to use the kitchen equipment I need to cook beef. (8)	○	○	○	○	○	○	○
I prepare beef-based meals on a regular basis. (9)	○	○	○	○	○	○	○
When I buy beef, I know in advance what meal I am going to make with it. (10)	○	○	○	○	○	○	○
I am confident creating beef dishes from the ingredients I have on hand. (11)	○	○	○	○	○	○	○

Before I start cooking beef, I usually have a mental plan of all the steps I will need to complete. (12)	○	○	○	○	○	○	○
When comparing two similar beef products before purchase, I feel confident choosing between them. (13)	○	○	○	○	○	○	○
I know where to find the ingredients I need to prepare beef dishes. (14)	○	○	○	○	○	○	○
I find cooking beef-based meals a very fulfilling activity. (15)	○	○	○	○	○	○	○
For me, cooking beef dishes is just something to get through as quickly as possible. (16)	○	○	○	○	○	○	○
Compared to other activities, cooking beef-based meals brings me little enjoyment. (17)	○	○	○	○	○	○	○
If I try making a new beef dish and it does not come out right, I usually do not try to make it again. (18)	○	○	○	○	○	○	○
I think a lot about cooking or eating beef. (19)	○	○	○	○	○	○	○
I prefer to spend my time on things other than cooking beef-based meals. (20)	○	○	○	○	○	○	○
If everything else is equal, I prefer to cook beef dishes rather than have them prepared by someone else. (21)	○	○	○	○	○	○	○
I feel like cooking beef dishes is a waste of time and effort. (22)	○	○	○	○	○	○	○

I enjoy cooking beef dishes for other people, like my family or friends. (23)	○	○	○	○	○	○	○
I feel burdened by having to cook beef dishes for other people, like my family or friends. (24)	○	○	○	○	○	○	○
I wish that I had more time to plan meals made with beef. (25)	○	○	○	○	○	○	○
I have a hard time finding enough time to prepare beef dishes I would like to eat. (26)	○	○	○	○	○	○	○
My family responsibilities prevent me from having the time to cook beef dishes. (27)	○	○	○	○	○	○	○
My social responsibilities prevent me from having the time to cook beef dishes. (28)	○	○	○	○	○	○	○
My job responsibilities prevent me from having the time to cook beef dishes. (29)	○	○	○	○	○	○	○

Page Break

Q4.4 In the next session, you will be presented with situations including eating at restaurants or purchasing ingredients from shops for home cooking. Please read the questions carefully and respond to all of them.

End of Block: CAFPAS-Beef

Start of Block: Scenario-Beef-Restaurant

Q5.1 **Eating at a chain restaurant** (moderately-priced menus, in a casual atmosphere)

Imagine you are eating in an affordable restaurant from a well-known chain on the high street for a normal meal which you are paying for. You ordered a meal that includes a beef steak. After a few nibbles, you are disappointed because the beef steak is chewy and flavourless.

Q5.2 To what extent do you believe each of the following factors contributed to the problem with your food (1 being extremely unlikely and 7 being extremely likely)?

	Extremely unlikely (1)	Moderately unlikely (2)	Slightly unlikely (3)	Neither likely nor unlikely (4)	Slightly likely (5)	Moderately likely (6)	Extremely likely (7)
The restaurant used poor quality ingredients. (1)	○	○	○	○	○	○	○
The chef did not cook the food properly. (2)	○	○	○	○	○	○	○
The server did not handle the food correctly. (3)	○	○	○	○	○	○	○
I should have chosen a different restaurant. (4)	○	○	○	○	○	○	○
I should have ordered a different dish. (5)	○	○	○	○	○	○	○

Q5.3 How likely are you to take each of the following actions (1 being extremely unlikely and 7 being extremely likely)?

	Extremely unlikely (1)	Moderately unlikely (2)	Slightly unlikely (3)	Neither likely nor unlikely (4)	Slightly likely (5)	Moderately likely (6)	Extremely likely (7)
Tell the server about the experience as soon as you have a chance. (1)	○	○	○	○	○	○	○
Tell the server about the experience, but only if you are asked about the meal. (2)	○	○	○	○	○	○	○
Write a negative review on social media. (3)	○	○	○	○	○	○	○
Write a negative review on a website for restaurant reviewing (e.g., Trip Advisor). (4)	○	○	○	○	○	○	○
Tell your friends about the experience after you have left. (5)	○	○	○	○	○	○	○
Avoid visiting this restaurant for a while. (6)	○	○	○	○	○	○	○
Do nothing. (7)	○	○	○	○	○	○	○

Q5.4 Eating at a fine restaurant (high-priced menus, with a formal atmosphere)
Imagine you are eating in an expensive restaurant known for its fine dining which you are paying for. You ordered a meal that includes a beef steak, which is cooked by a well-known chef. After a few nibbles, you are disappointed because the beef steak is chewy and flavourless.

Q5.5 To what extent do you believe each of the following factors contributed to the problem with your food (1 being extremely unlikely and 7 being extremely likely)?

	Extremely unlikely (1)	Moderately unlikely (2)	Slightly unlikely (3)	Neither likely nor unlikely (4)	Slightly likely (5)	Moderately likely (6)	Extremely likely (7)
The restaurant used poor quality ingredients. (1)	○	○	○	○	○	○	○
The chef did not cook the food properly. (2)	○	○	○	○	○	○	○
The server did not handle the food correctly. (3)	○	○	○	○	○	○	○
I should have chosen a different restaurant. (4)	○	○	○	○	○	○	○
I should have ordered a different dish. (5)	○	○	○	○	○	○	○

Q5.6 How likely are you to take each of the following actions (1 being extremely unlikely and 7 being extremely likely) ?

	Extremely unlikely (1)	Moderately unlikely (2)	Slightly unlikely (3)	Neither likely nor unlikely (4)	Slightly likely (5)	Moderately likely (6)	Extremely likely (7)
Tell the server about the experience as soon as you have a chance. (1)	○	○	○	○	○	○	○
Tell the server about the experience, but only if you are asked about the meal. (2)	○	○	○	○	○	○	○
Write a negative review on social media. (3)	○	○	○	○	○	○	○
Write a negative review on a website for restaurant reviewing (e.g., Trip Advisor). (4)	○	○	○	○	○	○	○
Tell your friends about the experience after you have left. (5)	○	○	○	○	○	○	○
Avoid visiting this restaurant for a while. (6)	○	○	○	○	○	○	○
Do nothing. (7)	○	○	○	○	○	○	○

End of Block: Scenario-Beef-Restaurant

Start of Block: Scenario-Beef-Home

Q6.1 **Eating from home - regular meal**

Imagine you are going to prepare a regular weekly meal. For this reason, you purchased a cheap beef steak from your local supermarket. You are disappointed with the dinner you have cooked from scratch, because the beef steak is chewy and flavourless.

Q6.2 To what extent do you believe each of the following factors contributed to the problem with your food (1 being extremely unlikely and 7 being extremely likely)?

	Extremely unlikely (18)	Moderately unlikely (19)	Slightly unlikely (20)	Neither likely nor unlikely (21)	Slightly likely (22)	Moderately likely (23)	Extremely likely (24)
The shop was stocked with low-quality items. (7)	○	○	○	○	○	○	○
This ingredient I purchased was low quality. (8)	○	○	○	○	○	○	○
I did not cook the product properly. (9)	○	○	○	○	○	○	○
I should have chosen a different shop. (10)	○	○	○	○	○	○	○
I should have chosen a different product. (11)	○	○	○	○	○	○	○

Q6.3 How likely are you to take each of the following actions (1 being extremely unlikely and 7 being extremely likely)?

	Extremely unlikely (18)	Moderately unlikely (19)	Slightly unlikely (20)	Neither likely nor unlikely (21)	Slightly likely (22)	Moderately likely (23)	Extremely likely (24)
Go back to the shop straight after meal and tell customer services about your experience. (1)	○	○	○	○	○	○	○
Tell customer services about your experience when you visit the shop next time. (2)	○	○	○	○	○	○	○
Write a negative review on social media. (3)	○	○	○	○	○	○	○
Write a negative review under the product review on the shop's website. (4)	○	○	○	○	○	○	○
Tell your friends about the experience. (5)	○	○	○	○	○	○	○
Avoid buying this product from this shop for a while. (6)	○	○	○	○	○	○	○
Do nothing. (7)	○	○	○	○	○	○	○

Q6.4
Eating from home - special occasion

Imagine you are going to prepare a meal for a special occasion. For this reason, you purchased an expensive beef steak from your local butcher. You are disappointed with the dinner you cooked from scratch, because the beef steak is chewy and flavourless.

Q6.5 To what extent do you believe each of the following factors contributed to the problem with your food (1 being extremely unlikely and 7 being extremely likely)?

	Extremely unlikely (18)	Moderately unlikely (19)	Slightly unlikely (20)	Neither likely nor unlikely (21)	Slightly likely (22)	Moderately likely (23)	Extremely likely (24)
The shop was stocked with low-quality items. (1)	○	○	○	○	○	○	○
This ingredient I purchased was low quality. (2)	○	○	○	○	○	○	○
I did not cook the product properly. (3)	○	○	○	○	○	○	○
I should have chosen a different shop. (4)	○	○	○	○	○	○	○
I should have chosen a different product. (5)	○	○	○	○	○	○	○

Q6.6 How likely are you to take each of the following actions (1 being extremely unlikely and 7 being extremely likely)?

	Extremely unlikely (16)	Moderately unlikely (17)	Slightly unlikely (18)	Neither likely nor unlikely (19)	Slightly likely (20)	Moderately likely (21)	Extremely likely (22)
Go back to the shop straight after meal and tell customer services about your experience. (1)	○	○	○	○	○	○	○
Tell customer services about your experience when you visit the shop next time. (2)	○	○	○	○	○	○	○
Write a negative review on social media. (3)	○	○	○	○	○	○	○
Write a negative review under the product review on the shop's website. (4)	○	○	○	○	○	○	○
Tell your friends about the experience. (5)	○	○	○	○	○	○	○
Avoid buying this product from this shop for a while. (6)	○	○	○	○	○	○	○
Do nothing. (7)	○	○	○	○	○	○	○

End of Block: Scenario-Beef-Home

Start of Block: Motives-Beef

Q7.1 Consider the reason why you eat beef and rate the following descriptions.
I eat beef…

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
because it is healthy (1)	○	○	○	○	○	○	○
because it is a way of monitoring my mood (e.g., a good feeling or coping with stress) (2)	○	○	○	○	○	○	○
because it is convenient (to buy and prepare) (3)	○	○	○	○	○	○	○
because it tastes good (4)	○	○	○	○	○	○	○
because it is natural (5)	○	○	○	○	○	○	○
because it is affordable (6)	○	○	○	○	○	○	○
because it helps me control my weight (7)	○	○	○	○	○	○	○
because it is familiar (8)	○	○	○	○	○	○	○
because it is good for the environment (9)	○	○	○	○	○	○	○
to avoid disappointing someone who is trying to make me happy (10)	○	○	○	○	○	○	○
because I am supposed to eat it (11)	○	○	○	○	○	○	○

because everyone else eat it (12)	○	○	○	○	○	○	○
because it makes me look good in front of others (13)	○	○	○	○	○	○	○

End of Block: Motives-Beef

Start of Block: Consumption

Q28.1
In this session, we would like to know about your diet and the foods you cook at home. Please read each of the questions carefully before answering.

Q28.2 Please select **ALL** of the foods you have eaten during the past year.

- [ ] Beef (1)
- [ ] Chicken (7)
- [ ] Pork (2)
- [ ] Lamb (3)
- [ ] Fish (5)
- [ ] Other seafood (e.g., shellfish) (16)
- [ ] Eggs (9)
- [ ] Dairy Products (10)
- [ ] Soy and soy products (e.g., tofu, tempeh) (11)

- [ ] Other plant protein (e.g., pulses) (12)
- [ ] Meat-like plant-based RAW products (e.g., steaks, meat free minces, burgers patties) (13)
- [ ] Meat-like plant-based READY-TO-EAT products (e.g., sausages, ready meal, pie & pasties) (14)
- [ ] Other protein rich foods (please state) (15) _____

Page Break

Q28.3 For the next two questions, the products (fresh or frozen) you should consider when asked about a category are as follows:

1) **Meat alternatives:** plant-based protein foods. Any source of protein that are not obtained from animals, in a format that needs cooking. For example: dried or canned beans and pulses (e.g., peas, broad beans, chickpeas, butter beans, borlotti beans, kidney beans) soy and soy products (e.g., tofu, tempeh) frozen and refrigerated meatless products, such as plant-based steaks, minces, burger patties (e.g., Quorn or Linda McCartney's, or equivalent products from supermarket brands) other plant-based food that is high in protein
2) **Beef**: any raw beef products that needs cooking. For example: roasting joints, steaks, diced beef burgers, mince
3) **Lamb**: any raw lamb products that need cooking. For example: roasting joints (legs and shoulders), steaks, chops, diced lamb burgers, mince
4) **Pork**: any raw pork products that need cooking. For example: roasting joints, steaks, ribs, chops, fillet, diced pork mince, sausages, bacon
5) **Chicken**: any raw chicken products that need cooking. For example: whole chickens part chicken (thighs, drumsticks, wings, breast)
6) **Fish and Seafood**: any raw fish and seafood products that need cooking. For example: whole or fillet of sea fish (salmon, cod, mackerel, haddock, tuna, sea bream, sea bass) shellfish (crab, lobster, prawns, oyster, mussels) squid, octopus

Q28.4 How often do you eat the following foods? Please indicate an average figure.

	Never (1)	Less than once a month (2)	1-3 times a month (3)	1-2 times a week (4)	3-4 times a week (5)	5-6 times a week (6)	More than 6 times a week (7)
Meat Alternatives (6)	○	○	○	○	○	○	○
Beef (1)	○	○	○	○	○	○	○
Lamb (3)	○	○	○	○	○	○	○
Pork (2)	○	○	○	○	○	○	○
Chicken (4)	○	○	○	○	○	○	○
Fish and Seafood (5)	○	○	○	○	○	○	○

Q28.5 How much do you like eating the following foods?

	Dislike extremely (1)	Dislike very much (2)	Dislike moderately (3)	Neither like nor dislike (4)	Like moderately (5)	Like very much (6)	Like extremely (7)
Meat Alternatives (6)	○	○	○	○	○	○	○
Beef (1)	○	○	○	○	○	○	○
Lamb (3)	○	○	○	○	○	○	○
Pork (2)	○	○	○	○	○	○	○
Chicken (4)	○	○	○	○	○	○	○
Fish and Seafood (5)	○	○	○	○	○	○	○